

LAPAI JOURNAL OF ECONOMICS (LJE)

Volume 5 Number 1

June 2021



A Publication of the Department of Economics, Ibrahim Badamasi
Babangida University, Lapai, Niger State, Nigeria

LAPAI JOURNAL OF ECONOMICS (LJE)

Volume 5 Number 1

June, 2021

Print ISSN: 2659-028X

Online ISSN: 2659-0271



https://journals.ibbu.edu.ng/j_economics.php

Call: or Whatsapp: +2348032786701

e-mail: lje@ibbu.edu.ng and lje.ibbul@gmail.com

A Publication of the Department of Economics, Ibrahim Badamasi
Babangida University, Lapai, Niger State, Nigeria

Printed by:

MR SHI2 GRAPHICS PRINTS

Ajib Pharmacy Junction, Minna – Niger State

07065915523

Editorial Board

Prof. Bilyaminu I. Kadandani

Department of Economics
IBB University Lapai

Editor in Chief

Dr M. S. Ewugi

Department of Economics
IBB University Lapai

Associate Editor

Prof. Gobna O. Wafure

Department of Economics
University of Abuja

Member

Prof. Eniola O. Olorunsanya

Department of Agricultural Economics
IBB University Lapai

Member

Dr J. Obilikwu

Department of Economics
IBB University Lapai

Member

Dr Alfa A. B.

Department of Economics
IBB University Lapai

Business Editor

Editorial Advisory Board

Prof. M. S. Badayi

Department of Economics
Bayero University Kano.

Prof. Dr Mohd Zaini bn Abdel Karim

Othman Yeop Abdallah Graduate School of Business
Universiti Utara Malaysia

Prof. Christain E. Onwuka

Department of Economics
Ambrose Ali University, Ekpoma

Prof. Tukur Garba

Department of Economics
Usmanu Danfodiyo University Sokoto

Prof. Anthony Akamobi

Department of Economics
Chukwuemeka Odumegwu Ojukwu University, Anambra

Prof. Mohammed Yelwa

Department of Economics
University of Abuja

Dr Abu Nurudeen

Department of Economics
Umaru Musa Yar'adua University, Katsina

About the Journal

The Lapai Journal of Economics (LJE) is a blind peer reviewed academic journal, published by the Department of Economics, Ibrahim Badamasi Babangida University Lapai, P. M. B. 11, Niger State, Nigeria. The Journal covers areas such as Macroeconomics, Microeconomics, Development Economics, Agricultural Economics, Welfare Economics, Finance, International Economics, Health Economics, Environmental Economics, Political Science, Banking, Accounting, Public Administration, Economics of Happiness, Social Economics, Education Economics, Managerial Economics, Rural Development, Entrepreneur Development, Sociology, Psychology, Corporate Finance and Governance, Risk Management, Economic History, Human Resource, Women Studies, and all related Social Science courses.

Authors Guideline

- i. Manuscript must be written in English and must be clear and concise.
- ii. The manuscript should be in Time New Romans and 12 font size of single line spacing not exceeding 8000 words.
- iii. Abstract should not exceed 200 words with a maximum of 5 key words and appropriate journal classification index.
- iv. The entire manuscript should not exceed 8000 words and 10 pages including Tables and diagrams. Any extra page will attract additional charges of ₦2000
- v. Author should use APA reference style
- vi. Bank details: Account Name: Lapai Journal of Economics; Account Number: 2106634178; Bank Name: United Bank for Africa (UBA).

Submission and Processing Steps

1. Article should be submitted to the following email address lje@ibbu.edu.ng and copied lje.ibbul@gmail.com
2. The article will be considered for review by the committee within 15 working days, after the committee has verified the author(s) authenticity through plagiarism checker.
3. Any author whose article is accepted for review will pay ₦6000 for Review fee.
4. The article is subject to reviewer and editor decision.
5. The review process will take a minimum of six (6) weeks.
6. Upon acceptance of manuscript, corresponding author is to submit the following:
 - a. Evidence of correction to be highlighted in green colour
 - b. Evidence of Payment (Authors in Nigeria will pay ₦15,000 and outside Nigeria Authors will pay \$100; International Authors will be communicated on the payment mode through the corresponding Author by the Editor).
 - c. A copyright form will be sent to the corresponding Author for attestation

For information, call or WhatsApp LJE direct line: +2348032786701

Further inquiry: Ewugi - +2347062824011; Alfa - +2348036901810

Content

Operational Risk and Performance of Listed Deposit Money Banks in Nigeria: The Moderating Effect of Bank Size <i>Mohammed Babakatun Abubakar, Peter Agbo Amuche & Yabagi Ibrahim Mohammed</i>	1
Innovative Finance and Economic Development in Africa; what are the constraints, policy options and opportunities? <i>Anthony Ilegbinosa Imoisi</i>	12
Do we have Governance in Rural Commodity Value Chains? Evidences from Niger State, Nigeria <i>Sidikat Shitu</i>	23
Bank Credit and Manufacturing Sector Output in Nigeria: A Nonlinear Approach <i>Ashiru Ibrahim, Lukman Abdulrahman, Anas Bafeto Abubakar</i>	32
External Debt Overhang and Crowding Out Effect on Investment in Nigeria Economy <i>Wilson Ebhotemhen & Olawale Hezekiah</i>	46
Effect of Credit Risk on the Performance of Listed Deposit Money Banks in Nigeria <i>Ado Kofar Mata Bala , Muhammad Yadudu & Mohammed Babakatun Abubakar</i>	61
Analysis of the Nexus between Natural Gas Consumption and Economic Growth in Nigeria (1981-2019) <i>Sabiu Bariki Sani & Yusuf Babatunde Lateef</i>	80
Impact of Capital Structure and Financial Performance of Real Estates Companies in Nigeria <i>Salma Muhammad & Adamu Garba Zango</i>	96
Board Attributes and Financial Performance of Listed Oil and Gas Companies in Nigeria <i>Ali Mahmoud Ali & Ibrahim Yakasai Aminu</i>	108
Dynamic Economic Models: The Derivational Steps of Time Path with Numerical Example <i>Muktar Bala</i>	123

- The Nexus between Taxation, Government Expenditure and Economic Growth in Nigeria (1981 to 2016) 133
Walid Gbadebo Adebosin , Anu Keshinro Toriola , Lateef Abiodun Salami, Veronica Titilayo Akingbade & Felix O. Ajayi
- The Role of Port Infrastructural Quality on GDP Per Capital in West African Countries: A Static Model Approach 144
Yusuf Ndagi Baba
- An Assessment of the Patterns and Determinants of Public Expenditures and Revenues in Nasarawa State of Nigeria: 1997-2004 152
Ahmed Baba El-Yaqub

Operational Risk and Performance of Listed Deposit Money Banks in Nigeria: The Moderating Effect of Bank Size

Mohammed Babakatun Abubakar¹, Peter Agbo Amuche¹ & Yabagi Ibrahim
Mohammed²

¹Department of Business Administration, Kaduna Polytechnic, Kaduna, Nigeria

²Department of Accountancy, Federal Polytechnic, Bida, Nigeria

Correspondence Email: mba4949@gmail.com

Abstract

Deposit money banks performance has become a major concern for economists and policy makers because of their role in financing economic activities and their poor financial performance that can lead to failure and financial crunch which have undesirable impacts on the economic growth. The study examined the moderating effect of bank size on the relationship between operational risk and performance of listed deposit money banks (DMBs) in Nigeria. Data were collected from audited financial reports of selected thirteen (13) listed DMBs in Nigeria over the period of 2014 to 2020. Panel data approach was employed and fixed effects estimate was used for hypothesis testing after the Hausman test was run. The variables used are Banks performance measured by net interest margin, operational risk proxied by cost to income ratio, with Bank size as moderator. The study found that cost income ratio has significant negative effect on profitability of listed DMBs in Nigeria measured by net interest margin at 1% level of significance. However, the study recommends that DMBs should estimate the probability of an operational loss event occurring and the possible effect on bank financial performance on a quarterly basis, as well as implement appropriate internal reporting practices and procedures that are aligned with the scope of operational risk identified by supervisors and the banking industry as a whole.

Keywords: Bank Size, Moderator, Operational Risk

JEL Classification: D81, E51, G21

1. Introduction

The performance of deposit money banks according to Arif, Khan and Iqbal (2013), has become a major concern for economists and policymakers because of their role in financing economic activities. DMBs are the primary source of debt financing for both commercial and non-commercial enterprises. As a result, the stability of the banking industry is important to the financial system because it plays an important role in the operation of an economy. Furthermore, poor financial performance of deposit money banks can lead to failure and financial crunch, both

of which have negative effects on economic growth (Ongore & Kusa, 2013). However, in the aftermath of the failures of some large corporations, such as Enron and WorldCom, as well as the 2008 financial crisis, there has been an increase in research as to the root cause of these loss events and surprisingly, many studies have linked these failures to ineffective operational risk management (Chernobai, Jorion, & Yu, 2011). According to Chernobai, Jorion, and Yu (2011); several high-profile losses have been linked to operational risk, for example, Societe Generale, one of Europe's leading financial services groups and a major player in the economy for over 150 years lost \$7.2 billion in 2008 largely due to lack of internal controls and unmanaged operational risks.

Despite the Central Bank of Nigeria's 2010 crackdown on fraudulent bank executives, cases of fraud are on the rise in the Nigerian banking sector (CBN, 2010). Evidence shows that between 2014 and 2017, the industry lost N12.30 billion in more than 41,461 fraud cases (Okogba, 2018), in 2014, there were 1,461 fraud cases, 10,743 in 2015, 19,531 in 2016, and 25,043 in 2017. For fraud cases related to mobile and payment, the industry lost N6.22 billion in 2014 on an attempted fraud value of N7.76 billion, while N2.26 billion in 2015 on an attempted fraud value of N4.37 billion, and N2.19 billion in 2016 on an attempted fraud value of N4.37 billion (Okogba, 2018). According to reports on fraud cases, there was a 28% increase in 2017 compared to 2016, but with less financial loss. However, Automated Teller Machine (ATM) fraud was the most prevalent in 2017, accounting for a total loss of N497.64 million and a fraud volume of 9,823 (Okogba, 2018). Furthermore, CBN (2018) reported that, cases of bank fraud and forgery increased to 25,029 at the end of December 2018 from 20,774 at the end of June 2018, with the total amount involved falling to N18.94 billion from N19.77 billion in the same period. The Central Bank of Nigeria sanctioned four Nigerian DMBs (Standard Chartered, Stanbic IBTC, Citibank, and Diamond) between 2007 and 2015 for various forgeries in foreign exchange transactions. They are to refund N5.87 billion to the central bank as a result of these violations (Nelson, 2018). According to Nelson (2018), the investigations specifically revealed that Standard Chartered Bank repatriated \$3.45 billion on the basis of illegally issued Certificates of Capital Importation (CCIs). Between 2007 and 2015, Stanbic IBTC Nigeria, Citibank Nigeria, and Diamond Bank Plc repatriated \$2.63 billion, \$1.76 billion, and \$348.9 million respectively. According to Adesoji (2019), the Nigerian banking industry lost N15.15 billion in 2018 due to cybercrime and forgeries. This was 539% more than the N2.37 billion recorded in 2017.

A thorough review of the literature reveals that, there is empirical studies dearth on the effect of operational risk on the financial performance of DMBs in Nigeria, and the few studies that have been conducted have produced inconsistent results. For example, studies by Fadun and Oye (2020), Olalere, Aminul, Yusoff, and Shamsuddin (2018), Ng'aari (2016), Epetimehim and Obafemi (2015), Siminyu, Clive, and Musiega (2016) found that operational risk had a significant positive effect on bank performance, whereas studies by Muriithi and Waweru (2017), Muriithi and Muigai (2017), Meshack and Mwaura (2016), Muriithi (2016) showed significant negative effect of operational risk on banks performance.

Because of these inconsistencies in the findings, it is necessary to include a moderator in the current study as opined by Baron and Kenny (1986). Moderator is a “variable that affects the direction and/or strength of the relationship between an independent or predictor variable and a dependent or criterion variable (Baron & Kenny, 1986). Consequently, bank size is the moderating variable. The natural logarithm of the firm's total assets is used as measure for bank size (Skopljak & Luo, 2012).

The theory that underpins this study is extreme value theory. Leonard Tippet proposed extreme value theory in 1950 and it models and measures occurrences with extremely low probability. This theory broadens the understanding of operational risk management by indicating that risk securitization and alternative risk transfer emphasize the convergence of finance at the product level. Several researches have employed this theory, including Makokha, Namusonge, and Sakwa (2016) and Kamau and Njeru (2016), whose studies investigated the influence of operational risk on financial performance. Extreme value theory, however, aids in estimating the minimum and maximum capital that could be set aside to cover market risk.

2. Literature Review

Concept of Operational Risk

According to Goodhart (2001), operational risk is the risk associated with carrying out a company's business functions. It is a broad concept that focuses on the risks posed by the people, systems, and processes that a company employs. Other categories include fraud risks, legal risks, and physical or environmental risks. Cristina, Cornelia, and Nicoleta (2008) define operational risk as the risk of direct income loss caused by internal events such as insufficient personal, significant errors, or illegal behavior as a result of errors or inadequate systems and processes, or external events where the risks are not covered by credit, market, or interest rate risk. The most significant risk that organizations face is operational risk. Many financial institutions have spent tens of millions of dollars in an attempt to develop a solid framework for measuring and managing operational risk (Hoffman, 2002). Despite this significant investment, developing a viable operational risk management program remains an elusive goal for many businesses.

Empirical Review

Fadun and Oye (2020) use secondary data extracted from audited financial statements of selected commercial banks in Nigeria to examine the impact of operational risk management practices on the financial performance of commercial banks in Nigeria from 2008 to 2017. The Linear Multiple Regression Model was used to analyze the data, and the results revealed that there is a positive relationship between operational risk management and bank financial performance. Simamora and Oswari (2019) examined the effects of credit risk, operational risk and liquidity risk on the financial performance of banks listed in Indonesian stock exchange using secondary data extracted from the financial reports of five (5) sampled banks out of the 43 licensed banks in Ethiopia from 2009-2017. The independent variables were credit risk (measured by non-performing loan ratio), liquidity risk

(measured by loan to deposit ratio) and operational risk (measured by operational cost to operational income). Financial performance is the dependent variable and was measured by ROA. The data was analysed using the multiple linear regression model and the result showed that operational risk and liquidity risk had significant negative effect on financial performance. Credit risk had non-significant effect on financial performance.

Olalere, Aminul, Yusoff, and Shamsuddin (2018) explored operational risk in Nigeria banking industry for the period of 2009 to 2015, the study employed a panel data approach for the analytical model to run Hausman test for random or fixed effect choice and hypothesis testing. The banks performance was proxied by net interest margin while operational risk is proxy by cost to income and total operating expenses to total assets ratio. Bank size and GDP growth were used as control variables. Based on the random effect analysis in the model, bank efficiency ratio (ER) had a negative significant effect on firm performance, suggesting that, the lower the cost to income ratio, the better the bank performance in terms of Net Interest Margin. Operating expenses ratio has a positive significant effect on firm performance. The bank size is not an important determinant of bank performance in Nigeria, as compared to operational risk while GDP plays an important role in performance of commercial banks during the period of study. Therefore, this study has been taken over by time since the scope of the study is 2009 to 2015.

Muriithi and Waweru (2017) explored the effect of operational risk on financial performance of commercial banks in Kenya. The study used ordered logistic model and findings reveal that there exists an inverse relationship between operational risk and financial performance. The study also finds that bank size moderates the effect of internal and external fraud on financial performance of commercial banks in Kenya by shrinking it. Bank size moderates the effect execution, delivery and process management on financial performance of commercial banks in Kenya by enhancing it. Muriithi and Muigai (2017) analyzed the effect of operational risk on profitability of commercial banks in Kenya for the period of 2005 and 2014 using 43 registered commercial banks in Kenya. Panel data techniques of random effects estimation and generalized method of moments (GMM) were used and the findings indicate that cost income is negatively associated with bank profitability both in long run and in short run. Siminyu, Clive and Musiega (2016) examined the influence of operational risk on the financial performance of deposit on savings and credit cooperatives in Kakamega County, using a descriptive survey design, the study use a sample size of 56 respondents and a semi-structured questionnaire was used to collect the data. The study used descriptive statistics and finding revealed that there was a significant positive linear relationship between financial systems and financial performance of SACCOs in Kakamega County.

Meshack and Mwaura (2016) examined the effect of operational risk management practices on the financial performance in commercial banks in Tanzania using a sample size of 34 commercial banks in Tanzania The study used descriptive research design. Questionnaires were the primary data collection tool in their study. The data gathered from the respondents was analyzed and presented using descriptive statistics and the findings revealed that, the three independent variables

in the study credit risk, Insolvency risk and Operational efficiency influenced the financial performance of banks for the period of study. Muriithi (2016) investigated the effect of market risk, credit risk, liquidity risk and operational risk on financial performance of commercial banks in Kenya using secondary data for the period of 2005 to 2014 which were extracted from the audited annual reports of forty three (43) listed commercial banks in Kenya. However, the study concludes that liquidity risk, market risk, operational risk and credit risk have significant negative impact on the financial performance of commercial banks in Kenyan and operational risk was stressed to have the greatest impact on banks performance.

Ng'aari (2016) examined the effect of risk management practices on profitability of listed commercial banks in Kenya for the periods 2002-2015 using secondary data collected from the audited financial statement of the banks. Panel regression analysis was employed to analyze the data and the result showed that operational risk management, liquidity risk management and credit risk management have significant positive effect on banks' profitability. Epetimehim and Obafemi (2015) examined operational risk management and the financial sector development using a sample of 150 employees from different financial institutions, such as banks, insurance, stockbrokers, microfinance companies etc. Analysis of Variance was used in testing the hypothesis and the result showed that operational risk management has positive effects on the financial development and growth in the financial sector.

3. Methodology

The study used ex-post facto design and a census sample to generate a sufficient number of observations to facilitate data analysis. The study extracts panel data from the financial statements of 13 listed DMBs in Nigeria that have the required data for the period 2014–2020. The study's variables include a dependent variable, financial performance measured by net interest margin. NIM is used as a measure of bank performance because most empirical studies in the area of financial risk focus on ROA and ROE as performance measures. The study however justifies the use of net interest margin as it measures the difference between interest income generated by banks and interest paid out to their lenders in relation to the amount of interest earning assets (Owoputi, Kayode, & Adeyefa, 2014; Dumitic & Ridzak, 2013; Ongore & Kusa, 2013). However, it is calculated by dividing net interest income by the average interest earning assets. The independent variable is operational risk measured by cost income ratio. The cost-to-income ratio is also referred to as the Efficiency Ratio or the Expense-to-Income Ratio. Profits increase if costs are reduced for a given level of income, and vice versa. When profits rise, so does the return on investment, which is very important to bank owners. However, variability in deposit money banks' cost-to-income ratio may be a better measure of volatility in their cost performance. The cost to income ratio is the ratio of the bank's non-interest (operating) cost minus bad and doubtful debt to its net interest income plus non-interest income. The inclusion of the net interest income term in the denominator reduces the volatility that could result from changes in the overall level of interest rates (Correa & Raju, 2008). Bank size (BSIZE) is the

moderating variable and is measured by the natural logarithm of total assets of the banks (Skopljak & Luo, 2012).

However, the study runs a normality test on the dataset to see how it behaves. Relevant diagnostic and robustness tests, such as the Multicollinearity Test, Model Specification Test, Heteroskedasticity Test, and Hausman Specification Test, were performed to determine the best model for analysis and to determine whether or not the estimated models meet the conditions for acceptance. In order to examine the moderating effect of bank size on the relationship between operational risk and the performance of listed DMBs in Nigeria, the following model is specified: The original regression model is specified as follows:

$$Y_{it} = \alpha + \alpha_1 X_{it} + \alpha_2 Z_{it} + \alpha_3 X_{it} * Z_{it} + \epsilon_{it} \dots\dots\dots 1$$

Where the dependent variable is denoted by Y_{it} of bank i at time t , α is the constant, the coefficients of the independent variable and the moderating variables are denoted by α_1 and α_2 for bank i at time t while α_3 is the coefficient of the interaction effect between X and Z which measures the moderation effect and ϵ_{it} is the disturbance or error term. Based on the above, the model can be decomposed as follows:

$$NIM_{it} = \beta + \beta_1 CIR_{1it} + \beta_2 BSIZE_{2it} + \beta_3 CIR_{it} * BSIZE_{it} + \epsilon_{it} \dots\dots\dots 2$$

Where: NIM = Net Interest Margin measuring performance, CIR = Cost Income Ratio proxy for operational risk, BSIZE = Bank Size which is moderating variable proxy by natural log of total asset, CIR*BFSIZE= interaction effect between CIR and BFSIZE which measures the moderation effect, and ϵ_{it} = is the disturbance or error term.

4. Results

Table 1: Summary of Descriptive Statistics

VARIABLE	OBS.	MEAN	STD. DEV.	MIN.	MAX.
NIM	91	6.856923	1.588726	1.025	8.767
CIR	91	2.65478	.1676022	2.246	2.992
BSIZE	91	7.70511	1.629121	2.008	9.599
CIR*BSIZE	91	1.875604	.2365943	1.015	3.044

*Note: NIM= net interest margin, CIR= cost income ratio, BFSIZE= bank size, CIR*BSIZE= interaction term between CIR and BFSIZE.*

From Table 1 above, the descriptive statistics show mean values of 6.856, 2.654, 7.705 and 1.875 for NIM, CIR, BFSIZE and CIR*BFSIZE, while 1.025 and 8.767, 2.246 and 2.992, 2.008 and 9.599 and 1.015 and 3.044 are the corresponding minimum and maximum values for the variables. In most of the variables, the values show a wide range of dispersion. Similarly, the standard deviations of the variables differ significantly from the respective means of the data, indicating that the banks' responses to these phenomena vary widely.

Furthermore, the Shapiro Wilk test for data normality indicates that, none of the variables are normally distributed. When using financial data, it is nearly impossible to use normally distributed data because the distribution is

unsystematically distributed between and within banks (Wooldridge, 2013). Non-normality of data, however, has no effect on the validity of estimations with regression based on the Gauss-Markov Theorem (Shao, 2003). The link test was also used to perform the model specification test. The link test is based on the assumption that, if a regression is properly specified, the inclusion of an additional independent variable should not be significant, except by chance. The $\hat{\mu}$ value, which is the model's predicted value, is significant, as expected for the NIM (0.000) model. Similarly, the $\hat{\mu}^2$ value for the NIM (0.187) model is insignificant, indicating that the model is correctly specified. A Pearson correlation analysis was also performed on the variables to determine the degree of relationship between the dependent and independent variables. The correlation matrix is shown in Table 1 as follows:

Table 2: Pairwise correlation of component of Operational risk

	NIM	CIR	BSIZE	CIR*BSIZE
NIM	1.0000			
CIR	0.2806*	1.0000		
BSIZE	0.9189*	0.3496*	1.0000	
CIR*BSIZE	0.1607	0.1837	0.4271*	1.0000

*Note: * denotes 5% level of significance. NIM= net interest margin, CIR= cost income ratio, BSIZE= bank size, CIR*BSIZE= interaction term between CIR and BSIZE.*

A high level and strong form of relationship between dependent and individual independent variables is expected in correlation analysis, while a low level and weak form of relationship between and among independent variables is expected. However, according to the correlation matrix shown in Table 2, only CIR and BSIZE had a strong positive correlation with NIM, whereas, the interaction term between CIR and BSIZE had a weak positive correlation with NIM. The findings also revealed that CIR and BSIZE had a significant positive relationship, whereas the correlation between the interaction term CIR*BSIZE is weak but positive. According to the correlational matrix, there is no evidence of multicollinearity, as recommended by Gujarati (2004).

The pooled panel result was subjected to diagnostic tests for multicollinearity and heteroskedasticity. The variance inflation factor revealed a value of 1.24, which is less than 2, indicating that multicollinearity does not exist. To check for heteroskedasticity, the Breusch-Pagan/Cook-Weisberg test was used. The results show a chi2 value of 132.03, which is significant at 1%, indicating that the dataset violates the homoscedasticity assumption. Due to the violation of the homoscedasticity assumption in the pooled panel result as revealed by the Breusch-Pagan/Cook-Weisberg test that turns chi2 value of 132.03 which is significant at 1%, the study re-run a pooled panel regression using robust option as recommended by Gujarati and Porter (2009) to correct the problem of heteroskedasticity.

Both fixed effects (FE) and random effects (RE) tests were run using the Generalized Least Squares (GLS) method. The results revealed a significant difference between FE and RE, allowing the Hausman specification test to be used to determine which model was superior. The Hausman test resulted in a chi2

statistic of 18.70 and a p-value of 0.0003. According to the Hausman result, the FE model is preferable to the RE model to control for time-invariant unobserved characteristics across the DMBs listed. As a result, the fixed effect model was interpreted.

Table 3: Fixed Effect Estimates for moderating effect of Bank Size on Banks Performance

Model A NIM			
	Coef.	T-statistic	P-values
CIR	-.915	-2.48	0.016***
BSIZE	.897	7.94	0.000***
CIR*BSIZE	-2.041	-6.51	0.000***
CONS	6.198	4.85	0.000
R-Squared	Within	0.5382	
	Between	0.9685	
	Overall	0.8998	
Rho		.3775	
F-statistic		29.14***	

*Note: ***, **, * denotes 1%, 5%, and 10% level of significance. NIM= net interest margin, CIR= cost income ratio, BSIZE= bank size, CIR* BSIZE = interaction term between CIR and BSIZE.*

Table 3 shows that, the F-statistics returns values of 29.14 which is statistically significant at 1% level of significance. This confirms the overall significance of the model. It further supports the assumption of a significant linear relationship between the dependent variable NIM, and the independent variable. The interclass correlation (rho) is 37.8% implying that 37.8% of the variation in NIM is due to differences across the banks. The within and between R-squares are 53.8% and 96.9% respectively. Thus, 53.8% of variation in NIM is due to differences within individual listed DMBs while 96.9% of the variation is due to differences between the listed DMBs. The overall R-squares are 89.9% indicating that the variables considered in the models explain about 89.9% change in NIM, while about 10.1% change may be as a result of other variables not captured by the models.

From Table 3 above, the regression results showed that the CIR has negative coefficient of 0.915 with a p-value of 0.016 which is significant at 5% indicating significant negative effect of CIR on performance of listed DMBs in Nigeria. This implies that holding other factors constant, a 1% increase in CIR decreases the profitability of DMBs by 91.5%. This shows sufficient evidence to support the research finding at 1% level of significance. The finding is consistent with studies by by Muriithii (2016), Muriithi and Waweru (2017), Muriithi and Muigai (2017), Olalere, Aminul, Yusoff, and Shamsuddin (2018) whose study found a significant negative effect of CIR on banks profitability while it is inconsistent with studies of Epetimehim and Obafemi (2015), and Siminyu, Clive and Musiega (2016) who found a significant positive effect of CIR on banks profitability. From table 3, the result shows that Bank size has positive coefficient of 0.897 with a p-value of 0.000 which is significant at 1% level indicating that BSIZE had significant positive

effect on performance of listed DMBs in Nigeria. This implies that, holding other factors constant, a 1% increase in BSIZE increases the profitability of DMBs by 89.7%. Therefore, bank size has significant positive effect on performance of listed DMBs measured by NIM. However, the findings is in accordance with the theory and prior expectation that argued that, larger banks may incur lower cost for efficient information gathering, processing and analysing due to economies of scale. Therefore, larger banks were better placed than smaller banks in the country by harnessing economies of scale in transactions over the sampled period.

Also, the result from Table 3 shows that, the moderating effect of bank size on the relationship between operational risk and performance of listed DMBs in Nigeria had a negative coefficient of 2.041 with a p-value of 0.000 which is significant at 1% level indicating that, the interaction term between CIR and BSIZE has significant negative effect on performance of listed DMBs in Nigeria. However, the null hypothesis that there is no moderating effect of bank size on the relationship between operational risk and performance of listed DMBs in Nigeria was rejected at 1% level of significance.

5. Conclusion and Recommendations

Base on the empirical findings, the study concludes that, cost income ratio had significant negative effect on profitability of listed DMBs in Nigeria measured by NIM at 1% level of significance while bank size moderate the relationship between CIR and performance of listed DMBs in Nigeria. The effect is significant and negative. However, negative effect of operational risk on banks performance may be as a result of regulators inability to regularly review listed DMBs' vulnerability to operational risk and ineffective integration of operational risk management policy in their overall risk management framework. However, the study recommends that DMBs should on a quarterly basis estimate the likelihood of an operational loss event occurring and its potential impact on bank financial performance, as well as, put in place effective internal reporting practices and systems that are consistent with the scope of operational risk defined by supervisors and the banking industry as a whole.

References

- Adesoji, B. S. (2019). 'Banks lost N15billion to fraud, cyber-crime in 2018'. Retrieved on 5th May <https://nairametrics.com/2019/08/02/banks-lost-n15billion-to-fraud-cyber-crime-in-2018/>
- Arif, M., Khan, M. Z., & Iqbal, M. (2013). Impact of bank size on profitability: Evidence from Pakistan. *International Journal of Applied Research*, 2.
- Aruwa, S. A., & Musa, O. A. (2014). Risk components and the financial performance of deposit money in Nigeria. *International Journal of Social Sciences and Entrepreneurship*, 1 (11), 1-8.
- Central Bank of Nigeria (2018). Financial stability report.
- Chernobai, Jorion, & Yu (2011). The determinants of operational risk in U.S. Financial Institutions. *Journal of Financial and Quantitative Analysis*, 46 (6), 1683–1725.

- Cristina, B. T.; Cornelia, O. A.; Nicoleta, R. A. (2008). The necessity of operational risk management and quantification. *Economic Science Series*, 662-668.
- Dumicic, M., & Ridzak, T. (2013). Determinants of banks net interest margin in Central and Eastern Europe. *Financial Theory and Practice*, 37 (1), 1-30.
- Epetimehin, F.M. & Obafemi, F.(2015). Operational risk management and the financial sector development: An overview. *International Journal of Economics, commerce and Management*, 3(3), 1-11.
- Fadun, O. S. & Oye, D. (2020). Impacts of Operational Risk Management on Financial Performance: A Case of Commercial Banks in Nigeria. *International Journal of Finance & Banking Studies*, 9 (1), 22-35.
- Goodhart, C. (2001) 'Operational Risk', Special Paper 131, Financial Markets Group, London: London School of Economics.
- Gujarati, D.N. (2004). *Basic Econometrics*. McGraw Hill Companies.
- Hoffman, D. G. (2002). Managing operational risk. 20 firm wide best practice strategies.
- Jongh, R. D., & Vuuren, G. V. (2013). A review of operational risk in banks and its role in the financial crisis. *South African Journal of Economic and Management Sciences*, 16 (4), 364-382.
- Muriithi, G. J. & Muigai, G. R. (2017). Quantitative analysis of operational risk and profitability of Kenyan commercial banks using cost income ratio. *Journal of Economics and Finance*, 8 (3), 76-83.
- Muriithi, G. J. & Wuweru, M. K. (2017). Liquidity risk and financial performance of commercial banks in Kenya. *International Journal of Economics and Finance*; 9 (3), 256-265.
- Muriithi, J. G. (2016). *The effect of financial risk on financial performance of commercial banks in Kenya*. Kenya: Jomo Kenyatta University of Agriculture and Technology.
- Nelson, C. (2018). CBN uncovers serial fraud in four banks. Retrieved on 5th May from <https://guardian.ng/news/cbn-uncovers-serial-fraud-in-four-banks/>
- Ng'aari, E. W. (2016). Effect of risk management practices on profitability of listed commercial banks in Kenya. (Doctoral dissertation, KCA University).
- Okogba, E. (2018) Nigerian banks lose N12.30bn to fraud in 4 years. *Vanguard Nigeria*. Retrieved on 5th May from: <https://www.vanguardngr.com/2018/06/nigerian-banks-lose-n12-30bn-fraud-4-years-nibss/>.
- Olalere, O. E, Aminul, I., Yusoff, W. S., & Shamsuddin, Z. (2018). An Investigation into Operational Risk in Commercial Banks: Empirical Evidence from Nigeria. *International Journal of Accounting, Finance and Business (IJAFB)*, 3(12), 49 - 62.
- Ongore, V. O., & Kusa, G. B. (2013). Determinants of financial performance of commercial banks in Kenya. *International Journal of Economics and Financial Issues*, 3(1), 237- 252.

- Owoputi, J. A., Kayode, O. F., & Adeyefa, F. A. (2014). Bank specific, industry specific and macroeconomic determinants of banks profitability in Nigeria. *European Scientific Journal*, 10(25), 408-423.
- Pallant, J. (2007). *SPSS survival manual*. Australia, AU: McGraw Hill.
- Simamora, R. J., Oswari, T. (2019). The effects of credit risk, operational risk and liquidity risk on the financial performance of banks listed in Indonesian stock exchange. *International Journal of Economics, Commerce and Management*, 7(5), 182-193.
- Siminyu, M., Clive, M., & Musiega, M. (2017). Influence of operational risk on financial performance of deposit taking savings and credit co-operatives in Kakamega County. *International Journal of Management and Commerce Innovations*, 4(2), 509-518.

Innovative Finance and Economic Development in Africa; what are the constraints, policy options and opportunities?

Anthony Ilegbinosa Imoisi

Department of Economics, Faculty of Arts, Management and Social Sciences, Edo University, Uzairue, Edo State

Correspondence Email: mcanthonyby@yahoo.co.uk

Abstract

Innovative finance performs a vital function in the advancement of socioeconomic activities and this is renowned in development literature. This research investigates the influence innovative finance has on Africa's development with the focal point on potential sources of innovative finance, constraints of innovative finance, potentials for innovative financing and policy options. The Africa economy has been affected negatively due to the 2008 global economic and financial crisis, climate change and the current COVID 19 pandemic as numerous nations in the continent are experiencing reduced export earnings, insufficient growth rates, inadequate investment opportunities, dwindling remittances and decreasing inflow of foreign direct investment. Therefore, there is the need for African economies to source for sufficient internal and external financial resources to increase economic growth as well as realise their development goals, which includes the Millennium Development Goals and the Sustainable Development Goals. Certainly, innovative finance is significant to Africa's investment needs. Based on this, it was proposed that African leaders and governments ought to increase their potential sources of innovative finance, as well as endeavour to tackle the constraints that hinder innovative finance for development of the continent.

Keywords: Innovative Finance, Development, Investment, Africa, Financial Crisis

JEL Classification: F39, O19, O31

1. Introduction

The role finance plays in the growth and development of the African continent cannot be overemphasized. So too are the difficulties African nations encounter in mobilizing domestic and foreign financial resources to rapidly transform their economies, create adequate and sustained levels of economic process, generate additional jobs also as realize their development potentials. Certainly, mobilizing internal and external finance is vital to meet the investment requirements of Africa. For this reason, it is essential that African nations generate adequate financial resources to speed up and sustain economic growth as well as accomplish their developmental goals that have been extensively recognized in numerous spheres

(Mukeredzi, 2015). Nonetheless, over the years, the obtainable conventional finance sources, both local and foreign have shown to be insufficient in fulfilling these financial prerequisites. For instance, it is approximated that the African continent needs in excess US\$90 billion yearly to build up and develop its infrastructures as well as amenities, but has only succeeded in raising roughly half of it, and mostly from internal sources (World Bank, n.d.).

Presently, the COVID 19 pandemic has overturned previous improvements, as African economies are experiencing lower export earnings, inadequate growth rates, insufficient investment opportunities, dwindling remittances as well as decreasing inflow of foreign direct investment (United Nations Conference of Trade and Development, 2021). Furthermore, the 2008 global economic and financial crisis as well as climate change before now had and will keep on having stern economic impacts on African nations with wide-ranging effect on their development as well as increasing the level of poverty (Nnadozie 2011). Several studies believe that, African economies might find the cost of climate change expensive, since it might cost them roughly US\$ 20-30 billion per annum for over the next 10 to 20 years, which can lead to increased pressure on their development budgets (African Development Bank & African Development Fund, 2011).

Table 1: Tax Revenue for Sub Saharan Africa, Europe and Central Asia

Years	Sub Sahara Africa	Europe and Central Asia
2014	18.92	19.49
2015	18.65	19.26
2016	18.18	19.17
2017	18.94	19.34

Source: World Bank, n.d.

Five years after the adoption of the Addis Ababa Consensus by the Heads of State, Government and High Representatives at the International Conference on Financing for Development and five years after the 2015 MDGs target date, obtainable evidence shows that the majority of African economies cannot achieve their MDGs and SDGs if the present financing trends persists. Since 2015, realizing the goals set by the Addis Ababa Consensus on Development Financing has shown to be a difficult task. From the perspective of raising domestic public resources, tax revenue (% of GDP)s , broadening the tax base, strengthening tax administration, tax evasion, corruption and reducing illicit financial flows by 2030 remains below the Addis Ababa expectations. For instance, tax revenue (% of GDP) for Sub-Saharan African economies is lower than that of Europe and Central Asia (World Bank, n.d.). Also, the CPIA transparency, accountability and corruption in the public sector for Europe and Central Asia are better than what is obtainable in Sub Saharan Africa. This is illustrated in tables 1 and 2.

Despite this perturbing picture, major improvements have been accomplished in debt relief as well as access to global resources, though lot less in domestic public resource mobilization, aid and international trade. Mobilizing domestic public resources ought to be the key to unlock the challenge of development finance African economies encounter. Regrettably, as previously illustrated, the truth is that

there exists a momentous venture gap regardless of the laudable endeavours to mobilize investment finance across the African continent. Certainly, improvement of public resource mobilization locally has gotten the interest of African macroeconomic policymakers' way earlier than the Addis Ababa Consensus. The United Nations Economic Commission for Africa's Economic Report on Africa 2019 reveals that a well-organised domestic public resource mobilization can address a considerable part of this financing shortfall, assist to achieve and sustain high growth rates and creates prosperity for all. Additionally, it will give African nations better macroeconomic policy space as well as possession of their development agenda. This state of affairs requires novel and ground-breaking means of mobilizing additional finance that is capable of supplying African economies with resources that will enhance their growth potentials.

Table 2: CPIA Transparency, Accountability and Corruption in the Public Sector for Sub Saharan Africa, Europe and Central Asia

Years	Sub Sahara Africa	Europe and Central Asia
2014	2.73	2.70
2015	2.71	2.60
2016	2.68	2.60
2017	2.65	2.60
2018	2.71	2.60
2019	2.72	2.60

Source: World Bank, n.d.

Numerous studies on innovative finance have focused on what the concept is all about, why it is needed and its evolution. This study not only discusses all these but in addition, looked at the following issues that relate to innovative financing: the potential sources of innovative finance, constraints of innovative finance, the potentials for innovative financing as well as policy options. This study is significant to various governments in Africa, macroeconomic policy makers, various development institutions, academics and the general public.

2. Literature Review

Conceptualization

Innovative finance for development denotes different things to different people. Presently, innovative finance for development includes a lot of diverse initiatives. The Leading Group on Innovative Financing for Development (2012) sees innovative financing for development as financial solutions to development challenges that are not adequately dealt with by conventional aid flows. According to innovative financing consists of: 1) innovative sources which assist in generating modern budgetary streams for economic improvement that might emanate from different financial segments; 2) innovative machineries that assist in maximizing the effectiveness, effect as well as leverage of obtainable resources. Innovative financing is a used to explain financing methods dealing with development issues that are inadequately tackled by conventional aid flows and which might attempt to leverage extra financing and/or try to offer financing promptly, efficiently and with more dependable and greater influence (Gelil, 2018). According to Sandor (2011),

the Organisation for Economic Cooperation and Development (OECD) defines innovative financing for development as instruments for increasing funds or persuading activities in encouraging international development that exceed conventional expenditure methods. Its features include: 1) authorised sector participation 2) cross-border transfer of resources to developing economies; 3) mobilise additional finance; and 4) functional.

The United Nations (2012) opines that innovative financing for development include initiatives with these features: 1) authorised sector involvement; 2) cross-border transfer of resources to developing nations; and 3) innovation, in the sense that mechanisms are utilised in a new context or incorporate innovative characteristics with respect to conventional finance. Nnadozie (2011) asserts that a variety of nonconventional means employed to supplement additional funds for development via innovative projects/schemes such as market-based financial transactions, nonconventional taxes, micro contributions and public-private partnerships (PPP) is termed innovative financing.

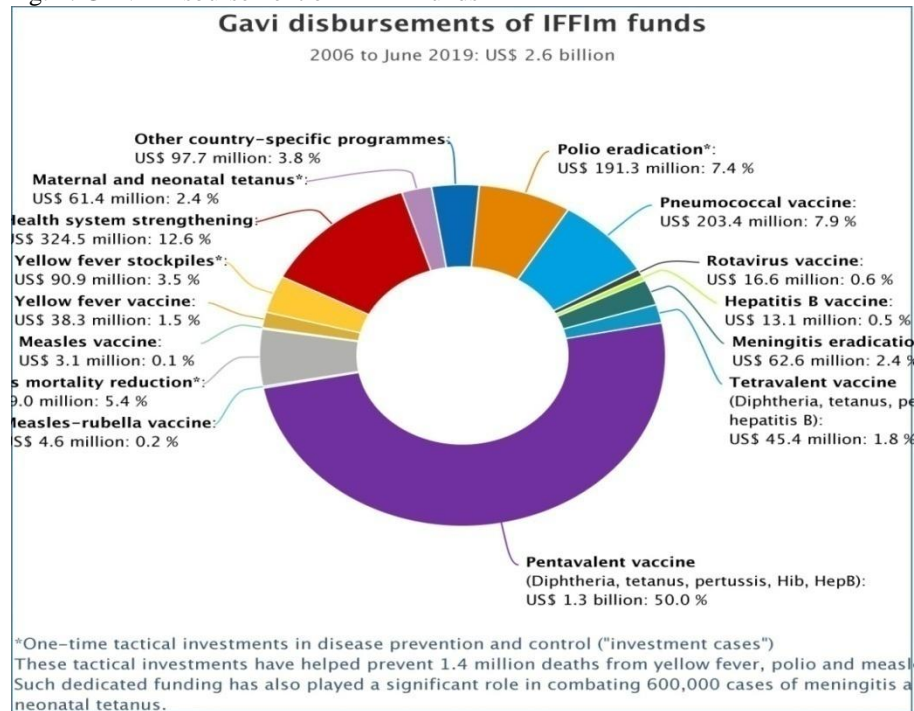
Financing method that assists to: 1) create supplementary development funds as a result of utilising novel sources of funds (e.g. by looking further than budget expenditures) or by attracting new partners (e.g. up-and-coming donors, private sector); 2) improve the effectiveness of financial flows, by lessening costs and/or time of delivery; 3) capable of making financial flows more efficient, through clearly connecting flows of funds to assessable feat on ground. Such financing apparatus can be termed innovative financing for development (World Bank, n.d.). Guarnaschelli et al. (2014) indicated that innovative financing denotes different things to different persons. From their survey, we could see two different aspects of innovative financing. The first aspect concentrates on innovative financing as the capital base which adds to flows that are accessible, specifically that of governments and non government organisations. This thought implies that innovative financing supplies finance that are secure, conventional as well as complementary to Official Development Assistance (ODA) from donor nations. The focal point of the second aspect is on innovative finance as a utilization of capital. This aspect centres on the various methods in which innovative financing enables the efficiency of development initiatives, economical and useful by enhancing liquidity, reallocating risk as well as harmonising the gestation period of investments with project requirements. Their opinion is that innovative financing procedure for development includes both aspects: methods to mobilize resources as well as enhance the efficiency/effectiveness of monetary/financial flows that tackles environmental and socioeconomic challenges globally.

3. Potential Sources of Innovative Finance

Thus far, innovative finance for development initiative funds mobilised sums up an average of US\$2 billion annually. This is a small percentage (approximately 14.29%) of the sum allocated as ODA in 2012 (United Nations, 2012). Also, the United Nations' ball park figure entails that more than US\$600 billion could be mobilised annually, that is five times as much as ODA in 2012 (United Nations, 2012).

A development cooperation report on mobilizing resources for sustainable development by OECD in 2014 showed that the International Finance Facility Immunisation funds (IFFIm) has offered huge amount of cash for immunisation programmes by putting up for sale vaccine bonds in capital markets sponsored by long-term pledges from suppliers of development co-operation. As a result of the World Bank managerial assistance, bonds offered in the international capital markets by the IFFIm are to be paid back from ODA allocations. According to Nnadozie (2011), the IFFIm has raised in excess of US\$3 billion for immunization programmes. The advantages of IFFIm are demonstrated by the use of US\$ 535 million in proceeds from IFFIm bonds to finance strategic purchases in special disease areas, identified as investment cases. This assisted in preventing 1.4 million deaths from yellow fever, polio and measles. Also, such dedicated funding played an important role in fighting 600,000 cases of meningitis and maternal and neonatal tetanus (International Finance Facility Immunisation Funds, n.d.).The Global Alliance for Vaccines and Immunizations (GAVI) has led the effort to vaccinate in excess of 760 million children from 2000–2019, saving over 13 million lives in the long run. With no funds from the IFFIm. All in all, US\$2.6 billion has been disbursed to assist in purchasing as well as delivering vaccines to 71 developing economies (International Finance Facility Immunisation Funds, n.d.). Fig 1 below shows GAVI disbursements of IFFIm funds.

Fig. 1: GAVI Disbursement of IFFIm Funds



Source: International Finance Facility Immunisation Funds, n.d.

The International Drug Purchasing Facility (UNITAID), is an international health initiative set up by the governments of United Kingdom, France, Brazil, Chile, Norway in 2006 to provide sustainable financial support for diagnostics, medicines and prevention for tuberculosis, malaria and HIV/AIDS. The main source of UNITAID's income is the international solidarity tax on airline tickets. According to UNITAID's 2018 – 2019 annual report, it has committed US\$1.3 billion to make tuberculosis, malaria and HIV/AIDS treatments more affordable; it has increased its grants to recipient countries from 28 in 2014 to 48 in 2018; it has carried out in excess of 60% investment with focal point on antimicrobial resistance. UNITAID and partners have brought unused, reasonable HIV medications to Africans in just three years, three times quicker than the past eras of antiretroviral. Additional decrease in prices will assist the global health response save US\$300 million annually. In July 2018, UNITAID invested US\$26 million in two projects led by the MTV Staying Alive Foundation and Solthis to increase Africa's HIV self-test and jointly collaborated with a distinct group of to launch the MenStar Coalition, an endeavour to increase the diagnosis and treatment of HIV in men, especially in Sub-Saharan Africa. Furthermore, in February 2019, UNITAID invested US\$59 million in two innovative projects to corner malaria-carrying mosquitoes (The International Drug Purchasing Facility, n.d.).

The 2015 United Nations Economic Commission for Africa and the Organisation for Economic Co-operation and Development (UNECA & OECD) Mutual Review of Development Effectiveness in Africa: Promise and Performance Report showed that the present levels of climate finance to Africa excluding North Africa are mainly inadequate to meet the regions adaptation requirements approximated to be US\$ 7 – 15 billion yearly by 2020. Based on Climate Fund Update, the 20 bilateral and multilateral climate funds effective in Africa excluding North Africa have a cumulative total of US\$ 2.3 billion from 2003 – 2014. Bilateral climate related-development finance commitment to Africa average US\$ 5.6 billion annually from 2010 – 2013 (United Nations Economic Commission for Africa & the Organisation for Economic Co-operation and Development, 2015)

In order to facilitate additional external private capital, numerous means have either been proposed or put into practice. For instance, African nations can utilise new financial sources from the population of their citizens residing overseas by issuing modified financial instruments and/or making available a structure that encourages remittances. According to Shimeles (2010), Africa approximately received US\$37 billion net remittance inflows in 2010 and considering its effect on the economy, remittances make up in excess of 5% of GDP in no less than 12 African nations in 2009. It is approximated that Sub-Saharan African economies are likely to raise a minimum of US\$23 billion by cutting the cost of international migrant remittances, issuing diaspora bonds, and securitizing future remittances as well as other future receivables (Nnadozie, 2011).

4. Constraints of Innovative Finance

There are some constraints that hinder innovative finance and addressing them could bring a substantial increase from the currently projected US\$24 billion annual growth trajectory. They include:

Demand Constraints- Inadequate investment in financing designs restrict innovation and raises the costs connected with bringing in new instruments. Generating new innovative financing mechanisms particularly mechanisms with no track records can be extremely expensive. The GAVI Alliance, for instance, gave over US\$30 million to the Pneumococcal Vaccines Accelerated Development and Introduction Plan (PneumoADIP) to develop the business case for the Pneumococcal AMC. It took decades of grants and concessional finance before microfinance became a market able feasible investment. Designing new mechanisms also requires a considerable amount of time. For example, it took more than two years for the World Bank, the UK Government, Goldman Sachs, as well as lawyers for GAVI to collaborate in designing the IFFIm. Similarly, in spite of having assurances from the Norwegian government and Gates Foundation, the Global Health Investment Fund, initiated an impact investing fund that assists research and development for new vaccines. They used more than two years in raising capital. Innovative financing mechanisms frequently fail to function efficiently and achieve their potential in the absence of major upfront assistance.

Supply Constraints- Not many organisations have the capability, authorisation or experience with innovative financing mediums required to make new products or to assess the risks of the ones that exists. Large organisational investors have a duty to accomplish risk-adjusted returns that align with the expectations of investors. While a lot of large investors accept as true that responsible investing can generate financial returns and cut reputational risk, they are not eager to give up financial return in place of social benefits. This unwillingness limits the provision of capital to opportunities where financial and social returns are connected. From a public sector viewpoint, a lot of big donor organisations do not possess the legal right and institutional incentives to engage in innovative financing programmes. Numerous donors make investment decisions on the basis of yearly appropriations, which restrict their capability to make long-term obligations. In addition, they frequently do not have the right to create investments with contingent liabilities. Whereas multilateral financial institutions (e.g. the World Bank) and bilateral institutions with a private sector authorisation (e.g. the CDC group in the UK) have better flexibility, innovative financing remains a comparatively small part of government assistance.

The sponsor of innovative financing products failure to connect with a large part of the financial sector also hinders capital and expertise. Specific suppliers of financial services, such as private banking and private equity, have presented microfinance investments as well as impact investing. On the other hand, other types of financial institutions, for instance, pension fund managers as well as insurance companies have simply looked at innovative financing in a limited capacity. Also, within financial institutions, there has been not much meeting with the risk assessment and credit departments to be taught how to assess new innovative financing mechanisms. This inadequate participation hinders the supply of capital and does not utilise the departments' expertise, which is essential to create and develop new products.

Intermediation Constraints– Inadequate liquidity, performance, data as well as standards metrics makes it hard for investors to evaluate the opportunities of innovative financing. Apparent, inclusive, and credible performance information will permit profitable investors to partake in the market. For instance, in the case of microfinance and green bonds, the accessibility of consistent information concerning the mechanisms' financial performance has allowed investors to take part in these markets. Though, it is not easy to collect this information for a lot of other types of innovative financing mechanisms. Furthermore, while institutions such as the Global Impact Investing Network (GIIN) have made substantial attempts to provide the benchmark metrics for evaluating the development effect of these investments, nevertheless there is no means to evaluate the environmental, social, and economic outcomes of diverse investments.

With the remarkable exception of microfinance and green bonds, instruments of innovative financing do not possess the essential market infrastructure to produce liquidity. The diverse as well as modified nature of numerous innovative financing mechanisms prevents investors from dealing on products to generate liquidity in the market. An everyday infrastructure, for instance, credit rating organisations and exchanges, can assist in making the trading of products easy to enhance liquidity

5. Potentials for Innovative Finance

The present COVID 19 pandemic as well as the global financial crisis in 2008 emphasized the reality that African economies face major exposure to the current sources of external finance and the necessity to discover other more conventional, predictable, sustainable and balancing sources. Given the extreme dependence on overseas development aid by numerous African nations, these crises exposed the risks connected with its volume and volatility. The declining trend of Africa's foreign direct investment (FDI) inflow is set to worsen considerably in 2020 amid the shock of the COVID 19 pandemic. According to the United Nations Conference on Trade and Development's (UNCTAD's) *World Investment Report 2020*, FDI flows to Africa are estimated to contract between 25% and 40% base on gross domestic product (GDP) growth projections and a variety of certain investment factors (UNCTAD, 2020). Also, as a result of the 2008 global crisis, FDI plummeted from a peak of USD\$73 billion in 2008 to roughly USD\$53 billion in 2010 (Nnadozie, 2011). This is an awakening for the African continent to discover new and more resilient external finance sources.

More than a few innovative mechanisms are being talked about at numerous meetings, which draw on both the official as well as private finance sources. These include taxes on universal activities that are either taxed a little or not taxed at all, for instance, air ticket solidarity charges or international financial transactions levies, pre-financing mechanisms based on financial markets with public warranty (IFFIm) or depending on market mechanisms (carbon emission auctions), states (advanced market commitments), and voluntary donations by the private sector channeled as well as made easy by the public authorities (diaspora bonds, migrants' remittances, voluntary solidarity donations).

6. Policy Options for Innovative Finance

African leaders and governments have a vital role to play in making sure that the enormous potential market for new development finance sources are brought into fruition. A good number of the proposed innovative mechanisms depend on building the trust of the private sector to partake in this market. Thus, African governments have to be in the forefront in: i) expanding and promoting the market for these instruments where there is obvious market failure (for instance, through provision of partial warranty or securitization of prospective public financial flows), ii) providing a suitable official policy environment that will support market growth, development and deepening, and iii) making sure the new mechanisms intensify macroeconomic as well as debt sustainability risks.

In addition, other proposed means can only be put into practice via partnership, collaboration as well as harmonisation amongst African governments. Finally, international development institutions can leverage their numerous strengths to assist in developing the capabilities of market players (including governments) and make technical assistance and pertinent information available that can assist in advertising several markets and instruments for innovative finance. In this regard, the Economic Commission for Africa will carry on to strengthen its endeavours through awareness, policy assistance, knowledge, experience sharing and technical assistance to African economies in mobilizing resources for development.

Realistically, innovative financing ought not to be perceived as a universal remedy, nevertheless, to a certain extent as a significant accompaniment for closing down Africa's investment gap. An important lesson from COVID 19 pandemic and 2008 global financial crisis for Africa is the necessity to pay extra attention to internal public resource mobilization via accountability, good governance, tax reforms, balancing different types of taxes and efficient management of natural resource incomes. African nations teaming up with their associates have to manage illegitimate capital flows out of the continent, which are more and more depleting the continent's financial resources required for development.

7. Conclusion and Recommendation

The paper examined the impact of innovative finance on economic development in Africa focusing on the potential sources of innovative finance, constraints of innovative finance, potentials for innovative financing and policy options. The 2008 global economic and financial crisis, climate change and the current COVID 19 pandemic has negatively affect Africa as various countries in the continent are experiencing lower export earnings, inadequate growth rates, insufficient investment opportunities, dwindling remittances as well as decreasing inflow of foreign direct investment. Thus, it is essential for nations in the continent to put up adequate innovative financial resources to improve the growth and development of their various economies. Base on this, it is recommended that African leaders and governments should increase the potential sources of innovative finance such as IFFIm and UNITAID as well as endeavour to deal with the constraints that restrict innovative finance for development of the African continent.

References

- African Development Bank & African Development Fund (2011). *The Cost of Adaptation to Climate Change in Africa*.
<https://www.afdb.org/fileadmin/uploads/afdb/Documents/Project-and-Operations/Cost%20of%20Adaptation%20in%20Africa.pdf>
- Guarnaschelli, S., Lampert, S., Marsh, E. & Johnson, L. (2014). *Innovative Financing for Development: Scalable Business Models that Produce Economic, Social, and Environmental Outcomes*. (Report No. WP. 2016/02). Global Development Incubator. <https://www.globaldevincubator.org/wp-content/uploads/2016/02/Innovative-Financing-for-Development.pdf>
- Gelil, I. A. (2018). Innovative Financing. In N. Saab & A. Sadik (Eds.), *Financing Sustainable Development in Arab Countries* (pp 85 - 98). Beirut, Lebanon: Technical Publications.
- International Finance Facility Immunisation Funds (n.d.). *Gavi Disbursements of IFFIm Funds*. Retrieved May 2 from <https://iffim.org/funding-immunisation/disbursements>
- Leading Group on Innovative Financing for Development (2012, January 16). *FAQs - Innovative financing*.
<https://www.leadinggroup.org/rubrique325.html>
- Mukeredzi, T. (2015). Can Africa fund its own Growth? Mobilising Domestic Resources is a Key Source of Finance. *African Renewal*.
<https://www.un.org/africarenewal/magazine/august-2015/can-africa-fund-its-own-growth>
- Nnadozie, E. (2011, November 28). *Innovative financing for development: Opportunities and policy options for Africa*.
<https://www.devex.com/news/innovative-financing-for-development-opportunities-and-policy-options-for-africa-76772>
- Organisation for Economic Co-operation and Development (2014). *Development Co-operation Report 2014: Mobilising Resources for Sustainable Development*. OECD. https://www.oecd-ilibrary.org/development/development-co-operation-report-2014_dcr-2014-en
- Sandor, E. (2011). Mapping Innovative Finance for Development Mechanism. *OECD Journal: General Papers*, 2010(1), 77–97.
http://dx.doi.org/10.1787/gen_papers-2010-5kgc6cl2x95d
- Shimeles, A. (2010). Diaspora Bonds and Securitization of Remittances for Africa's Development. *African Economic Brief*, 7(1), 1–7
- United Nations (2012). *World Economic and Social Survey: In Search of New Development Finance*.
<https://www.un.org/en/development/desa/publications/wess2012.html>
- United Nations Conference on Trade and Development (2021). *COVID-19 Slashes Foreign Direct Investment in Africa by 16%*. <https://unctad.org/news/covid-19-slashes-foreign-direct-investment-africa-16>
- United Nations Conference on Trade and Development (2020). *World Investment Report: International Production Beyond the Pandemic*
https://unctad.org/en/PublicationsLibrary/wir2020_en.pdf

- United Nations Department of Economic and Social Affairs (2015). *Financing for Development* [Paper presentation]. Third International Conference. Addis Ababa, Ethiopia. <https://www.un.org/esa/ffd/ffd3/index.html>
- United Nations Economic Commission for Africa & the Organisation for Economic Co-operation and Development, (2015). *Mutual Review of Development Effectiveness in Africa: Promise and Performance*. UNECA & OECD https://read.oecd-ilibrary.org/development/the-mutual-review-of-development-effectiveness-in-africa-2015_9789264247642-en#page2
- United Nations Economic Commission for Africa (2019). *Economic Report on Africa: Fiscal Policy for Financing Sustainable Development in Africa*. <https://repository.uneca.org/handle/10855/41804>
- The International Drug Purchasing Facility (n.d.). *2018 – 2019 Annual Report*. Retrieved May 2, 2021, from <https://unitaid.org/assets/annual-report-2018-2019.pdf>
- World Bank (n.d.). *Economic Indicators*. Retrieved May 2, 2021, from <https://data.worldbank.org/indicator>
- World Bank (n.d.). *Innovative Finance for Development Solutions*. Retrieved May 2, 2021, from https://olc.worldbank.org/system/files/Innovative_Finance_for_Development_Solutions.pdf

Do we have Governance in Rural Commodity Value Chains? Evidences from Niger State, Nigeria

Sidikat Shitu

Department of Economics, Ibrahim Badamasi Babangida University, Lapai

Correspondence Email: siddyshitu@yahoo.com

Abstract

This study deployed the Value Chain Approach (VCA) to study governance in rural commodity value chains while focusing on yam value added products within Niger State, Nigeria. The question of whether actors within the yam industry respects the food safety standards endorsed by the standardization bodies of the government or not is the major crux in this study. The study deployed qualitative case study methodology and the procedures utilized for data gathering were nine structured interviews, review of past literature and observation using the overt technique. The findings of the study revealed that governance and food safety measures are well spelt out by the certification bodies but what isn't clear enough is the implementation of food safety measures and governance within the rural settings where many unregistered actors participate in value chains. The findings suggest that disintegration in value chain governance may limit the market exploitability of yam value added products, specifically yam flour, which is mostly traded in the rural markets and this could further make international competitiveness less possible.

Keywords: Value, Chain, Yam, Rural Markets

JEL Classification: A13, O18, M2, Q1, M13.

1. Introduction

Excerpting from the available literature on the commercialization of indigenous value-added agricultural products, Nigeria accounts for over 65% of global yam production, with the bulk of products emanating from the North-Central Zone of Nigeria (Ajibade et al., 2018; Adejo, 2017). Nigeria is rated the largest producer of yam in West Africa and in 2018 the export of yam was pegged and valued at a total of 72,580.851 thousand tonnes (Ajibade et al., 2018; Basse, 2017; Wood, 2020). Yam production and its export have provided income for households and revenue for government to the tune of over 500million annually (Adejo, 2017). The data provided is principally for yam tuber trade and not explicitly for value added yam products such as yam flour. Research revealed that more than half of the yam flour produced and consumed in Nigeria emanate from four states Kwara, Niger, Nassarawa and by extension Benue (Bekun, 2017; Akanmu et al., 2018; Agba et al., 2019; Iorzua et al., 2020).

In the Nigerian context, sustained entry into organized market with value added yam products ought to be affected by Nigerian government's food safety and certification regulations. The guidelines requires that yam should be in its whole form, fresh, firm in texture, free of sprout, free of rot, free from mechanical and physiological damage, external moisture and odour. In this paper we align our certification standards to the guidelines provided by National Agency for Food and Drug Administration and Control (NAFDAC) to analyze the impact of standards on the domestic trade of rural commodities such as yam within the organized market settings. The crux of the study is that, certification standards may relegate rural actors' participation in value chain to the traditional rural markets where food safety is not necessarily considered by consumers of locally processed food products.

The comparative significance of agricultural products standards otherwise referred to as food safety standards have been discovered to mitigate effective performance in value chains. For instance, in Nigeria, it has become a reason for competitiveness especially with the implementation policies such as border closure (Abegunde & Fabiyi, 2020). The World Trade Organization developed an agreement in relation to sanitary, phytosanitary and technical wedges to trade and these have been the strategical instruments countries have been using as guidelines to check issues related to food safety standards for commodities traded across international markets. These standards give governing authorities opportunity to fly stringent standards that would cut across nations without pulling down specific international trade rules. For example, the total rejection of polycyclic aromatic hydrocarbon in shea butter is one very important standard concern by buyers of the product in USA, Europe and China (Nahm, 2011; Shitu & Mohd-Nor, 2017). Similarly, in the Yam Industry, microbial rots found in the exported yam from Nigeria to the USA was rejected over poor quality (Onyeka, 2020).

Consequently, the growing inflexibility of developed countries food safety standards with better-quality of food using investigative dimensions pooled with swiftly progressing national certification bodies such as NAFDAC has placed quality on business sprightliness, technological complexity and quality regulation arrangements has made it almost impossible for actors within the rural settings to meet with international standards. Apart from investigating standardization in yam production and trade in Nigeria, emphasis will also be given to yam flour production and the inability of these products to compete effectively at the international market despite the plumb integration of small-scale producers within the rural settings. In this paper we narrow down our focus to yam flour which is the largest value-added commodity derived from yam tuber. In a nutshell, it accounts for 85% of the total value derived from the yam industry after direct consumption. Past research on rural food supply chains revealed how supply chains in this context are determined by varying demands from consumers (Kolawole et al., 2020). It is often controlled by actors within the value chains of various commodities and mostly those in the retail business or by direct consumers of food products. Though, in the sub-Saharan part of the world many researches have revealed how multiple stakeholders also participate in rural food supply chains

those stakeholders include exporters, middlemen, standard organizations, government and non-governmental organizations (Naik & Suresh, 2018). This confirms that foods produced in the rural settings are not only consumed locally but can also go into the international markets through export.

Even though, there is a dearth in the number of studies related to yam flour supply chain. A great number of researches in the yam industry have focused more on the economics of yam cultivation (Kolawole et al., 2020; Bekun, 2017; Akanmu et al., 2018; Agba et al., 2019; Iorzua et al., 2020). Studies emanating from Regina and Kikuno (2011) and Migap and Audu (2012) extended their research beyond cultivation to the economic impact which gave an insight to the analysis of value chain and supply chain.

2. Literature Review

Conceptualization of Stakeholders Relationships using Value Chain Approach

Theorizing stakeholders' relationship using Value Chain Approach (VCA) has remained an interesting area of research. It focuses on management and governance of how actors at the tail and head of the chain relate. In the case of the yam industry, rural farmers, local buyers, local sellers, processors, retailers and consumers have relationships that can be interlinked or skipped as it is shown in figure 1. The farmers are segmented into various categories i.e. small, medium and large-scale producers who sell their products either directly to consumers or retailers who are considered as the local buyers and by extension to exporters. In most cases, the yam producers sell their products to buyers who are only interested in the wider domestic markets because of the nature of the product and handling. Recently, the policy makers became actors who are interested in the export chain while incorporating the food regulatory bodies such as NAFDAC and Standard Organization of Nigeria (SON) who designs and enforces standards.

The socio-economic factors promoting the development of research in the yam industry are that of cultural beliefs and festivities that surrounds yam production, harvesting, processing and marketing. In figure 1 below, the structure utilized to examine actors relationship and governance takes its flow from the roles of multiple stakeholders, production, value chain, supply chain as well as consumption.

Trading of Value-Added Yam Products in Nigeria

Historically, yam production has a long history which predated to the pre-independence period. Before 1960, when communities trade in cash crops there was no guideline for yam products trading since it wasn't considered as a very important crop that can be traded across the seashores to Europe. With the establishment of NAFDAC, many commodities were forced to embrace food safety standards to enable a safer market economy. The government policy on standardization built the trust of consumers on locally produced goods especially in the urban areas. The boom in the innovative yam flour production in Nigeria started with the emergence of two brands of packaged yam flour namely 'Poundo' yam flour and 'Ayoola' yam flour in the early 2000s and the products are still in the market creating brand competition. This particular value chain has been grossly

improved upon through technological innovations and handling capability. According to Olufemi (2018), reported that before the emergence of pounded yam flour, the popular ‘Amala’ yam flour has always been the favorite of many Nigerians. The significant change that occurred in the industry was marked by the massive intervention of the FADAMA fund that boosted production and processing. These enabled actors within the industry to substitute the traditional knowledge they are used to into a modern and technological driven approach and this engrossed the consideration of research into the industry.

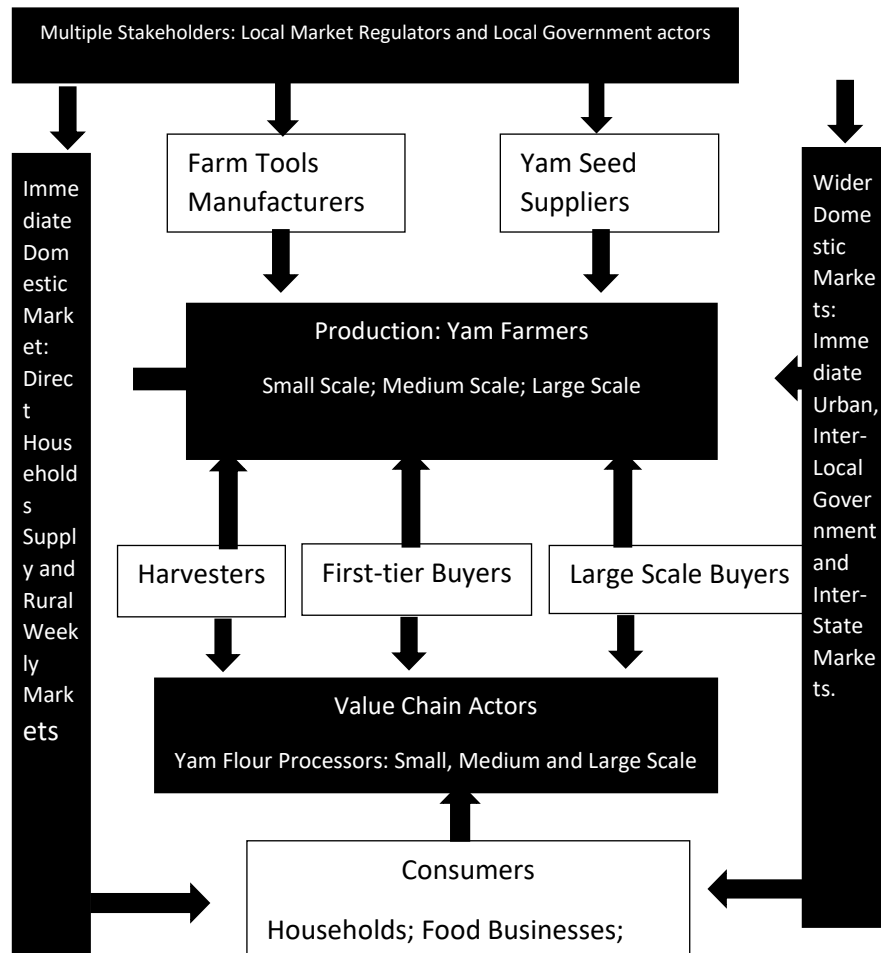


Figure 1: Depiction of yam value chains

Niger State, Nigeria epitomizes an exciting location for an empirical research in the yam industry. It’s a case study of where governance and standardization of the industry can be tested in terms of yam value added products such as yam flour. Rural Nigeria is generally constituted with feeble market associations and as such

governance of products, access to financial opportunities, technological competence and governance skills becomes difficult compared to what is obtained in the urban settings (Victor et al., 2020). Nigeria is one of the developing countries that have given serious priority to diversifying its economy by looking inward into the agricultural sector. This was done through agricultural financing and support mechanism to promote agriculture. Where smallholder farmers and actors participating in value chains within the rural context have been mobilized and supported by the government and the center (Victor et al., 2020). Also, in the aspect of penetration into the domestic market, there is flexibility of entrance while penetration into the international market proved to be inflexible due to the tough standards and guideline presented by the buying countries of value-added yam products. The production of yam in Nigeria is dominated by smallholder farmers mostly men assisted by their family members while processing and trading are mostly facilitated by women. This pattern of value and supply chain is what is obtained in the North-eastern, south-eastern and south-western parts of Nigeria.

3. Methodology

This study used a qualitative method and structured interview as a procedure for its data overt technique. A total of nine entrepreneurs were interviewed, six from Gwada community of Shiroro Local Government Area (LGA) and three from Takunpara community in Paikoro LGA.

The study discovered that Gwada women predominantly engaged in yam value chain, whereas women in Takunpara engage in less participation in yam value chain but participate more in yam flour processing and supply. Atlas.ti was used for the qualitative data analysis. Notably, one of the challenges encountered while collecting data for the study is the Covid-19 pandemic restriction protocols and low level of production as a result of the activities of Bandits in the Shiroro axis.

4. Results

Findings: Standard and Governance of Yam Products in the Domestic Chain

Trade interactions between producers and sellers of yam in the wider domestic chain in the Nigerian context have some distinctive antiquities. For instance producers of yam in Paikoro and Shiroro LGAs of Niger state have a unique relationship with buyers from the south-western states and history revealed that the relationship is dated back to the 1960's. Research also revealed that the Gwari speaking tribe of Niger state produce yam in abundant quantity (Nmadu et al., 2017) though, they use their indigenous knowledge to process it into yam flour but the reality is that processing methods varies and consequently, they don't perform efficiently to fulfill the demand of buyers in the wider domestic or international market (Oluwalana et al., 2018). Demand for yam flour is very high in the axis of Kwara state and Oyo state. This facilitated migration of many Yoruba speaking tribe into Paikoro and Shiroro local government areas of Niger state. They established processing clusters, they installed grinding and crushing machines as well as provided processing skill trainings not only for the Yoruba women but for their host as well. Recently, marketing companies in Lagos and Ogun States picked interest in yam flour supply chain emanating from Niger state and they frequently give specification so as to ensure that yam flour is processed and packaged base on

their demands. With the importation policy review of the Federal Government of Nigeria in year 2017, which specifically placed a ban on rice importation, but at the same time paved way for domestically produced food such as yam flour to find market within the immediate and wider domestic supply chain just as locally produced rice provided flexible relationship between producers, buyers and consumers. However up till the time this research was carried out traders still patronize yam flour from Niger state despite insecurity.

Findings from the interviews conducted with actors within the yam flour value chains in Paikoro and Shiroro LGAs revealed that governance of value chain is weak and largely unregulated. One of the respondents in Paikoro mentioned that “Government officials do not come around to check our activities, they only ask us to pay tax in the markets” Another respondent from Shiroro also said “We are free to take our products into the market without any check by the authority” while some consumers who were casually interacted with seems not to care about food safety or standard measures that ought to have been attached to value chain. Though the Nigerian government has saddled some agencies with the responsibility of checks and balances on food products safety, one of the most important of all is NAFDAC which serves as the food safety regulatory body in Nigeria that has made it compulsory that every food processing company must register. Part of the mandate of NAFDAC is to inspect processing facilities of all food products and sanction those who fail to comply by the guidelines. Some consumers may reject packaged yam flour products if NAFDAC registration number is not found on the packaged; whilst the regulatory bodies do a lot of inspection of facilities and if found not complying with the standard measures, sanctions would be imposed on the supplier.

Up till this present moment yam flour is still largely traded using the traditional method in the rural communities as well as in many urban traditional markets. One of the respondents mentioned that “Yam flour is best sold in the traditional market, we do not hawk or take it to supermarkets, this is because of its nature, unlike yam tuber that can be carried around”. This has grossly affected the level of respect actors have for the regulatory bodies especially NAFDAC. In many organized markets such as shopping malls where we can find food pantries the Nigerian government plays a vital role in ensuring that there is governance in sale of foodstuff. The NAFDAC staff interviewed during data collection made it clear that the agency is working towards extending their activities to the rural areas so as to ensure compliance using stringent measures. Factually, there are many unregistered SMEs operating within the rural settings and the country have the tradition of concentrating, implementing and enforcing strategic economic policies within the urban settings and in most cases policies do not have much impact on the rural actors and as such government usually do not have total control of the economic activities in the rural areas.

Research investigation revealed that yam tuber and yam flour markets are controlled by segmented and mostly small retail entities in Niger State Nigeria. In the rural communities of Shiroro, Paiko and Bosso LGAs there are huge numbers of impending yam producers and limited large buyers who mainly troop in from the

southwest. The value chain could be described as free market where the forces of demand and supply determine what transpires in the process of product supply. By implication, it means that, the capability of the yam flour producers to penetrate to the Southwest and other wider domestic chain depends hugely on the scrappy trading between suppliers and producers. These dynamics muddles the chain of protection required for accomplishing strict governance and standardization. Despite understanding that, certified products can easily fly in the urban organized markets.

Research Implication

In the rural context, implementing and enforcing standardization of food products is not the responsibility of the actors within value chains but rather that of the government, since food safety is not the only issue confronting value chains in this context. Producers have more challenging obstacles ranging from poor infrastructure to inadequate finance. In most cases, yam flour producers do not have adequate drying flaps, innovative knowledge and technological knowhow to enhance the process of production. Typically, not all small-scale producers have problem of low productivity but the incapacitated ones usually rely on the better tier producers to market their products and in the process of doing so products are collected and mixed together for sale regardless of the quality, this further belittle the quality of products in the market. NAFDAC may choose to enforce food safety standards on individual producer at the point of production and also target registered retailers who mostly do the value addition in the urban centers. However, many government and non-governmental projects have targeted value chains in Nigeria, in the course of their intervention, standards are being adopted or sometimes promoted, but the certification process and guidelines usually involve stringent measures. The sardonicism in all efforts to get rural entrepreneurs to be involved in standardization is that, those at the bottom of value chain are usually ostracized in the entire process.

5. Conclusion and Recommendations

Using the Value Chain Approach (VCA) to understand the yam flour value chain within the context of Niger State, Nigeria, it was discovered that rural entrepreneurs at the bottom of the value chain are the most important actors and the value chain is typically dominated by small and medium scale processors. In this research, the case studies were Paikoro and Shiroro Local Government Areas (LGAs) of Niger State, Nigeria. The buyers coming from the south-western region of the country established an entry point business relationship with the actors at the bottom of value chain who are mostly women. At the point of entry, the governance system is highly unorganized in the sense that a greater number of rural entrepreneurs involved are unregistered. The Value Chain Approach (VCA) in this research has been described as that of free-market oriented type, which indicates that the forces of demand and supply determines what transpires in the process of product supply.

Conventionally, Nigerian government have a governing body for all food products which is NAFDAC. Going by the fact that actors are unregistered, buyers do not have the courage to ask about sustainability and food safety standards for yam products and as such nobody cares about the safety measures. In the last one

decade, with the emergence of organized markets such as those situated within shopping malls and more specifically ShopRite, sellers have begun to demand for food safety certification to enable them participate efficiently in the competitive market. This new development had forced many small-scale enterprises to begin registering their companies through the Cooperate Affairs Commission (CAC) as well as the National Agency for Food and Drug Administration and Control (NAFDAC) but in the context of yam products value chain it has had limited control. This study, therefore, recommends that stakeholders relationship needs to be strengthened whilst state actors facilitate certification processes to encourage actors at the bottom of value chain to adopt food safety certification.

References

- Abegunde, O., & Fabiyi, R. (2020). Nigeria-Benin Border Closure: Implications for Economic Development in Nigeria. *Journal of Humanities and Social Sciences Studies*, 2(4), 56-65.
- Adejo, P. E. (2017). Post-Harvest Management Practices of Yam and Farmers' Information Needs in the North-Central of Nigeria. *Journal of Nutraceuticals and Food Science*, 2(3), 1-7.
- Agba, S. A., Ode, I., Ugbem, C., & Nwafor, S. C. (2019). Impact of Yam Postharvest Activities on Standard of Living of Yam Farming Households in North-East Zone of Benue State, Nigeria. *Journal of Applied Life Sciences International*, 1-9.
- Ajibade, T. B., Ayinde, O. E., Abdoulaye, T., & Ayinde, K. (2018). Determinants of Price of Yam in Nigeria: A Time-Series Analysis. *Nigerian Journal of Agricultural Economics*, 8(2066-2018-4633), 109-119.
- Akanmu, P. M., Clement, J. O., & Samaila, M. (2018). Impact of cooperative microfinance on the performance of women entrepreneurship in Kwara state Nigeria.
- Bassey, E. E. (2017). Constraints and prospects of yam production in Nigeria. *European Journal of Physical and Agricultural Sciences Vol*, 5(1).
- Bekun, F. V. (2017). Economics of Yam (Dioscoreaceae Dioscorea) Marketing: New Insights from Bosso Local Government Area of Niger State, Nigeria. *EUropean Journal of Managerial Research (EUJMR)*, (1), 1-13.
- Iorzua, D. A., Ikwuba, A. A., Aan, J. T., & Nwafor, S. C. (2020). Post-Harvest Loses and Socioeconomic Sustenance of Yam Farmers in Southern Agricultural Zone of Nasarawa State. *Journal of Scientific Research and Reports*, 88-98.
- Kanu, I. M., Onwukwe, F. O., & Madufo, J. C. (2021). Analysis of Yam Marketing in Ngwa Road Market, Abia State, Nigeria. *Black Sea Journal of Agriculture*, 4(1), 33-40.
- Kolawole, O. A., Mishra, J. L., & Hussain, Z. (2021). Addressing food waste and loss in the Nigerian food supply chain: Use of Lean Six Sigma and Double-Loop Learning. *Industrial Marketing Management*, 93, 235-249.
- Nahm, H. S. (2011). *Quality characteristics of West African shea butter (Vitellaria paradoxa) and approaches to extend shelf-life* (Doctoral dissertation, Rutgers University-Graduate School-New Brunswick). Retrieved from <https://rucore.libraries.rutgers.edu/rutgers-lib/33959/>

- Naik, G., & Suresh, D. N. (2018). Challenges of creating sustainable agri-retail supply chains. *IIMB management review*, 30(3), 270-282.
- Naik, G., & Suresh, D. N. (2018). Challenges of creating sustainable agri-retail supply chains. *IIMB management review*, 30(3), 270-282.
- Nmadu, J. N., Coker, A. A. A., & Adams, E. (2017). *Determinants of climate change adaptation strategies of yam producers in Niger State, Nigeria* (No. 2223-2019-1760).
- Olufemi, A. S. (2018). Measuring and Assessing the State of Technological Innovations and the Level of Interaction between Rice Processors and Stakeholders in Rice Processing Industry in Nigeria. *International Journal of Business, Economics and Management*, 5(6), 164-175.
- Oluwalana, E., Oladeji, S., & Bello, A. (2019). Economic Analysis Of Yam Flour Processing In Saki, Oyo State, Nigeria. *J. Hum. Soc. Sci. Crtv. Arts*, 14, 30-46.
- Onyeke, C. C. (2020). Review of mycotoxins in foods in Nigeria. *Food Control*, 107376.
- Sidikat, S., & Rohaya M. (2017). Implementation of Sustainability Standard into Commodity Supply Chain Networks: A Processual Case Approach Published by International Journal of Academic Research in Business and Social Sciences. Volume 7, Issue 6 (June, 2017) Pages 52-62. DOI: 10.6007/IJARBSS/v7-i6/2941
- Victor, O., Olufemi, O., & Samson, A. (2020). Assessment of Entrepreneurship Skills Needs of Small-Scale Farmers in Akpabuyo Local Government Area of Cross Rivers State, Nigeria. *Assessment*, 11(6).
- Victor, O., Olufemi, O., & Samson, A. (2020). Assessment of Entrepreneurship Skills Needs of Small-Scale Farmers in Akpabuyo Local Government Area of Cross Rivers State, Nigeria. *Assessment*, 11(6).

Bank Credit and Manufacturing Sector Output in Nigeria: A Nonlinear Approach

Ashiru Ibrahim¹, Lukman Abdulrahman¹, Anas Bafeto Abubakar¹

¹Department of Economics, School of Postgraduate Studies, Nigerian Defence Academy, Kaduna, Kaduna State

Correspondence Email: Ibrahimashiru@gmail.com

Abstract

This study examines the nexus that exists between bank credit and manufacturing sector output in Nigeria between 1981 and 2019 using the nonlinear autoregressive distributed lag (ARDL) model and Granger causality. Unlike most other studies, this study employs the use of bank credit to the manufacturing sector as a proxy for bank credit. The NARDL method used is to investigate the asymmetric relationship suggested in the literature. Results from the bounds test reveal that a long-run relationship exists between bank credit, manufacturing output and lending interest rate. Furthermore, the Wald test for asymmetry showed that there is a long-run asymmetry in the impact of bank credit on manufacturing output. Meanwhile, estimates reveal that positive changes in bank credit are positively associated with manufacturing output, while negative changes in bank credit are negatively related to manufacturing output in the long run. In the short run, however, there appears to be no significant impact of bank credit and lending rates on manufacturing output. More so, results reveal a unidirectional causality running from output to bank credit, lending rates to bank credit and lending rates to output. This study, therefore, concludes that the growth-led finance postulate is valid in this case and that finance encourages output growth in the manufacturing sector in the long run with an error correction of 21%.

Keywords: Bank Credit, Manufacturing Output, Lending Rates, Nonlinear ARDL

JEL Classification: E2, E5, G2

1. Introduction

In every nation, one of the most important macroeconomic objectives is to achieve steady growth and development. The manufacturing sector plays a key role in the achievement of this objective in a modern economy as it has many benefits which are central to economic transformation (Ogar, Nkamare & Effiong, 2014). The manufacturing sector of the industrial sector is seen as an engine of growth and development and cannot be undermined. Kaldor (1966) believes that an operative manufacturing sector leads to fast economic growth, gives a way out for high level of unemployment as well as a mechanism for sustained development over a long duration. Goshit, Dabwor and Kromtit (2018) opined that investment capital is

more quickly created in the manufacturing sector than in other sectors of the economy and at the same time, encourages links that are more robust and broader amongst other sectors of the economy. Countries such as the USA, Germany, China and Japan have through their manufacturing sector, speed up their rate of growth and development. This is resulting from the realisation that the manufacturing sector allows economies to attain full employment of their resources in encouraging employment and output growth and in the process, improve the standard of living of the populace.

Successive Nigerian governments have over time, enacted laws and formulated policies which are aimed at improving the performance of the manufacturing sector and industrial sector at large. One of such policies is the National Economic Empowerment and Development Strategy (NEEDS) that was aimed at invigorating the financial system to set a stage for sustainable progression in the manufacturing sector. This is due to the realisation of the role of finance in the growth of the manufacturing sector. The growth of an economy to a large extent, depend on the level of funding received by the manufacturing sector (Ogunmuyiwa, Okuneye & Amaefule, 2017).

The financial sector is perceived as the conduit of growth in every economy, through which the developments of other sectors are achieved. This is because of the financial conduit roles ascribed to it. The financial sector through financial institutions seeks out funds from the surplus sectors in form of savings and idle funds and apportions such to entrepreneurs who need funding for their ideas and business ventures, for a return in form of interest on loans (Ademu, Dabwor & Ezie, 2019). Financial institutions make structures available for monetary administration and the foundation for the management of liquidity in the system. Banks, therefore, have to be very effective in their roles as intermediaries for deposits mobilisation and channelling such to the productive sector of the economy particularly the manufacturing sector. The monetary authorities in a bid to bolster the confidence of savers in the financial system established the Nigerian Deposit Insurance Corporation (NDIC) to cover insurance for deposits in financial institutions. Again, the CBN embarked on several banking reforms, one of which was the 2004 banking consolidation which saw the paid-up capital base of banks raised from 2 billion Naira to 25 billion naira which forced the merger and acquisition of the weak banks thereby leaving only 25 strong banks in operation (Soludo, 2004). Between 1981 and 1990, commercial banks credit to the manufacturing sector was below 10 billion naira. However, the volume rose to a little above 10 billion naira in 1991 and has since, sustained a steady incline up until 2019 when it peaked at 2.6 trillion naira (CBN, 2020).

Despite all efforts put in place to encourage the growth of the Nigerian manufacturing sector, its performance has not been commensurate with efforts put into it as the sector has been experiencing stunted growth and its contributions to Gross Domestic Product (GDP) has remained almost insignificant (Manufacturers' Association of Nigeria, MAN, 2015). Between 1981 and 1993, the contribution of the manufacturing sector to GDP has stayed below 20 per cent with the peak during that period in 1988 at 19.8 per cent. However, in 1994, it rose to a mere 20.1 per

cent of GDP and sustained a steady decline afterwards until it was 12.2 per cent in 2001 and thereafter, remained below 10 per cent until 2019 when it slightly rose to about 11.6 per cent (CBN, 2020). The persistent underperformance of the manufacturing sector in defiance of all revitalising efforts may not be unconnected to bottlenecks in accessing finance particularly from commercial banks which hold about 90 per cent of total financial sector assets but concentrate their credits mostly in the oil and gas sector which is perceived to be more lucrative (Daniel, Oluwatobi, Taiwo & Julius, 2017). This problem has called for the need to examine the impact of bank credit to the manufacturing sector on manufacturing sector output.

Previous works on this topic have not had a consensus in their results on the relationship between bank credit and manufacturing sector output. For instance, some studies concluded that bank credit significantly influences manufacturing sector output (Asaleye, Adama & Ogunjobi, 2018; Daniel et al., 2017; Ume, Obasikene, Oleka, Nwadike & Okoyeuzu, 2017), while others find no significant relationship between the duo (Aminu, Raifu & Oloyede, 2019; Elijah, 2018; Emmanuel, Olupeeka & Adeyinka, 2020; and Toby & Peterside, 2014; among others). The lack of consensus has given rise to another strand of literature that posits that bank funding of the manufacturing sector is only growth encouraging up to a point, after which it becomes a deterrent to growth (Law & Singh, 2014). This has led scholars such as Ademu et al. (2019); Kalu, Okoyeuzu, Okechukwu and Ukpere (2019); and Hung (2009) among others, to believe that there might be a non-linear relationship between bank credit and output. It is based on this that, this study is set out to examine the relationship between bank credit and the manufacturing sector output in Nigeria between 1981 and 2019 using a non-linear approach.

The rest of this study contains the literature review, where related theories and empirical studies are discussed; the methodology, where the procedure of data analyses are discussed; results, where findings are presented and discussed; and conclusion, where the major findings are summarised and recommendations are made.

2. Literature Review

Theoretical Underpinning

This study is hinged on the framework of finance-led growth postulate. This view was first brought to light by Schumpeter(1934) when he postulated a circular flow occurring in the economy. According to Schumpeter(1934), the economy is in a stationary and competitive state in which there is no interest rate, no profit, no involuntary unemployment, no savings and no investments. In this hypothetical economy, the same goods are produced yearly and the circle is broken only by innovation, which is funded by bank credits.

Schumpeter (1934) allotted a key role to bank credit in the development of the real sector by assuming that loans facilitated to the real sector are the main reasons for innovation and by extension, growth of the real sector. He further assigned importance to interest rates as the cost of this credit which the entrepreneurs have to

pay back when they begin to make profits, hence, bringing the economy back to its optimum level after an initial wave of increase in earnings. From his view, Schumpeter (1934) believes that finance precedes growth. Scholars such as Gurley and Shaw (1960) are in support of his opinion as they believe that the financial sector supports the real sector with the required finance for growth. However, despite the wide acceptance of the finance-led growth postulate, economists such as Robinson (1953) and Jung (1986) among others have disagreed with the former's opinions arguing that growth in the real sector necessitates the supply of finance.

Empirical Review

From both theoretical and empirical evidence, there has been a lack of consensus as to the relationship between bank credit and the manufacturing sector. For instance, studies like that of Aigbomian and Mamudu (2020) study the impact of bank credit on the growth of the manufacturing sector in Nigeria using an error correction model. They study find a significant cointegration relationship, the short-run estimates indicate that oil revenue and manufacturing credit from deposit money banks have a positive significant impact on manufacturing sector growth, while corruption in the banking sector significantly retards the growth of the manufacturing sector. Additionally, interest rate and exchange rate are found to have an insignificant impact in determining manufacturing sector output. Meanwhile, Emmanuel, et al. (2020) in their investigation of the role of commercial bank credit on real sector performance in Nigeria from 1990 to 2017, used ordinary least squares and found that commercial bank credit and bank lending rates had no significant impact on manufacturing sector output.

More so, Aminu et al. (2019) in their study on the nexus between manufacturing sector output and financial development employed the use of a cointegration and causality model in analysing data from 1984 to 2016. Results from Granger causality indicated a bi-directional causality between credit to the private sector and the manufacturing sector output. Furthermore, the authors found a long-run relationship between the variables. Again, the short-run estimates indicate an insignificant relationship between credit to the private sector and the manufacturing sector output while in the long run, a positive significant relationship was found. Meanwhile, in both the long and short run, interest rate was found to exert a negative significant impact on manufacturing sector output.

Using a Non-linear Autoregressive Distributed Lag (NARDL) model, Ademu et al. (2019) in their examination of the nexus between bank credit and the Nigerian manufacturing sector output in Nigeria used annual time series data covering the period between 1986 and 2017. Regressing manufacturing sector output on commercial bank credit, the bounds test result indicates the presence of a long-run relationship. The results for the short run further indicate a positive relationship between manufacturing output and negative shocks of bank credit from the current period up to the two-period lag. More so, positive shocks of bank credit at the current period was seen to exert a positive influence on manufacturing output while it changes to a negative relationship at the one-period and two-period lags. This, however, returned to a positive impact at the three-period lagged bank credit variable. Concluding the Wald test result, the study concludes that both the

negative and positive shocks are significant in determining manufacturing sector output.

In another study, Andabai (2018) investigate the nexus between bank credit and manufacturing sector growth using annual time series data from 1990 to 2017 in Nigeria using a vector error correction model. Results indicate a cointegrating relationship between the variables. Causality test results indicate that all variables included in including credit to the private sector and interest rates neither jointly nor individually Granger-cause manufacturing sector output. The study concludes that, credit to the private sector has no significant relationship with manufacturing sector output. Elijah (2018) employed an autoregressive distributed lag model in analysing the impact of bank credit on the manufacturing sector output using Nigerian data from 1986 to 2016. Results from the bounds test indicate that the variables are cointegrated. In the long run, all explanatory variables including credit to the private sector and lending rates are not significant in explaining manufacturing sector growth in the long run while in the short run, credit to the private sector, money supply and lending rates have a positive significant relationship with manufacturing sector growth while savings rate has a significant negative relationship with manufacturing sector output. Meanwhile, results from causality indicate the presence of a one-way causality from credit to the private sector to manufacturing sector growth. Asaley et al. (2018) employed a vector error correction model, dynamic ordinary least square and Granger non-causality in assessing the financial sector and manufacturing sector nexus in Nigeria from 1981 to 2016. Results reveal a bi-directional causality between credit to the private sector and the manufacturing sector output in Nigeria. A positive significant relationship was observed between credit to the private sector and manufacturing sector output.

In another study, Mesagan, Olunkwa and Yusuf (2018) investigated the financial development and manufacturing sector growth nexus using Nigerian annual data from 1981 to 2015. Results from the error correction model indicate the presence of a long-run relationship between the variables. Furthermore, short-run estimates indicate the existence of a positive and significant relationship between credit to the private sector and manufacturing sector output while interest rate was observed to have a negative significant impact on manufacturing sector output. Meanwhile, in the long run, they find no significant relationship between interest rate and bank credit with manufacturing sector output. Daniel et al. (2017) investigate the nexus between bank credit and manufacturing sector output in Nigeria using annual time series from 1978 to 2015. Employing the Engle-Granger two-step error correction model, they study found a long-run relationship between the variables. Additionally, estimates show that, in both long and short run, manufacturing capacity utilisation, capital formation and bank loans to the manufacturing sector have a positive significant impact on the manufacturing sector growth. The authors conclude that bank credits are critical to the growth of the manufacturing sector in Nigeria.

Again, investigating the relative impact of bank credit on the Nigerian manufacturing sector, Ume et al. (2017) employed an autoregressive distributed lag model in analysing annual time series data from 1986 to 2013 and found a long-run

relationship between manufacturing sector output and the explanatory variables. The short-run estimates indicate that volume of bank credit and interest rate have positive and negative significant relationships with manufacturing sector output respectively while in the long run, the volume of bank credit and exchange rates have a significant positive relationship with manufacturing sector output while interest rates uphold a negative significant relationship. Ogunmuyiwa et al. (2017) examine the nexus between bank credit and manufacturing sector growth in Nigeria from 1999 to 2014. Employing an ARDL model, they find a long-run relationship between manufacturing sector output and bank credit. Furthermore, the short-run estimate indicates that bank credit only begins to be significant in influencing manufacturing output from two previous periods and the two-period lag of bank credit had a negative relationship with manufacturing sector output. John and Terhemba (2016) examine the effect of commercial bank credit on manufacturing sector output in Nigeria from 1980 to 2015 using a partial adjustment model. Results show that bank loans and advances, and broad money supply have a positive and significant impact on manufacturing sector output while lending rates and inflation rates have negative significant impacts on manufacturing sector output. Additionally, the AR1 variable, which is the dependent variable lagged by one period is found to be insignificant in determining manufacturing sector output at the current period. Ogar et al. (2014) while assessing the contributions of commercial bank credit on the Nigerian manufacturing sector from 1992 to 2011 using ordinary least square. Estimates indicate that there is a positive significant relationship between commercial banks credit and manufacturing sector growth while interest rate is insignificant in explaining manufacturing sector growth. They conclude that access to bank credits encourages more investment in the manufacturing sector.

Employing the same method with annual time series data from 1981 to 2010, Toby and Peterside (2014) assessed the roles of banks in manufacturing sector finance in Nigeria. They study found that commercial banks loans to the manufacturing sector are insignificant in explaining manufacturing output while merchant banks credit to the manufacturing sector has a positive and significant impact on manufacturing sector output. They conclude that the roles of banks in growing the Nigerian manufacturing sector are very limited. A review of previous studies has shown gaps in the literature, which this study will attempt to minimise. This study is different from previous studies in that it uses credit to the manufacturing sector as against credit to the private sector as a proxy for bank credit and follows the required systematic procedure involved in time series analysis unlike Daniel et al. (2017); Aigbomian and Mamudu (2020); and Toby and Peterside (2014) who neglected the necessary steps involved in time series analysis thereby rendering their methodologies unreliable. Secondly, this study considers the possibility of an asymmetry in the relationship as suggested by Ademu et al. (2019) and hence, employs a test of the asymmetric relationship.

3. Methodology

To achieve the research objectives, this study considers the Non-Linear ARDL approach of Shin, Yu and Greenwood-Nimmo (2014), the Wald test for long run asymmetry testing, and the Pairwise Granger Causality by Granger (1969) approach.

Model Specification

The model estimated for this study is adopted from Ademu et al. (2015), who used a non-linear ARDL framework in estimating the relationship between bank credit and the manufacturing sector. Their model in its linear functional form is given as follows:

$$MSO = f(BC) \dots\dots\dots 1$$

Where; MSO is manufacturing sector output and BC is the bank credit. Albeit adopting the model by Ademu et al. (2015), this study differs from the former in that it incorporated a proxy for lending interest rate to control for the cost of obtaining capital thereby giving the functional form as follows:

$$MANQ = f(CMAN, LINT) \dots\dots\dots 2$$

Where; *MANQ* is manufacturing sector output measured in billions of Naira, *CMAN* is credit to the manufacturing sector measured in billions of Naira and *LINT* is lending interest rate measured in per cent. Data for both *MANQ* and *CMAN* were obtained from CBN Annual Statistical Bulletin, 2020 while data for *LINT* were obtained from World Bank 2020 World Development Indicators and all series cover the period from 1981 to 2019.

Test for Stationarity

The time series properties of the variables were tested using the Phillips-Perron stationarity test by Phillips and Perron (1988). The essence of testing for a unit root in time series analysis is to avoid bias or spurious results from the analysis because of the wrongful linear combination of stationary and non-stationary series. Therefore to avoid this problem and provide robust and accurate results, the properties of the series need to be examined by first ascertaining the order of integration of the series.

$$\Delta \hat{u}_t = \alpha_0 + \alpha_1 \hat{u}_{t-1} + \varepsilon_t \dots\dots\dots 3$$

The above Phillips-Perron unit root equation is a simple AR(1) process. This corrects for any autocorrelation and heteroskedasticity in the errors and as such it gives robust estimates when the series has serial correlation and time-dependent heteroscedasticity (Odhiambo, 2009). The test compares the test statistic with the McKinnon critical value at 5 per cent, where a higher test statistic in absolute terms signify the stationarity of the variable at the level it is tested.

NARDL Model

The NARDL model developed by Shin et al. (2014) is a widely used method of examining asymmetric relationships. It is derived from the standard ARDL model with the difference lying in the incorporation of choice explanatory variables

decomposed into positive and negative cumulative sums. NARDL, therefore, carries all the attributes of the standard linear ARDL such as the ability to combine stationary and non-stationary series, giving robust estimates for small sample sizes, among others, which favours it above other methods of cointegration analysis such as, the nonlinear threshold Vector Error Correction Model (VECM) or smooth transition model. For empirical analysis, equation (ii) is transformed into its general linear ARDL form given in the below equation:

$$\Delta \log MANQ_t = \alpha_0 + \alpha_1 \sum_{i=0}^n \Delta \log MANQ_{t-i} + \alpha_2 \sum_{i=0}^n \Delta \log CMAN_{t-i} + \alpha_3 \Delta LINT_{t-1} + \delta_1 \log MANQ_{t-1} + \delta_2 \log CMAN_{t-1} + \delta_3 LINT_{t-1} + \mu_t \dots\dots 4$$

Where; Δ is a difference operator, $\alpha_1 - \alpha_3$ are short-run parameters and $\delta_1 - \delta_3$ are parameters of levels coefficients. To get the non-linear equation, $CMAN$ was decomposed into its positive and negative cumulative sums using the formula given as follows:

$$CMAN_t^{POS} = \sum_{j=1}^t \Delta CMAN_j^{POS} = \sum_{j=1}^t \max(\Delta CMAN_j, 0) \dots\dots\dots 5$$

$$CMAN_t^{NEG} = \sum_{j=1}^t \Delta CMAN_j^{NEG} = \sum_{j=1}^t \min(\Delta CMAN_j, 0) \dots\dots\dots 6$$

Substituting the decomposed $CMAN$ (i.e. $CMAN^{POS}$, which is the positive changes of credit to the manufacturing sector and $CMAN^{NEG}$, which is the negative changes) in the linear ARDL in equation (iv), it gives the NARDL model for this study as below:

$$\Delta \log MANQ_t = \alpha_0 + \alpha_1 \sum_{i=0}^n \Delta \log MANQ_{t-i} + \alpha_2 \sum_{i=0}^n \Delta \log CMAN_{t-i}^{POS} + \alpha_3 \sum_{i=0}^n \Delta \log CMAN_{t-i}^{NEG} + \alpha_4 \Delta LINT_{t-1} + \delta_1 \log MANQ_{t-1} + \delta_2 \log CMAN_{t-1}^{POS} + \delta_3 \log CMAN_{t-1}^{NEG} + \delta_4 LINT_{t-1} + \mu_t \dots\dots\dots 7$$

To test for cointegration among the series, the f-statistic gotten from estimating the linear ARDL in (iv) is compared to the critical values given by Pesaran, Shin and Smith (2001). If the f-statistics is greater than the upper bound value at 5 per cent, it means there is cointegration among the series and hence, the long run and short-run asymmetric models which are given in equations (viii) and (ix) respectively are estimated. However, in a case where the derived f-statistic is less than the lower bound 5 per cent value, it then means there is no cointegration among the series.

$$\log MANQ_t = \alpha_0 + \delta_1 \log MANQ_{t-1} + \delta_2 \log CMAN_{t-1}^{POS} + \delta_3 \log CMAN_{t-1}^{NEG} + \delta_4 LINT_{t-1} + \mu_t \dots\dots\dots 8$$

$$\Delta \log MANQ_t = \alpha_0 + \alpha_1 \sum_{i=0}^n \Delta \log MANQ_{t-i} + \alpha_2 \sum_{i=0}^n \Delta \log CMAN_{t-i}^{POS} + \alpha_3 \sum_{i=0}^n \Delta \log CMAN_{t-i}^{NEG} + \alpha_4 \Delta LINT_{t-1} + \mu_t \dots\dots\dots 9$$

To test for the presence of a significant asymmetric relationship, in the long run, a Wald test is conducted on the respective model using the reduced form of (vii) in the following equation:

$$-\beta^{POS} / \partial = -\beta^{NEG} / \partial \dots\dots\dots 10$$

Where; δ is the lag value of the dependent variable, used in testing for long run asymmetry while β represents long-run coefficients. If the effects are equal (i.e. if the null hypothesis is not rejected), then it implies that there is no significant asymmetric relationship.

Granger Causality Test

To determine the causal relationship among the series, we employed the pairwise Granger causality by Granger (1969). It tests a null hypothesis of “no causality” against its alternative. To conduct the test, the following equations, which predict a variable from its past values and the past values of another variable, were also estimated.

$$LogMANQ_t = \lambda_0 + \lambda_1 \sum_{i=0}^n LogMANQ_{t-i} + \lambda_2 \sum_{i=0}^n LogCMAN_{t-i} + v_t \dots\dots\dots 11$$

$$LogCMAN_t = \lambda_0 + \lambda_1 \sum_{i=0}^n LogCMAN_{t-i} - \lambda_2 \sum_{i=0}^n LogMANQ_{t-i} + v_t \dots\dots\dots 12$$

4. Results

This section contains the presentation and discussion of results from data analysis; it begins with the unit root test for stationarity of series. Results from the test for stationarity using the Phillips-Perron approaches were presented in Table 1. From the table, it is observed that all series including (MANQ, CMAN and LINT) have their test statistics greater in absolute terms than the corresponding critical values only at the first difference. This implies that all the series included are non-stationary series, but only became stationary after first differencing. This finding sets the basis for the conduct of a cointegration test to see if the series is integrated in the long run or not.

Table 1: Unit Root Tests with Intercept and no Trend

Variables	Levels		First Difference		Remark
	PP	5% Critical value	PP	5% Critical value	
<i>LogMANQ</i>	-0.1802	-2.9411	-4.4751	-2.9434	I(1)
<i>LogCMAN</i>	-0.8395	-2.9411	-4.8658	-2.9434	I(1)
<i>LINT</i>	-2.4703	-2.9411	-6.8525	-2.9434	I(1)

Source: Author's Computations Using E-Views 10, 2021

Going further from a test for stationarity, the results of the ARDL bound test for cointegration are presented in Table 2. From the table, it is observed that the f-statistics obtained (27.66) is greater than the upper bound critical values at all levels. This implies that, during the period of study, a long-run relationship exists between manufacturing sector output, bank credit to the manufacturing sector and lending interest rate.

Having established that there is a long-run relationship between the series, the long-run estimates of the coefficients are presented in Table 3. It is observed that of the included series, only lending interest rate (*LINT*) is not statistically significant in influencing manufacturing sector output in Nigeria judging from its probability value of 0.1159 which is greater than 0.05 (5 per cent).

Table 2: Bounds Test (Dependent Variable: LogMANQ)

Test Statistics	Value	K=3
F- Statistics	27.65758	
Critical Value Bounds Significance	I(0)	I(1)
10%	2.37	3.2
5%	2.79	3.67
2.5%	3.15	4.08
1%	3.65	4.66

Source: Author's Computations Using E-Views 10, 2021

The positive changes in manufacturing sector credit (LogCMAN_POS) has a coefficient of 0.75 which implies that a billion naira positive shock in credit to the manufacturing sector will give rise to a 0.75 billion naira increase in manufacturing output in the long run while the negative changes of credit to manufacturing (LogCMAN_NEG) has a coefficient of -51.86 which implies a reduction of manufacturing output by 51.86 billion naira for every billion naira decrease in manufacturing credit. This lends support to the Schumpeterian view of finance and output as it suggests that bank credit is one of the key drivers in the growth of the manufacturing sector and by extension, the economy at large. This is because, even in the long run, bank credit still encourages output growth in the manufacturing sector. The result is in conformity with the findings of Ume et al. (2017), Ogar et al. (2014), and Asaleye et al. (2018) among others.

Table 3: Long-Run Estimates (Dependent Variable: LogMANQ)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LogCMAN_POS	0.745604	0.064490	11.56160	0.0000
LogCMAN_NEG	-51.85711	23.78353	-2.180379	0.0372
LINT	0.069026	0.042638	1.618899	0.1159
C	3.057185	0.347085	8.808181	0.0000

Source: Author's Computations Using E-Views 10, 2021

In Table 4, the study presents the results of the short-run relationship. It is observed from the table that both lending interest rate and negative manufacturing credit changes have their probability values greater than 0.05 hence, are not statistically significant determinants of manufacturing output in the short run. Again, the positive change is observed to be missing from the analysis thereby implying that, it is not important in the short run. This result suggests that in the short run, there may be other sources of financing production in the manufacturing sector that are of more importance than bank loans. Nevertheless in the long-run, as seen from Table 3, bank credits become necessary in the finance of manufacturing output. Again, the error correction coefficient (ε_{t-1}) has a probability value less than 0.05 and has the desired sign, therefore implying that it is statistically significant. The small coefficient size implies a weak error correction, one in which in the case of a disturbance in the system, there is an adjustment towards long-run equilibrium at a speed of 21 per cent. Meanwhile, the coefficient of multiple determination (R^2) is 0.41 which implies that, only about 41 per cent variations of manufacturing output are determined by interest rates and credit to the manufacturing sector, leaving

about 59% to other factors not captured in the model, suggesting that perhaps there might be other more important facts which determine manufacturing output.

Table 4: Short-Run Estimates (Dependent Variable: D(LogMANQ))

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LogCMAN_NEG)	-0.714576	4.273258	-0.167220	0.8683
D(LINT)	0.001292	0.004801	0.269071	0.7897
ε_{t-1}	-0.211608	0.016903	-12.51904	0.0000

$R^2=0.406967$, Adj. $R^2=0.372083$, Durbin-Watson stat = 1.873365

Source: Author's Computations Using E-Views 10, 2021

In Table 5, the result for the Wald test for long run asymmetry is presented. It is observed that for all three statistics used in testing, the null hypothesis of no long-run asymmetry is rejected as all test statistics have their probability values less than 0.05 (5 per cent) hence, the result indicates the presence of a long-run asymmetric relationship between bank credit to the manufacturing sector and manufacturing sector output. Furthermore, results from Granger causality as seen in Table 6 shows that, there is a one-way causality running from manufacturing output to bank credit to manufacturing, thus suggesting that it is the expansion of the manufacturing sector that generates the need for finance. This is in contrast to Asaleye et al. (2018), who discovered a bi-directional causality between bank credit and manufacturing output. Meanwhile, lending interest rates is also seen to Granger cause credit to the manufacturing sector, thereby suggesting that borrowing habits depend on the levels of lending interest rates as the cost of borrowing determines if investors will borrow or not, as well as the amount to borrow.

Table 5: Wald Test for Long-run Asymmetry

Test Statistic	Value	Degree of Freedom	Prob.
t-statistic	2.239213	32	0.0322
F-statistic	5.014076	(1, 32)	0.0322
Chi-square	5.014076	1	0.0251

Source: Author's Computations Using E-Views 10, 2021

Similarly, further results from Table 6 shows a one-way causality running from lending interest rates to manufacturing output. This may not be unrelated to the fact that since borrowing decisions are dependent on the rate charged on interest, the interest charged will also have a key role in the expansion of manufacturing output produced by investments made with the borrowed funds.

Table 6: Pairwise Granger Causality

Null Hypothesis:	F-Statistic	Prob.
LOGMANQ does not Granger Cause LOGCMAN	6.67560	0.0038
LOGCMAN does not Granger Cause LOGMANQ	0.04600	0.9551
LINT does not Granger Cause LOGCMAN	5.70129	0.0076
LOGCMAN does not Granger Cause LINT	1.99582	0.1525
LINT does not Granger Cause LOGMANQ	4.34672	0.0214
LOGMANQ does not Granger Cause LINT	0.67005	0.5187

Source: Author's Computations Using E-Views 10, 2021

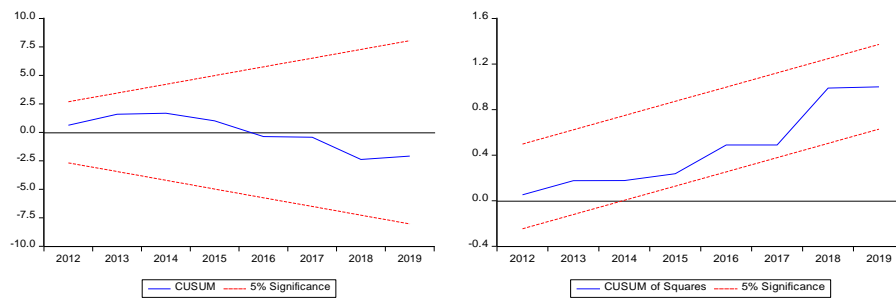
The results for the diagnostic tests conducted to ascertain the fit and reliability of the estimates are summarised in Table 7. From the table, it can be discerned that all four tests presented have their probability values greater than 0.05 (5 per cent) hence, the null hypotheses are accepted.

Table 7: Model Diagnostics

Test Statistics	P-value
Serial Correlation: F-statistic(2, 28)	0.9326
Heteroskedasticity: F-statistic(6, 30)	0.3181
Normality: Jarque-Bera	0.616660
Specification Error: F-statistic(1, 29)	0.5220

Source: Author's Computations Using E-Views 10, 2021

More so, the stability test results for CUSUM and CUSUM of squares presented in Figure 1 show the acceptance of the null hypothesis of stability of estimates since in both cases, the estimated trend line does not exceed the upper and lower boundaries. This means that the model meets the requirements of the classical linear assumptions and thus, the estimates can be trusted.



Source: Author's Computations Using E-Views 10, 2021

5. Conclusion and Recommendations

This study focused on exploring the relationship between bank credit asymmetry and the manufacturing sector output in Nigeria between the periods 1981 and 2019. The study used manufacturing output as a percent of GDP and as a proxy for manufacturing output while bank loans to the manufacturing sector were used as a proxy for bank credit and the lending interest rate was employed as a control for the cost of lending. The study found that there is a long-run relationship between bank credit, manufacturing output and interest rates while the Wald test for long run asymmetry revealed the presence of an asymmetric relationship between bank credit and manufacturing sector output.

NARLD estimates suggest that positive changes in bank credit, in the long-run, is positively related to output while negative changes are negatively related to output. Meanwhile, in the short run, both the positive and negative changes in bank credit have no significant roles in determining manufacturing output. What this simply suggests is that firms in the manufacturing sector may rely more on equity financing in the short run while in the long run, they would have expanded to a point that equity financing would be insufficient hence, may need to resort to

borrowing from banks to supplement. This is supported by the relatively small proportion of variations explained by the model from the R-squared value. The nexus between bank credit and output in the manufacturing sector is further strengthened by the results of causality which suggests that growth precedes finance, thereby contracting Schumpeter (1934) and that borrowing decisions are dependent on the rate of interest being charged. This study, therefore, recommends that monetary authorities make lending rates more attractive to enable investors to borrow more to finance their production activities.

Reference

- Ademu, W. A., Dabwor, T. D. &Ezie, O. (2019).Bank credit and manufacturing sector output in Nigeria: A nonlinear dynamics and structural breaks analysis. *Journal of Economic and Financial Issues*,5(1), 101-128.
- Aigbomian, E. E. &Mamudu, Z. U. (2020).Analysis of the impact of bank credit on the growth of agricultural and manufacturing sectors In Nigeria.*International Journal of Arts and Social Sciences*, 1(2), 25-43.
- Aminu, A., Raifu, I. A. &Oloyede, B. D. (2019). Financial development and manufacturing output growth nexus in Nigeria: The role of institutional quality. *DBN Journal of Economics and Sustainable Growth*. Available at: <https://www.researchgate.net/publication/332008396>
- Andabai, P. W. &Eze, G. P. (2018).Bank credit and manufacturing sector growth in Nigeria (1990-2017): A causality investigation. *International Journal of Economics, Commerce and Management*, 6(3), 326-336.
- Asaleye, A. J.,Adama, J. I. &Ogunjobi, J. O. (2018). Financial sector and manufacturing sector performance: Evidence from Nigeria. *Investment Management and Financial Innovations*, 15(3), 35-48.
- Central Bank of Nigeria (2020).Central Bank of Nigeria Annual Statistical Bulletin, 31(August). Abuja, Nigeria.
- Daniel, G. A., Oluwatobi, A. A., Taiwo, M. &Julius, F. F.(2017).Banks credits and manufacturing growth in Nigeria.*Nigerian Journal of Management Sciences*, 6(1), 276-284.
- Elijah, S. (2018). An empirical analysis of the impact of bank credit on the manufacturing sector output in Nigeria (1986-2016).*Journal of Economics Library*, 5(4), 371-382.
- Emmanuel, I. O., Olupeeka, O. &Adeyinka, A. J. (2020).Commercial banks credit and the performance of real sector in Nigeria: 1990-2017. *American International Journal of Supply Chain Management*, 1(1), 1-15.
- Goshit, G. G., Dabwor, T. D. & Kromtit, M. J. (2018). Monetary policy and manufacturing sector output in Nigeria: An empirical investigation. *Benue Journal of Social Sciences*, 5(2), 19-35.
- Gurley, J.G., and E.S. Shaw.(1960). Money in a theory of finance. Washington: Brookings.
- Hung, F. (2009).Explaining the nonlinear effects of financial development on economic growth.*Journal of Economics*,97(1), 41-65.
- John, E. E. & Terhember, I. O. (2016).Commercial bank credit and manufacturing sector output in Nigeria. *Journal of Economics and Sustainable Development*, 7(16), 189-196.

- Jung, W. S. (1986). Financial development and economic growth: International evidence. *Economic Development and Cultural Change*, 34(2), 333-346.
- Kaldor, N. (1966). Causes of the slow rate of economic growth in the United Kingdom. In: Kaldor, N. (Ed.), *Further Essays on Economic Theory*. Holmes & Meier, N. York, 282–310.
- Kalu, E. U., Okoyeuzu, C. R., Okechukwu, E. U. & Ukpere, W. I. (2019). Financial deepening and sustained economic growth in Nigeria: What nonlinear models reveal. *Journal of Reviews on Global Economics*, 8, 1320-1328.
- Law, S. H. & Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking & Finance*, 41, 36-44.
- Mesagan, E., Olunkwa, N. & Yusuf, I. (2018). Financial development and manufacturing performance: The Nigerian case. *Studies in Business and Economics*, 13(1), 97-111.
- Odhiambo, N. M. (2009). Electricity consumption and economic growth in South Africa: A trivariate causality test. *Energy Economics*, 31(5), 635–640.
- Ogar, A., Nkamare, S.E. & Effiong, C. (2014). Commercial bank credit and its contributions on manufacturing sector in Nigeria. *Research Journal of Finance and Accounting*, 5(22), 188-196.
- Ogunmuyiwa, M. S., Okuneye, B. A. & Amaefule, J. N. (201). Bank credit and growth of the manufacturing sector nexus in Nigeria: An ARDL approach. *EuroEconomica*, 2(36), 62-72.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.
- Phillips P. C. B. & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 75, 335-346.
- Robinson, J. (1952). The model of an expanding economy. *The Economic Journal*, 62(245), 42-53.
- Schumpeter, J. A. (1934). The theory of economic development. In Jhingan, M. L. *The economics of development and planning*, 40th Revised Edition. Vrinda Publications (P) Ltd, Delhi, India.
- Shin, Y., Yu, B. & Greenwood-Nimmo, M. (2014). Modelling asymmetric cointegration and dynamic multipliers in a nonlinear ARDL framework. In Sickles, R., Horrace, W. (eds). *Festschrift in honour of Peter Schmidt*. Springer, New York, NY. Available at: https://doi.org/10.1007/978-1-4899-8008-3_9
- Soludo, C. C. (2004). Consolidation of the Nigerian banking industry to meet the development challenges of the 21st century. An address delivered to the special meeting of the Bankers Committee, July 6, at the CBN Headquarters, Abuja.
- Toby, A. J. & Peterside, D. B. (2014). Analysis of the role of banks in financing the agriculture and manufacturing sectors in Nigeria. *IMPACT International Journal of Research in Business Management*, 2(2), 9-22.
- Ume, K. E., Obasikene, A. C., Oleka, C. D., Nwadike, A. O. & Okoyeuzu, C. (2017). The relative impact of bank credit on manufacturing sector in Nigeria. *International Journal of Economics and Financial Issues*, 7(2), 196-201.
- World Bank (2020). *World Development Indicators*. Washington DC; World Bank.

External Debt Overhang and Crowding Out Effect on Investment in Nigeria Economy

Wilson Ebhotemhen¹ & Olawale Hezekiah¹

¹Department of Economics Edo State University Uzairue KM. 7, Auchi Abuja Road, Iyamho – Uzairue Edo State, Nigeria

Correspondence Email: harlyns1974@gmail.com

Abstract

This study examines the impact of debt overhang and crowding out effects hypotheses on investment in Nigeria for the period of 1981 to 2018. A three-stage least squares (3SLS) estimation technique was used after the identification condition was carried out. Simulation was also conducted on the macroeconomic model. The coefficient of the National Income (GDP) is in line with the apriori expectation and also the other explanatory variables. From the results obtained, the variables were stationary at first difference I(1). From the estimated model, all the variable became significant at the 0.05 per cent level. There was no autocorrelation in the estimated model. The simulated results indicate that 10 per cent reduction in the external debt overhang show a negligible impact on investment. When the 50 per cent reduction of external debt overhang was tested, it indicates a higher level impact of 34.18 per cent. Based on these findings, it is therefore recommended that, the government should ensure that external loans are optimally deployed into investment in order to increase the volume of export goods and our National Income so as to enable debt repayment and use the balance to increase the productive investments in the economy.

Keywords: External Debt, Investment, Crowding-out, Error Correction Mechanism

JEL Classification: E20, H60, H63

1. Introduction

Every government of a nation requires economic growth and development through investment increase for the purposes of improving the welfare of their citizens and to enhance the development of their countries. In the desire to achieve this target through investments, governments formulate and implement various policies which can encourage an enabling environment for the local and foreign investors. In addition, government can equally undertake investment programme in the economy, like social services and infrastructures such as education, health, roads, social-securities, rail and air ports etc. As a result of this, government inevitably obtained external loans to finance the needed investment necessary for development (Adesola, 2017). Developing countries like Nigeria are also faced with the issue of capital scarcity, as such, forcing the country to acquire external

loan in order to supplement or fill the saving-investment gap or export-import gap (dual gap) which as a result of the fall of the export prices especially the oil shock of 1970s, 80s and till date.

Sachs (2013) argues that growth will not take place until the capital stock has risen to a given threshold of 20 – 30 per cent of GDP, particularly in the developing countries like Nigeria. According to his view, increase in savings and investments accelerate economic growth. In addition, as capital rises, investment and outputs rises, so in a vicious circle, hence the level of savings will continue to increase. Being that as it may, after a given threshold of 16 per cent of GDP, further increase in capital and savings will be enough to achieve golden age growth path of an economy. External borrowing remains the bases for the developing nations to achieve a greater volume of investment possibility (Wahiba, 2014).

The rationale for choosing external borrowing as a means to ensuring sustainable development instead of utilizing the domestic resources is given in the ‘dual-gap’ analysis (Egbetunde, 2016). Though, public debts is simply referring to debt within country, from other countries, banks, and non-banking financial institutions, private individuals and associate friends (Dewett & Navalur, 2015). External debts on the other hand are debts that are obtained from the foreign creditors and they do not translate into burden when the borrowed funds are optimally deployed into investment areas in the economy.

There is no country in the world today that is completely free from debt issue. However, the question that always comes to mind is that, is external loan worthwhile or deleterious to a country’s well-being or should countries embark on external borrowing? There appeared to be no ready answer to these questions, ideas are divided among different scholars. Having put these questions to the ordinary Nigerian citizens, the answer is always ‘debt is harmful to their welfare. They will not sympathize on the strength of historical debt antecedent of Nigeria and the deleterious effects it had caused on the well-being of the citizens and the country at large. In fact, external borrowing is a supplement to domestic savings as a means to bridge investment-savings gap. The rationale for dual gap analysis (investments-savings) and export-import (X-M) that is foreign exchange gap indicate foreign loans can also be seen as a supplement to foreign exchange earnings in order to achieve a faster growth rate needed for development. Often time, the gap between the foreign exchange earnings is larger than domestic investment-savings gap, and the domestic resources are not easily available for the required investment. In order to achieve the needed investment for the economy to drive, external loans have to be obtained to fill the gaps.

The beginning of the Nigeria external debt can be trace back to 1968 when amount of \$28 million was borrowed for railway construction. Debt was not a problem in Nigeria until 1982, this was as a result of the collapse of the oil prices and the pressure on the government to finance huge capital project and to support balance of payments deficits (Adesola, 2014). Based on this, Nigeria debt profile had been on the increase with a huge debt service problem. The debt burden service issue has remained a sensitive issue among various scholars in Nigeria. Onyeiwu (2012),

considered this as a malignant issue affecting the Nigerian economy, meanwhile Okoduwa (2011), saw it as a gun powder that threatens economic fortunes of the developing countries particularly Nigeria. Anyinwe (2012), was disturb at heart by asking what legacy of the type the present generation will bequeath to the future generation with a huge sum of debts owed to the foreign creditors. Ajayi (2013), pointed out that the great children of the current generation will bear the burden of servicing these external debts and he further described this as ‘evergreen’ for the creditors and ‘unlimited hell’ for the borrower.

Ndubuisi (2011) examined the Effect of External Debt Relief on Sustainable Economic Growth and Development in Nigeria using Chi-square, Regression and Correlation analysis to test the relationship between external and internal debt stock in relation to debt relief, but the present author proceeds to bridge the gap by using Three-stage Least Square (3SLS) regression technique.

The above assertions coupled with the debt servicing issues are associated with the external debt borrowing, particularly the foreign debt crisis of the 1980s which still lingers on till today in Nigeria. The external debt owed to the foreign loan owners as at 1981 is ₦2331.2 million and over the years the debt has been on the increase. In 2004, Nigeria witnessed external debt reduction from ₦489029 billion to ₦43889 billion in 2007 (CBN 2018). Sudden rise of external debt to ₦775920 billion and the servicing cost to ₦216137 billion in 2018 remained a matter of serious concern (CBN 2018). Debts do not translate into burden if the borrowed funds are optimally deployed into investment areas in the economy. This study aims to contribute to the understanding of external borrowing for the Nigeria development goals and also other developing nations in the world. Therefore, this study tends to investigate the effect of external debt overhang and its crowding out effect on investment in Nigeria economy. This paper consists of five sections. The next is the literature review. Section 3 takes a look at the methodology. The results and discussion of findings in section 4 while conclusion and policy recommendations are in section 5.

2. Literature Review

Conceptual Issues

Crowding out Effect Hypothesis: The crowding out effect hypothesis refers to accumulation of external debt which leads to adverse effects on economic growth of the debtor country hence there exist an inverse relationship with economic growth. The reason being that, a part of the foreign exchange earnings has been used for the external debt service payment and is not available for investment oriented programs. The issue refers to the fact that heavily indebted countries are likely to be bedeviled by financial constraint which is found to be tantamount to high interest rate and can adversely affect the level of investment in the developing country like Nigeria. Increase in interest rate coupled with inflationary pressure worsen the aggregate macroeconomics performance and this further worsen investment and limit rate of economic growth. Cohen (1997), asserts that the liquidity constraint is captured as a ‘crowding out’ to debt impact on investment since it leads to the reduction of foreign exchange earnings which would have been

available for further investment. He added by saying that a reduction in the current debt service would stimulate investment growth. Taylor (2003), considered the consequential effect of external debt service on the government expenditure. He found out that the damaged effect of debt service is as a result of dearth capital occasioned by debt-induced liquidity squeeze.

Kambor, Classn and Detragiach (2016), opine that for the reason being huge amounts is utilized for debt service limit investment by way of hindering access to international financial markets. However, public expenditure has remained the major determinant of economic activities of other sectors in the economies of the developing nations. By implication, any liquidity squeeze by the debt servicing countries will definitely shift away public investment (Fosu, 2017).

Moha (2009), considered the effect of crowding out and disincentive on the economy as a result of the mounting debt accumulation pressure which depresses investment in Nigeria. In due cause, Krugman (2008), states that crowding out effect of external debt arises from the fact that a number of poor countries often divert foreign exchange earned and also foreign aids for the accumulated debt service obligations.

External debt does not only lead to crowding out public investment but also dampen growth by way of crowding out private investment. Similar to the same line of reasoning, Clement (2013), explains that increase in debt service raises the government interest bill and also leads to budget deficit, and this also leads to decrease in savings which in due time warrants increase in interest rate for private investment. Greater debt service payment has adverse effect on public expenditure by squeezing the resources available for the purpose of infrastructural development. By these activities, no doubt that external debt remained the key barrier for meeting human basic requirement in Nigeria.

Debt overhang Hypothesis: Various researchers explained debt overhang hypothesis at different times. Borensztein (1996), described debt overhang as a situation when countries found it difficult to service their debt in full and payments are determined by negotiation process with the creditors. Ugwuanyi (2017) states that many developing countries among the sub-Saharan Africa has been trapped by huge external debt which they find difficult to pay. In his view, the problem was compounded by more external loans obtained from the foreign creditors as the deteriorating world prices of primary export goods hindered them to have favourable balance of payments which will enable them to fulfill debt service obligation.

This type of situation in Nigeria called for debt-rescheduling, debt service restructuring, negotiation for debt forgiveness and debt equity swap. All these were pursued in order to reduce the negative effects of debt overhang. Bhattacharya, Clement and Nguyen (2013) exert that in a theoretical literature on the relationship between the stock of external debt and growth focus on the adverse effects of debt overhang.

Krugman (2008), had it that debt overhang is a situation where the expected repayment of external loan falls short relative to the contractual value of debt. By this, it is explained that the country debt level exceeds the country's debt repayment ability being that debt service remains an increasing function of the country export earnings. Note that some of the local investment goods are heavily taxed away by the foreign creditors, some of the foreign earnings from the exported goods are available for investment.

In the view of Sahmano and Serven (2001), explain that debt as an act of anticipated foreign tax is a way of reducing the incentive from investment and savings thereby promoting capital flight. Being that as it may, the combination of vicious circle of external debt stock and debt service burden, Iyoha (2002), view it as a problem affecting the developing countries in the sub-Saharan Africa as it leads to low foreign exchange earnings, which further results to import strangulation. Import strangulation holds back export growth by a way of limiting import goods. Therefore, the debt overhang arising from debt further reduced investment. Reduction in investment along with the short fall in the essential imports goods lead to a decline in the real output. Reduction in output therefore and current account deficits results to a rise in debt service obligations. All these as a whole account for the debt overhang and crowding out effect of external debt on investment in the economy.

Empirical Issues

External borrowing has in recent time become a source of government finance. Budget deficit explained the excess of government expenditure over its revenues and debt; therefore budget deficit can be regarded as accumulated values of previous deficits (Rosen, 2009). However, the major area of interest is whether or not external borrowing warrant investment. Researchers do not have the same view on this as indicated in our literature. Calvo (2009), opines that a high level of initial debt is associated with high tax burden during the process of debt service, as a result, a lower rate of return on investment will occur. A high economic growth reduces the impact of such debt service payment. When the value of debt exceeds the necessary rate of returns, the economy settled in a region characterized by low growth. If the growth rate of the economy is found lower than debt itself, the tax burden will become high and the rate of capital accumulation will become low which will further contribute to low growth of the economy.

In another study carried out by Ndubuisi (2011) on the Effect of External Debt Relief on Sustainable Economic Growth and Development in Nigeria used Chi-square, Regression and Correlation analysis to test the relationship between external and internal debt stock in relation to debt relief, the study found out that there is a relationship between external and internal debt stock in relation to debt relief, it also discovered that, debt relief affected the economic growth of the economy and that gradual reforms and investments will help to bring back a healthy economy for the nation. In the study by Mohd-Daud, Halim-Ahmad and Azman-Saini (2013), empirical analysis was employed to account for the impact of external debt to the Malaysian economy. Autoregressive Distributed Lag (ARDL) and bound test were conducted in line with objectives of the study. Furthermore,

the existence of the threshold effect was examined in order to determine the optimal level of external debt. The results reveal that the accumulation of external debt is associated with the level of increase in economic growth in Malaysia up to an optimal level, and further rise in external indebtedness beyond the level will adversely affect the Malaysia economy.

Faraji and Mkame (2015), examined the impact of external debt on economic growth of Tanzania beginning from 1990 to 2013. The study makes use of time series data on external debt and other macroeconomics performance. The results obtained in the study reveal that there exist significant impact of the external debt and debt service payment. Wamboye (2016) examined the impact of government external debt on the economic growth of forty less developing countries. The author used Arellano-Bond SGMM technique on unbalanced panel data, spanning from the period of 1975 to 2014. A comparative analysis based on different specifications was provided. The results revealed that high external debt depresses economic growth. The study therefore adds that debt relief initiatives have remained important evidence of low debt effect on growth. Al-Zeaud (2016) investigated the impact of external debt on the performance of the Jordanian economy. Clear evidence from the empirical results showed that increase in the population growth and external debt has demonstrated a non-significant and significant role respectively towards economic growth in Jordan. The results added that, external debt enhances growth while the population increase hinders it. The study therefore recommends that in order for Jordan to attain a sustainable economic growth, population increase should be discouraged while population decrease should be encouraged.

Edimeligil and Mucuk (2017) investigated the impact of external debt on economic growth in Turkey by using Vector Auto Regressive (VECM) technique with quarterly data for a period of 2000:01 – 2015:04. The results of the co-integration test, Variance Decomposition test, Impulse Response Function show that, there exists co-integration among the variables used. Ben Ali and Sadraoui (2017) investigated the relevance of external loans in financing economic development in African countries. The study was modelled by Patillo et al (2007) and it employed technical panel and thereby combined countries that are highly indebted in addition with the major determinants of growth. The results reveal that for the North African countries, external debt is not a barrier to development when it is within a reasonable limit. However, a rise in debt service payment leads to inverse impact on growth and the impact of this, depends on investment on which the external loan is used. Sen, Kasibhatia and Stewart (2017) investigated the impact of debt overhang on economic growth in Asia and Latin America. In the study, panel data was employ to test the existence of debt overhang in the two countries. The results showed that debt overhang reduced the growth in the Latin American country and the impact on the Asian country was found to be moderately negative.

In addition, Pervin and Shad (2018) examined the significance of dependence of the Bangladesh economy on external borrowing to account for the period 1974 to 2016. In order to properly account for the debt overhang and crowding out effect of external debt, they segmented the external debt burden into external debt service

and external debt stock. The results obtained showed that there is a long-run significant relationship between external debt stock and external debt service on economic growth. The results never found issues of debt overhang. However, the results reveal that crowding out effect was because of the presence of foreign debt service payment within the period. Kasidi and Said (2018) investigated the impact of external debt on economic growth of Tanzania covering the period of 1990 to 2016. They estimated a growth model utilizing GDP, external debt and debt servicing. Ordinary Least Squares technique was used. The results revealed significant effect of external debt and debt service on the economic growth.

Many of these studies literature reviewed above concentrated on external debt and economic growth, they did not focus on examining the validity or otherwise of the debt overhang and crowding out of the external debt in Nigeria economy. Sen, Kasibhatia and Steward (2017) studied the impact of external debt overhang on economic growth in Asia and Latin America economy using panel data technique. Therefore, this study attempt to bridge the gap discovered in the literature by investigating the impact of external debt overhang and its crowding effect on investment in Nigeria economy using Three Stage Least Squares (3SLS). This technique will enable the researcher to validate the presence of external debt overhang and crowding effect on investment in Nigeria.

3. Methodology

Theoretical Model

Investment-Saving Gap: In Investment-Saving Gap, external borrowed funds must be adequate for the short fall from domestic savings for us to obtain the target rate of investment relevant for growth in the economy. The area of emphasis is to determine the weight of the gap that is necessary to be filled by the external loans. Hence ‘r’ which is our target growth rate necessary for the foreign loans in the base year is given as:

$$F_0 = I_0 - S_0 = Y_0cr - Y_0s_a = Y_0(cr-s_a) \dots\dots\dots 1$$

Where, I_0 is the investment during the base year, S_0 , is the savings in the base year period, Y_0 , is the income during the base year, c , is the incremental capital-output ratio, s_a , is the average savings ratio and r is the target growth rate.

For the fact that savings is required to rise over time, we can state the savings function as:

$$S_t = S_a Y_0 + S^1(Y_t - Y_0) = (S_a - S^1) Y_0 + S^1 Y_t \dots\dots\dots 2$$

Where ‘ S^1 ’ is the savings ratio. We can rewrite the investment function with respect to ‘t’ as: $I_t = Y_t c_t \dots\dots\dots 3$

Combining equations (2) and (3) the net inflow of the amount of capital in time is therefore guaranteed at time ‘s’ which is stated as

$$F_t = Y_t c_t - [(S_a - S^1) Y_0 + S^1 Y_t] \dots\dots\dots 4$$

The difference between equation (2) and (4) which is referred as the difference between the loans required during the base year and amount of loans needed at time 't', hence we can have $C_t(Y_t - Y_0) - S^l(Y_t - Y_0)$ 5

Therefore, this can be regarded as:

$$F_1 - F_0 = \Delta I - \Delta S \text{ 6}$$

This is taken as an external capital finance, which is the difference between a rise in the amount of savings generated as a result of increase in income and investment needed in the economy. A reduction in foreign aids i.e. $F_1 < F_0$, ΔI is found less than ΔS . When this occur, the investment-saving gap will seize to exist and there will be an increase in savings necessary to generate a rise in investment.

From equation (4) the amount of growth in investment is realizable by the inflow of external capital, i.e.

$$Y = \frac{1}{c} \left[(S_a - S^l) \frac{Y_0}{Y_t} S^l + \frac{F_0}{Y_t} \right] \text{ 7}$$

The derivative is positive; the inflow of external capital is achieved with a better growth so long as there is absence of increase in the $\frac{Y}{K}$ (capita output -ratio) a fall in the marginal rate of savings.

Therefore, equation (5) becomes at a given year say nth $F_n = 0$

$$(c_r - s^l) Y_n + (s^l - s_a) Y_0 = 0 \text{ 8}$$

$$(s^l - s_a) + (s^l - s_a) Y_a$$

Hence,

$$(s^l - s_a) Y_0 = + (s^l - c_r) Y_n$$

$$Y_0 = \left[\frac{s^l - s_a}{s^l - c_r} \right] Y_n \text{ 9}$$

$$\text{Since } Y_n = Y_0 (1+r)^n \text{ 10}$$

So that,

$$(1+r)^n = \frac{s^l - s_a}{s^l - c_r} \text{ 11}$$

Taken a look at equation (9), it can be established that 'n' can be obtained to enable increase in investment.

The type of macroeconomic model to be considered in this study is a stochastic equation which comprises of debt overhang and crowding out effect variables of external debt. The equation is investment type. The technique of analysis used in this research study is the Three Stage Least Squares (3SLS). This requires full information method and complete specification of the model is taken into account explicitly. The rationale for this technique is base on the fact that the system estimator uses more information, therefore, the technique yields estimates that are

consistent and efficient (Iyoha, 2004). This will enable the study to validate the existence of debt overhang and its crowding effect on investment in the economy.

Many economists are of the opinion that poor investment performance of the highly indebted developing countries since the beginning of the debt crisis which erupted in 1982 can be attributed to dis-incentive effect arisen from the external debt burden (Iyoha, 2002). Montiel and Agenor (2006) had it that much stock of external debt is likely to cause high expectation that debt service could be financed by tax revenue or cut from the productive public investment. Harmonize with theoretical model

Based on the theoretical evidence on debt overhang and crowding out effect, this study uses annual time series data for the period of thirty-eight (38) years that is 1981 to 2018. The study obtains the data mainly from various secondary sources such as National Bureau of Statistics, Annual Report and Statement of Accounts and other documents of the Central Bank of Nigeria. Calve (1998), Krugman (1988), Iyoha (2002) and Elbadawi (1996) specified external debt and public investment in Nigeria. In the model, the following variables were included: ratio of debt service to export (DSE_t), Public investment GDP ratio ($GPUIV_t$), lagged values of foreign private investment ($FPUIV_{t-1}$), external debt to GDP ratio ($EXDGDPT$) and human capital development (HCD_t). These were measured using Ordinary Least Squares technique. Considering the above, the model for this study is therefore specified by including our variables of interest which are found relevant in the study:

$$IVT_t = f\{INT_t, GDP_t, (D/X)_t, (D/GDP)_{t-1}\} \dots\dots\dots 12$$

From equation (12) above, the model is formulated as

$$IVT_t = \partial_0 + \partial_1 INT_t + \partial_2 GDP_t + \partial_3 (D/X)_t + \partial_4 (D/GDP)_{t-1} + U_t \dots\dots\dots 13$$

$$\partial_2 > 0, \partial_1, \partial_3 \text{ and } \partial_4 < 0$$

Where: IVT_t = Investment, INT_t = Interest rate, GDP_t = National Income, $(D/X)_t$ = External Debt Service–Export Ratio, $(D/GDP)_{t-1}$ = Lagged values of External Debt – Income Ratio, U_t = Error term

Given equation (13), it is hypothesized that only the coefficient ∂_2 , has a direct relationship with the endogenous variable that is, increase in national income directly influence investment. All other coefficients such as ∂_1 , ∂_3 and ∂_4 indicate inverse relationship with IVT_t . The reason being that a high debt Service–export ratio $(D/X)_t$ will crowd out investment, while the coefficient of interest rate ' ∂_1 ', also indicates similar relationship with IVT_t , being the cost of investment.

The debt overhang hypothesis has it that the accumulated external debt of the developing countries acts as a tax on future investment earnings, thus reduces investment. Montiel and Agenor (2006) therefore opine that much stock of external debt is likely to cause high expectation that debt service could be financed from the revenue of productive investment.

4. Results

Unit Root Tests

The examination for ascertaining the presence of unit roots is often conducted to determine the time series behavior of the variables used in a study. The unit root test ascertains the order of integration of both endogenous and exogenous variables in a given model. Therefore, the study tested for the presence of unit root using Augmented Dickey-Fuller test for the purpose of overcoming the problem of spurious regression which is often associated with non-stationary time series. The order of integration would enable the study to ascertain a number of time a variable will be differenced in order to achieve stationarity. It will also give the study the standing ground to make meaningful inferences from the estimation of the variables under investigation. In order to do away with pitfall of incorrect inference arising from the non-stationary regression, the time series data used in our research study were rendered stationary. In this our research study, 0.05% test critical value is applied. Hence, the findings of the unit root test obtained are in table 1 and 2 underneath.

Table 1: Unit root test results at level using Augmented Dickey-Fuller Criterion

Variables	ADF test Statistic at Levels	ADF at 5% Critical Value	Order of integration
IVT	3.7297	-2.9530	I(0)
INT	-4.5115	-2.9561	I(0)
GDP	4.1136	-2.9677	I(0)
D/X	-0.5916	-2.9728	I(0)
D/GDP	-0.5570	-2.9728	I(0)

Source: Author's Computation from the Estimated Results

Table 2: ADF Unit root test results at 1ST Difference

Variables	ADF test Statistic at Levels	ADF at 5% Critical Value	Order of integration
IVT	-5.2602	-2.9571	I(1)
GDP	-4.5214	-2.9605	I(1)
D/X	-2.9774	-2.9718	I(1)
D/GDP	-3.8328	-2.9658	I(1)

Source: Author's Computation

The results in Table 2 above show that Investment (IVT), National Income (GDP), External Debt Service-Export Ratio (D/X) and External Debt-GDP Ratio (D/GDP) are found stationary at first difference while in table 1, only Interest Rate variable is stationary at that level. Therefore, the H_0 (null hypothesis), 'which states that the variables are characterised with unit root', following Box-Jenkins (1978) proposition of differencing can be rejected at 0.05% significance level.

Table 3: 3SLS Estimated Equation with Investment (IVT) as Dependent Variable

Variables	Coefficients	T-statistics	Prob-value
C	277.5515	0.5602	0.4132
DINT _t	-0.3441	-2.5249	0.0158
DGDP _t	4.1522	2.0611	0.0034
DD/X _t	1.5630	3.1245	0.0011
DD/GDP _{t-1}	12.0533	7.5484	0.0013
R ² = 0.84			
R ⁻² = 76			
D.W = 1.78			

Source: Author's regression output

The estimated investment model given in table 1 above indicates that out of the four exogenous variables, three of them have direct relationship with investment (IVT) being the dependent variable, viz; current value of National Income (GDP), Debt-Export Ratio and Lagged values of External Debt – Income Ratio. However, Interest Rate exhibits indirect relationship with the dependent variable IVT for the reason being that a rise in interest rate will crowd out investment.

Besides, the exogenous variables employed in our model are highly significant at the 0.05% level given the probability values. The goodness of fit is okay as it shows 84% of the systematic variation in the dependent variable caused by the independent variables, by the reason of the value of the coefficient of determination (R²). The result of the coefficient of determination was further attested to by adjusted value of the coefficient of determination (R⁻²) which reveals that about 76 per cent of the variation in IVT was accounted for by the independent variables after adjusting for the degree of freedom. In general, our estimated model performed satisfactorily as all the variables met their a priori expectations. And they are all statistically significant at the 5% level; the estimated model did not see any evidence of crowding out investment. Research method of this study differs from most studies that were reviewed in this study, the reason being that most of the studies used Ordinary Least Squares (OLS) technique, thus making comparison a little weak. For example, the result of Al-Zeaud (2016) had it that, external debt does not contribute to GDP and GDP does not contribute to external debt. Adesola (2017) concludes that, debt repayment servicing to creditors actually affects growth directly while Calvo(2009) study conclude that there, is no causality between external debt and economic growth in Nigeria.

The coefficient of D/X i.e. the ratio of external debt Service to Export is directly related to investment but contrary to our expected prediction, though found statistically significant at the 0.05% level. The meaning is that a high proportion of export to external debt payment accounts for a rise in investment outputs. This been the case, implies that the external loans were optimally deployed to domestic investment to increase our export goods. Hence the rise in export enabled debt service obligation and the balance for investment growth. The findings of this study are in line with Al-Zeaud (2016), who investigated the impact of external debt on the performance of the Jordanian economy. Clear evidence from the empirical

results showed that, increase in external debt have demonstrated a significant role in investment output of Jordan economy.

In addition, the coefficient of External Debt-Income ratio (D/GDP) show a direct relationship with investment output (IVT) and statistically significant at the 5 per cent level. This is contrary to our expected prediction because given the results obtained implies that as the proportion of National Income to external debt payment increases, the level of our investment output rises. The justification for this might be that there exist a continuous increase in the GDP hence there was enough balance after debt repayment for investment drive in the economy. However, the result is contrary to the work of Calvo (2009), who opines that a high level of initial debt is associated with high tax burden during the process of debt service; as a result, a smaller rate of return on investment will occur. The findings of this study contradict the findings of Calvo (2009), for the reason being that, there exists a continuous rise in the National Income.

The results of the Investment equation further show that there is no autocorrelation in the estimated model as the Durbin-Watson statistical value of 1.78 can be approximated to 2.0

Table 4: Historical Simulation

Model	Theil's Inequality Coefficients	Theil's Inequality Test Coefficients		
		Theil's Inequality Test Bias Proportion	Variance Proportion	Covariance Proportion
Investment	0.2344	0.0000	0.0954	0.9132

Source: Author's regression output

For the researcher to examine the forecasting power of the model of this study, Theil's Inequality test was used. This goes deep to facilitates the evaluation of the reliability of the estimated model. The output obtained is thereby summarized in table 4 above, indicating that Theil's Inequality Coefficient of the estimated model been decomposed into bias, variance and covariance in proportions. Given the equation, the estimated model performs very well the reason being that the values of the Theil's Inequality Coefficient indicate less than one. The same holds for the bias, variance and covariance proportions of the given model. The interpretation of these indices is that our model for this study is good and robust for forecasting and also policy simulation.

Table 5: Simulation Outputs

Simulation Experiments Having a Reduction in External Debt Overhang	
IVT (%)	
10%	6.47
50%	34.18

Source: Author's regression output

For us to ascertain the degree of the impact of reduction in the external debt overhang on investment in Nigeria from our estimated model, a simulation

experiment was carried out. Two cases of 10% and 50% reduction in the external debt overhang was conducted given the summarized results in table 5 above.

The 10% reduction in the external debt overhang only yields 6.47 per cent impact on investment. In the same line of reasoning, when the test was conducted using 50% reduction in external debt overhang, investment rose to 34.18%. By implication, reduction in the Nigeria external debt overhang is necessary as this will induce investment in the Nigerian economy.

5. Conclusion and Recommendations

The coefficients of the estimated model agree with the a priori expectation which indicates absence of crowding out investment in the Nigerian economy. On the basis of this, Nigeria should accommodate external loans obtained from the foreign creditors because, if the borrowed funds are optimally deployed into investment areas in an economy, the returns will be adequate for debt repayment and the balance for investment expansion. For this purpose, the policy makers need to appraise today debt situation for the purpose of appreciating the enormity of the problems. In order to do this and from the results of our study, this study recommends that Nigeria, external loans should be optimally allocated to the productive investments for the reason of increasing the volume of export goods so as to enable debt repayment and use the balance for the productive investment in Nigeria. A low rate of interest is necessary for the reason of sustainable investment, and efficient and effective utilization of various factor inputs are important for investment expansion.

References

- Adesola, W.A. (2017). Debt Servicing and Economic Growth: An Empirical Investigation. *Global Journal of Social Sciences*, 38 (3)
- Ajayi, I.B. (2013). Effect of External Debt on Economic Growth and Development in Nigeria. *International Journal of Business and Social Sciences* 3(12).
- Al-zead, H. A. (2016). Public Debt & Economic Growth: An Empirical Assessment. *European Scientific Journal*, 10(4)
- Anyinwe, M. A. (2012). External Debt Management of the 21st Century Nigeria G.N. Osagie Proceeding of National Conference on Debt, Financial/Economic Stability and Public. A.A.U., Ekpoma,
- Borensztein, E. (1996). Debt Overhang, Debt Reduction & Investment: The case of Philippines. International Monetary Fund Working paper, N0. WP/9078.
- Calvo, G. A. (2009). Debt Growth & Economic Transformation: The Capital Flight Problem. In Coricelli, F; Masscimo and Frank H. (Eds), *New Theories in Growth and Development*, St. Martin's Press, New York.
- Central Bank of Nigeria (2018). Statistical Bulletin Vol. 24 December.
- Clement, B. & Nguyen, T.Q. (2013). External Debt, Public Investment, and Growth in Low-Income Countries. International Monetary Fund Working Paper, N0 WP/03,248.
- Cohen, D. (1997). Growth and External Debt: A new Perspective on the African and Latin. America Tragedies. Centre for Economic Policy Research Discussion Paper, N0. 1753, 1-17.

- Cuddington, E. (1998). Investment Incentive; New Money, Debt Relief and Critical Role of Conditionality in the Debt Crisis. *World Bank Economic Review*, 14(1), 17-41.
- Dewett, K.K. & Navalur, M.N. (2015). *Modern Economic Theory*, Shymlal Charity Trust, New Delhi, India.
- Egbetunde, T. (2016). *External Borrowing and Economic Growth in Nigeria*. Department of Economics and Financial Studies, Fountain University, Oshogbo, Nigeria.
- Elbdawi, A.I. (1996). "Debt Overhang and Economic Growth in Sub-Saharan Africa. AERC, Nairobi, Kenya.
- Faraji, U. & Mkane, H. (2015). "Debt and Economic Growth in the European Union: What Causes What? Liboa School of Economics and Management Working Paper, Lisbon, WP/2015/DE/UECE.
- Fosu, A.K. (2017). *The External Debt-Servicing Constraint and Public Expenditure Composition: Evidence from African Economists*. UNU-WIDER Research Paper N0 2017/38
- Iyoha, M.A. (2002). *Macroeconomics: Theory and Policy*. Mareh Publishers Benin-City, Nigeria.
- Kamber, D., Classn, P. & Detragiach, O. (2016). "Impact of External Debt on Economic Growth In Nigeria; AVAR Approach". *Journal of Business Management and Administration*, 3(1), 1-15
- Kasidi, F. Said, A.M. (2018). "Impact of External Debt on Economic Growth; A Case Study of Tanzania". *Advances in Management and Applied Economics*, 3(4), 59-82.
- Krugman, P. (1998). Financing VS. Forgiving a Debt Overhang. *Journal of Development Economics*, 29.
- Mohad Daud, S.N., Ahmad, A.H. & Saini-Azman, W.N.W. (2013). Does External Debt Contribute to Malaysian Economic Growth? *Ekonomika Istrazvanja-Economic Research*, 26(2), 51-68
- Moha, A. E. (2009). Foreign Direct Investment and Growth in Nigeria: An Empirical Investigation. *Journal of Policy Modelling*, 26.
- Onyeiwu, S. (2012). "Dependent Industrialization and Nigeria Debt Crisis" in G.N. Osagie (ed), *Proceeding of National Conference on Debt Financial/Economic Stability and Public Policy*, A.A.U.Ekpoma.
- Patillo, C. Poirson, H. & Ricci, L.A. (2011). External Debt and Growth. *Review of Economics and Institutions*, IMF, 2(3), ISSN 1379-2038
- Sachs, J. (2013). The Debt Overhang of Developing Countries. In Calvo, G. Findlay, R., Kouri, P. and Macedo, J. (Eds). *Debt Stabilization and Development*, Basil Blackwell, Oxford.
- Sahmano, S. M. & Serven, J. E. (2001). *The African Debt Crisis*, AERC Special Paper 3, Initiative Publisher, Kenya, Nairobi.
- Sen, S., Kasibhatla, K. M. & Stewart, D. B. (2017). Debt Overhang and Economic Growth- The Asian and Latin American Experiences. *Economic Systems*, 31.
- Taylor, A. (2003). *Domestic Savings and International Capital Flows Reconsidered*; Department of Economics, North-East University, USA.

- Ugwuanyi, C.U. (2018). Public Debt, Economic Growth and Development in Nigeria. A Co-integration Approach. *Confluence Journal of Economics and Allied Sciences*, 1 (1)
- Wahiba, E. (2014). External Debt and Economic Growth in Tunisia. *Journal of Knowledge Management, Economics and Information Technology*, 4(6).

Effect of Credit Risk on the Performance of Listed Deposit Money Banks in Nigeria

Ado Kofar Mata Bala¹, Muhammad Yadudu¹ & Mohammed Babakatun Abubakar¹

¹ Department of Business Administration and Entrepreneurship, Bayero University, Kano- Nigeria

Correspondence Email: mba4949@gmail.com

Abstract

The study examined the effect of credit risk on the performance of listed deposit money banks in Nigeria using panel data collected from the audited annual financial statements of thirteen listed DMBs in Nigeria for a period of 2012-2018 using Ex-post facto research design and thirteen listed DMBs in Nigeria form the sample size. Furthermore, the study employed Generalized Least Squares (GLS) method of Panel Regression, Fixed and Random Effects in its estimations with the aid of STATA Software Version 14. The study found that all the measures of credit risk (NPL, LLPR, LAR, and CAR) have significant negative effect on profitability of DMBs in Nigeria measured by ROA and ROE respectively. Based on the findings of the study, the study recommends that Listed DMBs should have comprehensive credit risk management procedures that will cover the formulation of an overall credit strategy for managing problem credits, and a credit risk management framework which will serve as a tool for monitoring and controlling risk inherent in individual credit as well as banks credit portfolios.

Keywords: Bank Size, Bank Age, Credit Risk, Gdp, Inflation

JEL Classification: E51, P24

1. Introduction

The performance of deposit money banks is critical to economic growth, and the strength of most industries is dependent on the availability of finance within the economy provided by banks to facilitate transactions. Deposit Money Banks (DMBs) serve as financial intermediaries by channeling funds from the economy's surplus units to its deficit units through deposit taking and lending. This function ensures that limited resources are distributed as efficiently as possible among various users. A strong and well-developed financial system, according to Aurangzeb (2012), allows an economy to absorb shocks caused by a decline in external capital inflow. As a result, bank performance is critical to the stability of the financial system as well as economic growth and development (Ongore & Kusa, 2013). Furthermore, bank performance, to a great extent, facilitates economic growth by providing effective risk diversification instruments and improving deposit money banks' liquidity position (Levine, 2005).

However, lending represents the heart of the banking industry and loans and advances are the dominant assets as they generate the largest share of banks operating income. As banks generate income largely through credit creation, it may result in huge risks to the lender and the borrower. Hence, the smooth functioning of the bank can be greatly jeopardized by a failure of the trading partner to fulfill their contractual obligation in due date. A bank with a high credit risk has high bankruptcy risk that may put the depositors in danger. The credit risk profile of DMBs reveals that total non-performing loans increased by 14.59% between 2016 and 2017, rising from \$2,084.92 billion to \$2,389.11 billion (CBN, 2017). As a result, the top 50 and 100 obligors' exposure was 5,461.51 billion (34.33%) and 7,111.53 billion (44.7%) of the total industry exposure of 15,908.08 billion, indicating a high concentration of risk. As a result, credit risk increases as the industry-wide NPLs ratio increased from 12.8% to 15.02% in 2017, a 2.22% point increase over the previous period (CBN, 2017). Furthermore, CBN (2018) recently reported that DMBs' non-performing loans (NPLs) increased by N400 billion or 21% to N2.3 trillion in the third quarter of 2018 from N1.9 trillion in the second quarter of 2018, despite a 4% decline compared to N2.4 trillion in the same period of 2017. To strengthen these claims, a recent report published in 2018 by global rating agency Moody revealed that, bad loan losses in Nigeria's banking industry remain high (Komolafe, 2018). This is a worrisome development for an industry that has been struggling for many years, suffering massive losses as a result of bad loans.

Also, the methodology of most of the previous studies on the effect of credit risk on the performance of DMBs is fragmented. For instance, studies by Adesugba and Bambale (2016) and Maxwell and Peter (2016), Yimka, Taofeek, Abimbola and Olusegun (2015), Abiola and Olausi (2014), incorporated two measures of credit risk in their models instead of four measures of credit risk used by Annor and Obeng (2017) in Ghana, Isanzu (2017) in China and Muriithi (2016) in Kenya who incorporated four measures of credit risks in their study, leaving a gap that the current study will fill by incorporating four important measures of credit risk.

In view of this, the study examines the effect of credit risk on the performance of listed Deposit Money Banks in Nigeria. The theory that underpins this study is Finance Distress Theory. According to Baldwin and Scott (1983), when a firm's business declines to the state where it cannot meet its financial obligation, the firm is said to be in a state of financial distress. The first signal of financial distress is violations of debt payments and failure or reduction of dividend payouts. Whitaker (1999) defines entry in financial distress as the first year in which cash flows are less than current maturities' long-term debt. The firm has enough to pay its creditors as long as the cash flows exceed the current debt obligations. Firms go into financial distress as a result of economic distress, declines in their performance and poor management especially on risks (Wruck, 1990). Therefore, credit risk arises when the banks have non-performing loans resulting from borrowers delay in settling their debts. Therefore, banks should be cautious of their credit risks to avoid being plunged into financial distress. According to Whitaker (1999), corrective actions by banks management to improve upon their financial

performance are activated by financial distress. The finance distress theory therefore, is relevant to the study on the relationship between financial risk and financial performance as it identifies liquidity and credit risks as forecasters of financial distress (Wamalwa&Mukanzi, 2018).

2. Literature Review

Concept of Credit Risk

According to Luy (2010), credit risk exists if a lender is vulnerable to loss from a borrower, counterparty, or an obligor who refuses to honour their debt obligation as they have contracted. Credit risk is the risk that a financial institution incurred losses because the financial position of a borrower had deteriorated to the point that the value of an asset (including off-balance-sheet assets) is being reduced or extinguished. Credit risk is the potential that the real return on an investment or loan may differ from the projected return (Conford, 2000). Credit risk, according to Coyle (2000), are losses resulting from credit customers' unwillingness or inability to pay what is being owe in full and on time. In addition, the Basel Committee on Banking Supervision BCBS (2001) sees credit risk as the probability of losing the existing loan in part or all owing to credit events (default risk). Bankruptcy, failure to pay a due debt, repudiation/moratorium, or credit rating change and restructuring are examples of credit events.

Empirical Review

Kolapo, Ayeni and Oke (2012) examined the effect of credit risk on the performance of commercial banks in Nigeria over the period of 11 years (2000-2010) using a sample of 5 commercial banking firms selected on a cross sectional basis for eleven years. The traditional profit theory was employed to formulate profit, measured by Return on Asset (ROA), as a function of the ratio of Non-performing loan to loan & Advances (NPL/LA), ratio of Total loan & Advances to Total deposit (LA/TD) and the ratio of loan loss provision to classified loans (LLP/CL) as measures of credit risk. Panel model analysis was used to estimate the determinants of the profit function and the results showed that the effect of credit risk on bank performance measured by the Return on Assets of banks is cross-sectional invariant. Ogboi and Unuafe (2013) examined the empirical evidence on the magnitude of the relationships between credit risk and bank's profitability in Nigeria using a time series and cross sectional data from 2004-2009 which were obtained from selected banks annual reports and accounts in Nigeria. They examined the impact of credit risk and capital adequacy on banks financial performance in Nigeria. Panel data model was used to estimate the relationship that exists among loan loss provisions (LLP), loans and advances (LA), non-performing loans (NPL) and capital adequacy (CA) which were the independent variables and return on asset (ROA) as the dependent variable to measure the profitability of the banks and the findings showed that sound credit risk management and capital adequacy impacted positively on bank's financial performance with the exception of loans and advances which were found to have a negative impact on banks' profitability during that period.

Abiola and Olausi (2014) investigated the impact of credit risk management on the performance of commercial banks in Nigeria using financial reports of seven commercial banking firms were used to analyze for seven years (2005 – 2011). The panel regression model was employed for the estimation of the model. In the model, Return on Equity (ROE) and Return on Asset (ROA) were used as the performance indicators while Non-Performing Loans (NPL) and Capital Adequacy Ratio (CAR) are used as credit risk management indicators. The findings revealed that credit risk management has a significant impact on the profitability of commercial banks' in Nigeria. Samuel (2015) examined the effect of credit risk on commercial banks performance. The result shows that the ratio of loan and advances to total deposit negatively relate to profitability though not significant at 5% and that the ratio non-performing loan to loan and advances negatively relate to profitability at 5% level of significant. Yimka, Taofeek, Abimbola and Olusegun (2015) examined the role of credit risk management in value creation process among commercial banks in Nigeria. The study analyzes the impact of loan and advance loss provision, total loan and advances, non-performing loan and total asset on accounting Return on Equity (ROE) and Return on Asset (ROA). The panel data come from 10 commercial banks listed on Nigeria Stock Exchange (NSE) between 2006 and 2010. The results reveal that credit risk management has significant effect on financial performance of commercial banks.

Alshatti (2015) examined the effect of credit risk management on financial performance of the Jordanian commercial banks during the period (2005-2013) using a sample of 13 Jordanian commercial banks. Two mathematical models have been designed to measure this relationship; the research revealed that the credit risk management affects the financial performance of the Jordanian commercial banks as measured by ROA and ROE. The study concludes that credit risk management indicators considered in this research have a significant effect on financial performance of the Jordanian commercial banks. Iftikhar (2016) examined the effect of credit risk management on the financial performance of commercial banks of Pakistan listed in KSE using a sample of 10 banks. A statistical model had been designed to measure this relationship and the study showed that the credit risk management impact on financial performance of the commercial banks of Pakistan as calculated by ROE and ROA, where the indicator of credit risk management were non-performing loan and capital adequacy ratio. Data was analyzed using panel regression model and study concludes that the factor of credit risk management have significant impact on financial performance of commercial banks of Pakistan. Kimotho and Gekara (2016) conducted a study on the effect of credit risk management and financial performance of commercial banks in Kenya. The study adopted descriptive research design and target population consisted of credit risk managers, credit analyst and debt recovery managers. The study revealed that credit risk management procedures are used to influence profitability of the bank positively.

Otieno, Nyagol and Onditi (2016) evaluated the relationship between credit risk management and financial performance of microfinance banks in Kenya using Pearson correlation coefficient. The population of the study comprised of 12

licensed microfinance Banks. Longitudinal research design utilizing panel data covering the period from 2011 to 2015 was used. The results showed that credit risk management with PAR and LLPCR parameters had a strong negative correlation with both ROA and ROE performance measure. Thus, the study concludes that credit risk management impacts performance of MFBs

Maxwell and Peter (2016) investigated the impact of credit risk management on the performance of deposit money banks in Nigeria using the ECM and Granger causality techniques in addition to the IRF and VDC methodology. Data for the study were sourced from the CBN Statistical Bulletin and the Annual Reports and Accounts of the NDIC for the period 1989 to 2013. Our findings demonstrate succinctly that, the selected credit risk management indicators under study significantly impact on the performance of deposit money banks measured as return on equity, return on total assets, and return on shareholders' fund respectively. However, the findings report no evidence of significant granger causality relationship between the various credit risk management indicators and the various measures of performance except for a uni-directional granger causality relationship from ROE to RNPD and from ROTA to RNPS respectively. Isanzu (2017) examined the impact of credit risk on the financial performance of Chinese banks. Secondary data was collected from five largest commercial banks in the country for the period of 7 years which span from 2008 to 2014. The study used nonperforming loans, capital adequacy ratio, impaired loan reserve, and loan impairment charges as measures of credit risk measure of financial performance return on asset.. Data analysis was done using a balanced panel data regression model, and the study findings revealed that nonperforming loan and Capital adequacy have a significant impact on financial performance of Chinese commercial banks.

Annor and Obeng (2017) examined the impact of credit risk management on the profitability of 6 selected commercial banks listed on the Ghana stock exchange. Secondary data were gathered from the annual reports of the six selected banks and Ghana banking survey for the years under consideration. The study adopted the Random Effect Model within the panel estimation technique framework. The study used return on equity (ROE) to measure profitability of bank, non-performing loans, loan loss provisions ratio, loan to asset ratio and capital adequacy ratio as credit risk and the findings showed that, credit risk management have significant relationship with the profitability of banks. While capital adequacy ratio had positive relationship with a bank's profitability; non-performing loans, loan loss provisions ratio and loan to asset ratio showed statistically significant negative relationship with the profitability of a bank. Mendoza and Rivera (2017) examined the credit risk and capital adequacy of the 567 rural banks in the Philippines for the purpose of investigating how both variables affect bank profitability using the Arellano-Bond estimator and discovered that credit risk had a negative and statistically significant relationship with profitability. Also, empirical analysis showed that capital adequacy had no significant impact on the profitability of rural banks in the Philippines.

Theoretical Framework

Independent Variables

Dependent Variables



Figure 1: Theoretical framework
Source: The Researcher

3. Methodology

Ex-post facto design was used in this study and a census sample was employed in order to generate sufficient number of observations that will facilitate the conduct of data analysis. The population of the study is the 16 DMBs listed on the floor of Nigerian stock exchange as at 31st December, 2021. The study extracts panel data from the financial statements of all the 13 listed DMBs in Nigeria that have the required data available for the period 2012 – 2018. Also, data on the macro economic variables were obtained from the World Bank economic database.

Stata 14 software was used to generate both descriptive statistics and correlation matrix for the dataset to examine the main characteristics of the data and understand the direction and extent of relationship between and among the variables. The study also conducts normality test for the dataset to see its behaviour. Relevant diagnostic and robustness tests that include Multicollinearity Test, Model Specification Test, Heteroskedasticity Test, and Hausman Specification Test were conducted to determine the most suitable model for analysis as well as determine whether or not the estimated models satisfy the conditions for acceptance.

In order to examine the effect of credit risk on the performance of listed DMBs in Nigeria, the following models are specified: The original regression model is specified as follows:

$$Z_{it} = \alpha + \alpha_1 P_{1it} + \alpha_2 P_{2it} + \alpha_3 P_{3it} + \alpha_4 P_{4it} + \epsilon_{it} \dots\dots\dots 1$$

Where the dependent variable denoted by Z_{it} of bank i at time t , α is the constant, while the coefficients of the independent variables are denoted by $\alpha_1, \alpha_2, \alpha_3,$ and α_4 for bank i at time t and ϵ_{it} is the disturbance or error term.

Based on the above, the model can be decomposed as follows:

$$ROA_{it} = \alpha + \alpha_1 NPL_{it} + \alpha_2 LLPR_{it} + \alpha_3 LAR_{it} + \alpha_4 CAR_{it} + \alpha_5 BSIZE_{it} + \alpha_6 BAGE_{it} + \alpha_7 GDP_{it} + \alpha_8 IR_{it} + \epsilon_{it} \dots\dots\dots 2$$

$$ROE_{it} = \beta + \beta_1 NPL_{it} + \beta_2 LLPR_{it} + \beta_3 LAR_{it} + \beta_4 CAR_{it} + \beta_5 BSIZE_{it} + \beta_6 BAGE_{it} + \beta_7 GDP_{it} + \beta_8 IR_{it} + \epsilon_{it} \dots\dots\dots 3$$

From equation 2a and 2b above, the financial performance was measured using Return on Asset (ROA) and Return on Equity (ROE). The independent variable, Credit Risk was proxied by Non-Performing Loan (NPL), Loan Loss Provision (LLPR), Loan and Advances Ratio (LAR) and Capital Adequacy Ratio (CAR). Bank Size (BSIZE), Bank Age (BAGE), Gross Domestic Product (GDP) and Inflation Rate (IR) are the control variables while α and ϵ_{it} were previously defined. The control variables were introduced in this study based on the idea that bank financial performance may also be affected by some factors that are not incorporated in the explanatory variable.

The study's dependent variable is bank performance, which is represented by the return on asset (ROA) and return on equity (ROE). Return on Assets measures efficiency and it determines how well banks utilize their scarce resources to make profits. Return on assets was chosen as a measure of a bank's financial performance because it is an important performance factor in forecasting bank failures (Samad& Glenn 2012). However, ROA calculated by dividing Net Income with Total Assets. Return on Equity on the other hand is the return shareholders get from their investment. ROE shows the amount of profit banks generate relative to shareholders' equity as shown in the balance sheet (Ongore & Kusa, 2013; ECB, 2010). ROE is calculated by dividing net income with total equity (Khrawish, 2011). It was used in studies conducted by Mansyur (2017); Mendoza and Rivera (2017); Muthii, Githinji, and Muchiri (2017).

The independent variable credit risk is proxied by nonperforming loan, loan loss provision ratio, loan advances ratio and capital adequacy ratio. a) Non-performing Loans Ratio It is a measure of the percentage of gross loans in a bank's loan portfolio that are nonperforming or doubtful. This is calculated as the ratio of nonperforming to Total Loans and Advances. Kolapo et al., 2012; Samad, 2004; Rajan and Dhal, 2003 used this as a credit risk indicator. b) Loan Loss Provision Ratio: Banks use loan loss provisions to create reserves to cover the expected losses in their loan portfolios. It is calculated as the ratio of loan loss provision to gross loan. This is a credit risk indicator used by Annor and Obeng (2017); Maxwell and Peter (2016); Muriithi (2016); Aishatti (2015). c) Loan and Advances Ratio: The loan and advances ratio measures a bank's ability to withstand deposit withdrawals as well as its willingness to meet loan demand by reducing its cash assets. It is the ratio of total loan and advances to total deposit. Annor and Obeng (2017), Maxwell and Peter (2016), Muriithi (2016), Aishatti (2015), and Gizaw, Kebede, and Selvaraj (2015) used it as credit risk indicator. d) Capital Adequacy Ratio (CAR): It is the ratio of bank's core capital to risk-adjusted assets. A higher ratio indicates that the bank's capital is adequate, that the assets are of high quality, and that the credit risk is low. This measure was used by Muriithi (2016), Francis (2013); Perera et al. (2013); and Masood and Ashraf (2012).

The inclusion of control variables in this study was motivated by the fact that factors other than those included in the explanatory variable could have an impact on bank financial performance. Therefore, the control variables of this study are classified into banks' specific variables and macroeconomic variables. The banks' specific variables included are Bank Size (BSIZE) and Bank Age (BAGE) while the macroeconomic variables are Gross Domestic Product (GDP) and Inflation Rate (IR). Bank size (BSIZE) was measured by the natural logarithm of total assets of the firm (Skopljak&Luo, 2012) while Bank Age (BAGE) was measured by logarithm of the number of years from the time of its incorporation (Elvin & Hamid, 2016). Also, Gross Domestic Product (GDP) was measured by annual growth rate of the economy (Trabelsi, 2015, Eneyew, 2013, Dumcic & Ridzak, 2015 while the annual Inflation Rate (IR) was used to calculate the Inflation Rate (Knezevic&Dobromirov, 2016; Khanna, Srivastava, &Medury, 2015; Kanwal& Nadeem, 2013).

4. Results

This section presents the study's empirical findings for both descriptive and inferential statistics.

Table 1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	91	7.006	1.533	1.375	8.858
ROE	91	6.857	1.589	1.025	8.767
NPL	91	1.876	.237	1.015	3.044
LLPR	91	2.655	.168	2.246	2.992
LAR	91	2.043	.115	2.003	2.679
CAR	91	1.167	.047	1.101	1.299
BSIZE	91	7.705	1.629	2.008	9.599
BAGE	91	4.276	1.786	1.538	8.24
GDP	91	1.636	.171	1.008	1.856
IR	91	1.464	.325	.903	2.076

Note: ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, CAR= capital adequacy ratio, BSIZE= bank size, BAGE= bank age, GDP= gross domestic product, IR= inflation rate

From the result in table 1, the descriptive statistics of all variables used in the study show mean values of 7.006, 6.857, 1.876, 2.655 2.043, 1.167, 7.705, 4.276, 1.636, and 1.464 for ROA, ROE, NPL, LLPR, LAR, CAR, BSIZE, BAGE, GDP, and IR while 1.375 and 8.858, 1.025 and 8.767, 1.015 and 3.044, 2.246 and 2.992, 2.003 and 2.679, 1.101 and 1.299, 2.008 and 9.599, 1.538 and 8.24, 1.008 and 1.856, and .903 and 2.076 are the corresponding minimum and maximum values for the variables. In most of the variables, the values show a wide range of dispersion. Similarly, the standard deviations of the most of the variables differ significantly from the respective means of the data, indicating that the banks' responses to these phenomena vary widely.

Furthermore, the Shapiro Wilk test for data normality indicates that all variables are not normally distributed. Normal distributed data when using financial data is almost impossible because the distribution is unsystematically randomly distributed

between and within banks (Wooldridge, 2013). However, non-normality of data does not affect the validity of estimations with regression based on the Gauss-Markov Theorem (Shao, 2003). The model specification test was also conducted using link test. The link test is based on the assumption that if a regression is properly specified, then the inclusion of additional independent variable, except by chance should not be significant. The \hat{u} values that are the predicted values of the models are significant as expected for both ROA (0.001) and ROE (0.000) models. Likewise, \hat{u}^2 values are insignificant for both ROA (0.324) and ROE (0.152) models suggesting that both ROA and ROE models are correctly specified. The variables were also subjected to a Pearson correlation analysis to determine the degree of relationship between the dependent and independent variables, as well as among the independent variables. The correlation matrix is shown in Table 2 as follows:

Table 2: Pairwise correlation among components of Credit risk

	ROA	ROE	NPL	LLPR	LAR	CAR	BSIZE	BAGE	GDP	IR
ROA	1.00									
ROE	0.97*	1.00								
NPL	0.13	0.16	1.00							
LLPR	0.21*	0.28*	0.18	1.00						
LAR	-0.08	-0.12	-0.09	-0.35*	1.00					
CAR	-0.19	-0.19	0.08	-0.04	0.10	1.00				
BSIZE	0.88*	0.91*	0.42*	0.34*	-0.17	-0.18	1.00			
BAGE	-0.02	-0.01	-0.00	0.13	-0.05	-0.03	0.00	1.00		
GDP	0.08	0.11	-0.04	-0.01	-0.28*	0.06	0.0457	-0.66*	1.00	
IR	-0.42*	-0.39*	0.13	-0.10	-0.23*	0.03	-0.32*	-0.11	0.20*	1.00

Note: * denotes 5% level of significance. ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, CAR= capital adequacy ratio, BSIZE= bank size, BAGE= bank age, GDP= gross domestic product, IR= inflation rate

In correlation analysis, high level and strong form of relationship between dependent and individual independent variables are expected while low level and weak form of relationship between and among independent variables are expected. However, from the correlation matrix presented in table 1 above, only NPL, LLPR, CAR, BSIZE and IR have strong relationship with ROA while only NPL, LLPR, CAR, BSIZE, GDP and IR have strong relationship with ROE. The result also showed that, the components of credit risk and control variables are not strongly associated among themselves. However, this means there is no multicollinearity issue as recommended by Gujatati (2004).

The study then runs diagnostic tests on the pooled panel result, testing for multicollinearity and heteroskedasticity. The variance inflation factor and tolerance value revealed values that are less than 10 and greater than 0.10, indicating the absence of multicollinearity. The low mean VIF of 1.65 showed a weak correlation among the regressors. The Breusch-Pagan/Cook-Weisberg test was used to check for heteroskedasticity. The results show chi2 values of 4.41 and 5.21 for ROA and ROE models respectively, which are significant at 1% indicating that the dataset violates the assumption of homoscedasticity. Due to the violation of the homoscedasticity assumption in the pooled panel result as revealed by the Breusch-

Pagan/Cook-Weisberg test that turns chi2 values of 4.41 and 5.21, to significant at 1%, the study re-run a pooled panel regression using robust option as recommended by Gujarati and Porter (2009) to correct the problem of heteroskedasticity.

The Generalized Least Squares (GLS) method was employed to run both fixed effects (FE) and random effects (RE) tests. The results revealed a significant difference between FE and RE, allowing the Hausman specification test to be used to select the best model between the two. The Hausman test resulted in a chi² statistic of 46.12 and 41.04 with eight degrees of freedom and corresponding p-values of 0.000 and 0.000 for both ROA and ROE models respectively. Based on the Hausman result, the FE model is preferred over RE model to control for time-invariant unobserved characteristics across the listed DMBs. Therefore, the fixed effect model should be interpreted.

Table 3: Result of Generalized Least Squares Regression

Model A ROA			Model B ROE			
	Coef.	T-statistic	P-values	Coef.	T-statistic	P-values
NPL	-1.018	-3.16	0.000***	-1.309	-5.24	0.000***
LLPR	-.373	-0.97	0.007***	-.139	-0.46	0.045**
LAR	-.260	-0.40	0.041**	.265	0.52	0.003***
CAR	-.312	-0.30	0.048**	.038	0.05	0.034**
BFSIZE	.588	4.62	0.000***	.587	5.93	0.000***
BAGE	-.022	-0.52	0.105	-.038	-1.17	0.147
GDP	.954	1.36	0.050**	.497	0.91	0.036**
IR	-6.208	-6.35	0.000***	-5.417	-7.13	0.000***
CONS	13.889	5.07	0.000	11.853	5.58	0.000
R-Squared	Within	0.7317		0.8086		
	Between	0.4598		0.4423		
	Overall	0.4625		0.4630		
Rho		.955		.967		
F-statistic		23.86***		36.97***		

Fixed Effect Estimates for credit risk components

Note: ***, **, * denotes 1%, 5%, and 10% level of significance. ROA= return on asset, ROE= return on equity, NPL= nonperforming loan, LLPR= loan loss provision ratio, LAR= loan and advances ratio, CAR= capital adequacy ratio, BFSIZE= bank size, BAGE= bank age, GDP= gross domestic product, IR= inflation rate.

Table 3 shows that the F-statistics return values of 23.86 and 36.97 for ROA and ROE models that are statistically significant at 1% level of significance. These confirm the overall significance of the models. It further supports the assumption of a significant linear relationship between the dependent variables ROA and ROE, and the independent variables. The interclass correlations (rho) are 95.5% and 96.7% implying that 95.5% and 96.7% of the variations in in both ROA and ROE are due to differences across the banks. The within and between R-squares are 73.2% and 46% and 80.7% and 44.2% respectively. Thus, 73.2% and 80.7% of

variations in both ROA and ROE are due to differences within individual listed DMBs while 46% and 44.2% of the variations are due to differences between the listed DMBs. The overall R-squares are 46.2% and 46.3%, indicating that, the variables considered in the models explain about 46.3% and 46.3% change in both ROA and ROE, while about 53.8% and 53.7% change may be as a result of other variables not captured by the models.

NPL is negatively associated with ROA and ROE with coefficients of -1.018 and -1.309 with p-values less than 0.01. This means that holding other factors constant, a percentage increase in NPL decreases the profitability of listed DMBs by 102% and 131% measured by ROA and ROE. These results show sufficient evidence to support the research finding at 1% level of significance. This is consistent with the findings of Hamza (2017), Annor and Obeng (2017), Isanzu (2017), Olalere and Wan (2016), and Muriithii (2016), who found a significant negative effect of NPL on bank profitability, but contradicts the findings of Afriyie (2011) and Ogboi (2013), Marshal and Onyekachi (2014) who found a significant positive effect of NPL on bank profitability.

Loan loss provision ratio (LLPR) is negatively associated with ROA and ROE with coefficients of -0.373 and -0.139 with p-values 0.01 and 0.045 for ROA and ROE respectively indicating significant negative effect on financial performance. This means that holding other factors constant, a percentage increase in LLPR decreases profitability of listed DMBs by 37.3% and 13.9% measured by ROA and ROE. This result shows sufficient evidence to support the research finding at 1% and 5% levels of significance. Therefore, the result shows that LLPR negatively affect the financial performance of listed DMBs in Nigeria. This is consistent with the findings of Hamza (2017), Annor and Obeng (2017), Kolapo, Ayeni, and Oke (2012) who found a significant negative effect of LLPR on bank profitability

Also, loan and advances ratio (LAR) is negatively and positively correlated to ROA and ROE with coefficient of -0.260 and 0.265 with p-values of 0.041 and 0.003 for ROA and ROE indicating significant negative and positive effects on financial performance. This means that holding other factors constant, a percentage increase in LAR decreases and increases profitability of listed DMBs by 26% and 27% measured by ROA and ROE respectively. This result shows sufficient evidence to support the research finding at 5% and 1% levels of significance. Therefore, the result shows that LAR is negatively and positively associated with financial performance of listed DMBs in Nigeria measured by ROA and ROE respectively. This is consistent with the findings of Annor and Obeng (2017) and Kargi (2011).

Capital adequacy ratio (CAR) is negatively and positively associated with ROA and ROE with coefficients of -0.312 and 0.038 with p-values of 0.048 and 0.034 for ROA and ROE respectively, indicating a significant negative and positive effect on financial performance. This implies that holding other factors constant, a percentage increase in CAR decreases and increases profitability of listed DMBs by 31.2% and 3.4% measured by ROA and ROE respectively. This result shows sufficient evidence to support the research finding at 5% levels of significance. Therefore, the result shows that CAR has negative and positive effect on financial

performance of listed DMBs in Nigeria measured by ROA and ROE respectively. This is consistent with the findings of Hamza (2017), Mendoza and Rivera (2017), Annor and Obeng (2017), Ogboi and Unuafe (2013) who found positive effect of CAR on performance of banks and findings of Isanzu (2017), Abiola and Olausi (2014) found negative effect of CAR on performance of banks.

Bank size (BSIZE) is positively related with ROA and ROE with coefficients of 0.588 and 0.587 with p-values of 0.000 and 0.000 indicating significant positive effect on financial performance. This implies that holding other factors constant, a percentage increase in total assets (BSIZE) increases profitability of listed DMBs by 58.8% and 58.7% measured by ROA and ROE respectively. This result shows sufficient evidence to support the research findings at 1% level of significance. The finding is consistent with studies by Nomanet al. (2015), Pervanet al. (2015), Saona (2016), Tradet al. (2017), and Hasanovet al. (2018) who found that bank size has a significant positive effect on banks profitability indicating the existence of economies of scale while the finding contradicts studies by Trujillo-Ponce (2013) Knezevic and Dobromirov (2016), and Batten and Vo (2019); and Neveset al. (2020) who found that bank size has significant negative effect on banks profitability.

Bank age (BAGE) is negatively associated with ROA and ROE with coefficients of -0.022 and -0.038 with p-values 0.105 and 0.147 indicating nonsignificant negative effect on financial performance of listed DMBs. This implies that holding other factors constant, a percentage increase in bank age (BAGE) decreases profitability of listed DMBs by 2.2% and 3.8% measured by ROA and ROE respectively. However, there was no sufficient evidence to support this finding as the p-values of 0.105 and 0.147 are not significant at all conventional levels. This is consistent with studies by Salman & Yazdanfar (2012); Dogan (2013) and Sulub (2014) who found negative relationship between age and profitability and study by Stiewarld (2009) who found nonsignificant relationship between age and profitability.

GDP is positively associated with ROA and ROE with coefficients of 0.954 and 0.497 with p-values of 0.050 and 0.036 indicating significant positive effect on financial performance of listed DMBs. This implies that holding other factors constant, a percentage increase in GDP increases profitability of listed DMBs by 95.4% and 49.7% measured by ROA and ROE. This is an evidence to support the research finding at 5% level of significance. However, the finding is consistent with studies by of Trujillo-Ponce (2013), Rachdi (2013), Pervanet al. (2015), Djalilov and Piesse (2016), and Ha (2020) who found that GDP has a significant positive effect on banks profitability while it contradicts studies by Saeed (2014), Islam and Nishiyama (2016), Garcia and Guerreiro (2016), Saona (2016), and Garcia and Trindade (2019) who found that GDP growth has a significant negative effect on banks profitability.

Inflation rate (IR) has negative coefficients of -6.208 and -5.417 with p-values of 0.01 and 0.000 for ROA and ROE indicating significant negative effect on financial performance. This means that holding other factors constant, a percentage increase in inflation rate (IR) decreases profitability of listed DMBs by 620.8% and 541.7%

measured by ROA and ROE. This is an evidence to support the research finding at 1% level of significance. From the findings, inflation rate (IR) has significant negative effects on financial performance of listed DMBs in Nigeria. The finding is consistent with studies of Kosmidou (2008), Saeed (2014) and Hasanovet al. (2018) who found that inflation rate has significant negative effect on bank profitability while it contradicts studies by Nishiyama (2016), Saona (2016), Tradet al. (2017) and Batten and Vo (2019) who found that inflation rate has significant positive effect on banks profitability.

To test whether credit risk affect the financial performance of listed DMBs in Nigeria, F test was used. The test has a null hypothesis that all the coefficients of the measures of credit risk are jointly equal to zero. Table 3 shows that the F statistics are 23.86 and 36.97 for both ROA and ROE models which are greater than the critical value at 1% level of significance. Therefore, the hypothesis one that, credit risk has no significant effect on the financial performance of listed DMBs in Nigeria is rejected. This is consistent with studies by (Ogboi & Unuafe, 2013, Marshal & Onyekachi, 2014, Muriithii, 2016, Isanzu, 2017, Annor and Obeng, 2017)) who found significant negative effect of credit risk on financial performance of banks while it contradicts the findings of (Kithinji, 2010, Ogboi & Unuafe, 2013, Maxwell & Peter, 2016) who found significant positive effect of credit risk on financial performance of banks.

5. Conclusion and Recommendations

The study examined the effect of credit risk on the financial performance of listed DMBs in Nigeria. However, credit risk measures (NPL, LLPR, LAR and CAR) have significant negative effect on profitability of DMBs in Nigeria. Therefore, the study concludes that credit risk (CR) significantly affect the financial performance of listed DMBs in Nigeria.

Based on the findings of this study, the result on the effect of credit risk on the financial performance of listed DMBs in Nigeria has significant negative effect on the profitability of listed banks. Hence, the study recommends that Listed DMBs should have comprehensive credit risk management procedures that will cover the formulation of an overall credit strategy for managing problem credits, and a credit risk management framework which will serve as a tool for monitoring and controlling risk inherent in individual credit as well as banks credit portfolios.

References

- Abdellahi, A. S., Mashkani, J. A. & Hosseini, H. S. (2017). The effect of credit risk, market risk, and liquidity risk on financial performance indicators of the listed banks on Tehran Stock Exchange. *American J. Finance and Accounting*, 5 (1), 20-30.
- Abiola, I & Olausi, S. A. (2014). The impact of credit risk management on the commercial banks performance in Nigeria. *International Journal of Management and Sustainability*, 3(5), 295-306.
- Abioye, O. (2017). Banks' bad loans rise by 50% to N2.4tn. *The Punch*. Retrieved from <https://punchng.com/banks-bad-loans-rise-by-50-to-n2-4tn/>.

- Adesugba, A. K. & Bambale, A. J. (2016). The effect of risk management on the performance of some selected deposit money banks in Nigeria. *Intentional journal of management and commerce innovations*, 4, 73-83.
- Alshatti, A. S. (2015). The effect of credit risk management on financial performance of the Jordanian commercial banks. *Investment Management and Financial Innovations*, 12(1): 338-339.
- Annor, S. E. & Obeng, S. F. (2017). Impact of credit risk management on the profitability of selected commercial banks listed on the Ghana Stock Exchange. *Journal of Economics, Management and Trade* 20 (2), 1-10.
- Bagh, T. Khan, A. M. & Razaq, S. (2017). The underlying impact of risk management practices on banks financial performance: an empirical analysis on financial sector of Pakistan. *International Journal of Research in Business Studies and Management*, 4 (7), 10-23.
- Basel Committee on Banking Supervision. (2001). Studies on credit risk concentration: An overview of the issues and a synopsis of the results' from the research task force project. Retrieved from www.bis.org.
- Batten, J. and Vo, X. (2019). Determinants of Bank Profitability—Evidence from Vietnam. *Emerging Markets Finance and Trade*, 55(6), 1417-1428.
- Ben Naceur, S. and Omran, M. (2011). The effects of bank regulations, competition, and financial reforms on banks' performance. *Emerging Markets Review*, 12(1), 1-20.
- Bittencourt, M. (2012). Financial development and economic growth in Latin America: Is Shumpeter right? *Journal of Policy Modeling*, 34(3), 341-355.
- Cavana, R. Y., Delahaye, B. L. & Sekaran, U. (2001). *Applied business research: Qualitative and quantitative methods*. Australia, AU: John Wiley and Sons Inc.
- Chen, B., Cheng, X. & Wu, L. (2005). Dynamic interactions between interest rate credit and liquidity risk “theory and evidence from term structure of credit default and swap spreads. *Working Paper Series Aug. 8 2005*.
- Chioma, D. O., Adanma, S. E.; & Clementina, N. O. (2014). Empirical Study of the Impact of Inflation on Bank Performance: Implication for Investment Decision Making in Banking Industry in Nigeria. *Humanity & Social Sciences Journal*, 9 (2), 61-71.
- Conford, A. (2000). The Basel committee's proposals for revised capital standards: Rationale, design and possible incidence. G-24 Discussion paper series, United Nations, No.3, May.
- Coyle, B. (2000). Framework for credit risk management. Chartered Institute of Bankers, United Kingdom.
- Djalilov, K. and Piesse, J. (2016). Determinants of bank profitability in transition countries: What matters most? *Research in International Business and Finance*, 38, 69-82.
- Ekinci, A. (2016). The Effect of Credit and Market Risk on Bank Performance: Evidence from Turkey. *International Journal of Economics and Financial Issues*, 6 (2), 427-434.
- Ezeoha, A.E. (2011). Banking consolidation, credit crisis & asset quality in a fragile banking system. *Journal of Financial Regulation & Compliance*, 19 (1), 33-44.

- Fatemi, A. & Fooladi I. (2006). Credit risk management: A survey of practices. *Managerial Finance*, 32 (3), 227–233.
- Fayman, A. & He, T. L. (2011). Prepayment risk and bank performance. *The Journal of Risk Finance*, 12 (1), 26-40.
- Fredrick, O. (2012). The impact of credit risk management on financial performance of commercial banks in Kenya. *DBA Africa Management Review*, 3(1), 22-37.
- Funso, K. T. (2012). Credit risk and commercial banks' performance in Nigeria: A Panel Model Approach Australian. *Journal of Business and Management Research*, 2 (2), 31-38.
- Fuser, K. & Gleiner, W. M. (2009). Risk management (KonTrag). *Der Betrieb: Erfahrungen Aus der Praxis. Der Betrieb*, 52 (15), 753-758.
- Garcia, M. and Guerreiro, J. (2016). Internal and external determinants of banks' profitability. *Journal of Economic Studies*, 43(1), 90-107.
- Garcia, M. and Trindade, M. (2019). Determinants of banks' profitability in Angola. *African Journal of Economic and Management Studies*, 10(1), 116-128.
- Gbadeyanka, M. (2018). CBN limits dividend payment by banks. On February 15, 2018 retrieved from www.businesspost.ng.
- Githinji, A. M. (2010). Credit Risk Management and Profitability of Commercial Banks in. University of Nairobi.
- Gizaw, M., Kabebe, M., & Selvaraj, S. (2015). The impact of credit risk on profitability performance of commercial banks in Ethiopia. *African Journal of Business Management*, 9(2), 59-66.
- Goddard, J., Molyneux, P. & Wilson, J.O. (2009). The financial crisis in Europe: evolution, policy responses and lessons for the future", *Journal of Financial Regulation and Compliance*, 17 (4), 362-80.
- Gujarati, D.N. (2004). *Basic Econometrics*. McGraw Hill Companies.
- Ha, V. (2020). Does bank capital affect profitability and risk in Vietnam? *Accounting*, 273-278.
- Hasanov, F., Bayramli, N. and Al-Musehel, N. (2018). Bank-Specific and Macroeconomic Determinants of Bank Profitability: Evidence from an Oil-Dependent Economy. *International Journal of Financial Studies*, 6(3), 78.
- He, L.T. (2007). Does prepayment risk of mortgages affect excess returns of bank stocks? *Business Economics*, 42, 29-36.
- Hosna, A., Manzura, B., & Juanjuan, S. (2009). Credit risk management and profitability in commercial banks in Sweden. *Master Degree Project 2009*: 36.
- Hussain, A., Ihsan, A. & Hussain, J. (2016). Risk Management and Bank Performance in Pakistan. NUML *International Journal of Business & Management*, 11 (2.), 68-80.
- Iftikhar, M. (2016). Impact of credit risk management on financial performance of commercial banks of Pakistan. *University of Haripur Journal of Management*, 1(2), 110-124.
- Inusa, A. (2019). Determinants of bank performance: Evidence from listed deposit money banks in Nigeria (unpublished doctoral dissertation). Bayero University, Kano, Nigeria.

- Isanzu, S. J. (2017). The impact of credit risk on the financial performance of Chinese banks. *Journal of International Business Research and Marketing*, 2 (3), 14-17.
- Islam, M. &Nishiyama, S. (2016). The determinants of bank net interest margins: A panel evidence from South Asian countries. *Research in International Business and Finance*, 37, 501-514.
- Itsibor, M. (2017). Banks may seek merger over worsening liquidity. *Leadership Newspaper*. Retrieved from <http://leadership.ng/news/567632/2017-7-banks-may-look-for-merger-over-worsening-liquidity>.
- Justus, N.M., Dickson, K. K. & Harrison, M. M. (2016). Influence of credit risk management practices on loan delinquency in savings and credit cooperative societies in Meru County, Kenya. *International Journal of Economics, Commerce and Management*, 4(2), 763-773.
- Kamau, (2010). Adaptation of risk management by commercial banks in Kenya. Unpublished Paper, University of Nairobi.
- Kargi, H. S. (2014). Credit risk and performance of Nigerian banks. *American Journal of Accounting, Economics and Finance*, 1(1), 7-14.
- Kimotho, D.N. &Gekara, M. (2016). Effects of credit risk management practices on financial performance of commercial banks in Kenya. *International Journal of Economics & Finance*, 2(3), 116-189.
- Kinyua, K. J., Gakure, R., Gekara, M. &Orwa, G. (2015). Effect of risk management on the financial performance of companies quoted in the Nairobi Securities Exchange. *International Journal of Business & Law Research*, 3 (4), 26-42.
- Kipngetich S., &Muturi, W (2015). Effect of credit risk management on financial performance of savings and credit co- operative society in Kenya: *Strategic Journal of Business and Change Management*, 2 (44), 900-915.
- Kithinji, A. M. (2010). Credit risk management and profitability of commercial banks in Kenya. *School of Business, University of Nairobi, Nairobi*.
- Kolapo, T. F., Ayeni, R. K. &Oke, M. O. (2012).Credit risk and commercial banks' performance in Nigeria: A panel model approach. *Australian Journal of Business and Management Research*, 2 (02), 31-38.
- Komolafe, B. (2018, November). Losses to bad loans remain high in Nigerian banks. *Vanguard*. Retrieved from <https://www.vanguardngr.com/2018/11/losses-to-bad-loans-remain-high-in-nigerian-banks-moodys>.
- Komolafe, B. (2017, March). How economic recession constrained banking in 2016. *VanguardNewspaper*. Retrieved from: <http://www.vanguardngr.com/2017/01/economic-recession-constrained-banking-2016/> accessed on 17/03/2017.
- Kosmidou, K. (2008). The determinants of banks' profits in Greece during the period of EU financial integration. *Managerial Finance*, 34(3), 146-159.
- Kothari, S. P. (2001). Capital markets research in accounting. *Journal of Accounting and Economics*, 31, 105-231.
- Kothari, S. P., & Zimmerman, J. L. (1995). Price and return models. *Journal of Accounting and Economics*, 20, 155-192.

- Kwasi, M. (2010), Risk Based Assessment of Eco bank Ghana. Unpublished Paper, university of Ghana.
- Lagat, F. K., Mugo, R. &Otuya, R. (2013). Effect of credit risk management practices on lending portfolio among savings and credit cooperatives in Kenya. *European Journal of Business and Management*, 5 (19), 2222-2839.
- Maniagi, G. M. (2018). *Influence of Financial Risk on Financial Performance of Commercial Banks in Kenya* (Doctoral dissertation, JKUAT).
- Marshal, I., &Onyekachi, O. (2014). Credit Risk and Performance of Selected Deposit Money Banks in Nigeria: An Empirical Investigation. *European Journal of Humanities and Social Sciences*, 31(1). 23-32.
- Maxwell, O. O. & Peter, G. E. (2016). Credit risk management and the performance of deposit money banks in Nigeria: An error correction analysis. *Applied Economics and Finance*, 3 (2), 97- 109.
- Mendoza, R. & Rivera, J. P. R. (2017).The effect of credit risk and capital adequacy on the profitability of rural banks in the Philippines. *Scientific Annals of Economics and Business*, 64 (1), 83-96.
- Moti, H.O., Masinde, J.S., Mugenda, N.G. &Sindani, M.N. (2012). Effectiveness of credit management system on loan performance. Empirical evidence from microfinance sector in Kenya. *International Journal of Business, Humanities and Technology*, 2(6), 99-108.
- Muhammad, H., Agabi, C. Shosanya, M. & Ogwu, S.M. (2016). Investigations: Banks to lose 80% Profit. Daily Trust Newspaper. Retrieved from <http://www.dailytrust.com.ng/news/general/investigation-banks-lose-profit/151719.html>.
- Mulondo, R. (201). Credit risk management and loan performance in development financing. MBA Thesis. Makerere University Business School. Makerere University. Retrieved from <https://studylib.net/doc/8046637/>.
- Muriithi, J. G. (2016). *Effect of financial risk on financial performance of commercial banks in Kenya* (Doctoral dissertation, COHRED, JKUAT).
- Mutangili, O. M. (2011). The relationship between credit risk management practices and the level of nonperforming loans for commercial banks in Kenya. *Unpublished MBA Thesis, University of Nairobi*.
- Muthii W. S., Githinji, W. J. &Muchiri, N. J. (2017). The effect of financial risk management on the financial performance of commercial banks in Kenya. *International Journal of Finance and Banking Research*, 3(5), 70-81.
- Mwangi, M., &Murigu, J. W. (2015). The determinants of financial performance in general insurance companies in Kenya. *European Scientific Journal*, 11(1), 288–298.
- Mwaurah, I., Muturi , W. &Waititu, A. (2017). The influence of financial risk on stock returns. *International Journal of Scientific and Research Publications*, 7 (5), 418-431.
- Neves, M., Gouveia, M. &Proenca, C. (2020). European bank's performance and efficiency. *Journal of Risk and Financial Management*, 13 (4), 67.
- Obamuyi, T. M. (2011). Incessant bank distress and the policies of Central Bank of Nigeria. *International Journal of Finance and Accounting*, 1(1), 121 – 13.
- Obamuyi, T. M. (2012). Financial development and economic growth in emerging markets: The Nigerian experience. *Indian Journal of Finance*, 6(4), 16-27.

- Ochola, J. O. E. (2009). A study of the relationship between credit risk management and non-performing loans. *Unpublished MBA project, University of Nairobi*.
- Ogboi, C., & Unuafe, O. K. (2013). Impact of credit risk management and capital adequacy on the financial performance of commercial banks in Nigeria. *Journal of Emerging Issues in Economics, Finance and Banking*, 2(3), 703-717.
- Oji. H. (2019). Equity investors may lose dividend as non-performing loans rise. *The Guardian*. Retrieved from <https://guardian.ng/news/equity-investors-may-lose-dividend-as-non-performing-loans-rise/>
- Olukotun, G. A., James, O. O., & Olorunfemi, K. (2013). Bank distress in Nigeria and the Nigeria Deposit Insurance Corporation Intervention. *Global Journal of Management and Business Research Finance*, 13(8), 51-60.
- Oluwafemi, S. A., Israel, N. A., Simeon, O. A. & Olawale, O. (2013). Risk management and financial performance of banks in Nigeria. *Journal of Business and Management*, 14(6), 52-56.
- Onaolapo, A. R. (2012). Analysis Of Credit Risk Management Efficiency In Nigeria Commercial Banking Sector,(2004-2009). *Far East Journal of Marketing and Management*, 2(4), 39-52.
- Otieno, S., Nyagol, M. & Onditi, A. (2016). Relationship between credit risk management and financial performance. Empirical evidence from microfinance banks in Kenya. *Research Journal of Finance and Accounting*, 7(6), 2222-2847.
- Pallant, J. (2007). *SPSS survival manual*. Australia, AU: McGraw Hill.
- Pervan, M., Pelivan, I. and Arnerić, J. (2015). Profit persistence and determinants of bank profitability in Croatia. *Economic Research-Ekonomska Istraživanja*, 28(1), 284-298.
- Poudel, S. P. R. (2012). The impact of credit risk management on financial performance of commercial banks in Nepal. *International Journal of Arts and Commerce 1* (5), 9-15.
- Rachdi, H. (2013). What Determines the Profitability of Banks During and before the International Financial Crisis? Evidence from Tunisia. *International Journal of Economics, Finance and Management*, 2(4), 330-370.
- Rashid, M., Ramachandran, J. & Fawzy, M. T. S. T. (2017). Cross-country panel data evidence of the determinants of liquidity risk in Islamic banks: A contingency theory approach. *International Journal of Business and Society*, 18 (S1), 3-22.
- Ruziqqa, A. (2013). The impact of credit and liquidity risk on bank financial performance: the case of Indonesian Conventional Bank with total asset above 10 trillion Rupiah. *International Journal of Economic Policy in Emerging Economies*, 6(2), 93-106.
- Saeed, M. (2014). Bank-related, Industry-related and Macroeconomic Factors Affecting Bank Profitability: A Case of the United Kingdom. *Research Journal of Finance and Accounting*, 5(2), 42-50.
- Said, R. M., Tumin, M. H. (2011), Performance and Financial Ratios of Commercial Banks in Malaysia and China, *International Review of Business Research Papers*, 157-169.

- Samad, A. & Glenn, L. (2012). Determinant of bank failure: Evidence from US failed banks, *International Research Journal of Applied Finance*, 3 (4), 463-479.
- Saunders, A, & Cornet, M. M. (2008). *Financial institutions management. A risk management approach* (6th ed.): New York, McGraw- Hill Irwin.
- Saona, P. (2016). Intra- and extra-bank determinants of Latin American Banks' profitability. *International Review of Economics & Finance*, 45, 197-214.
- Shieler, B. ,Emenike, O. K. & Amu, U. C. (2017). Credit risk management and financial performance of microfinance institutions in Kampala, Uganda. *Journal of Banking and Financial Dynamics*, 1(1), 29-35.
- Shapiro, S.S., Wilk, M.B.; & Chen, H.J. (1968). A comparative study of various tests for normality, *Journal of the American Statistical Association*, 63, 1343–1372.
- Staikouras, C. and Wood, G. (2011). The Determinants of European Bank Profitability. *International Business & Economics Research Journal (IBER)*, 3(6).
- Taiwo, J. N.; Ucheaga, E. G; Achugamonu, B. U; Adetiloye, K.; Okoye, L., & Agwu, M. (2015). Credit risk management: implications on bank performance and lending growth. *Saudi Journal of Business and Management Studies*, 2 (5B), 584-590.
- Trujillo-Ponce, A. (2013). What determines the profitability of banks? Evidence from Spain. *Accounting & Finance*, 53(2), 561-586.
- Umaru, I. (2017). Banks may seek merger over worsening liquidity. *Leadership Newspaper*. Retrieved from <http://leadership.ng/news/567632/2017-7-banks-may-seek-merger-over-worsening-liquidity>
- Wooldridge, J. (2013). *Introductory Econometrics: A Modern Approach*. (5th Ed). South-Western Cengage Learning.
- Yimka, S. A.; Taofeek, A.; Abimbola, C. & Olusegun, A. (2015). Credit risk management and financial performance of selected commercial banks in Nigeria. *Journal of Economic & Financial Studies*, 03 (01), 01-09.

Analysis of the Nexus between Natural Gas Consumption and Economic Growth in Nigeria (1981-2019)

Sabiu Bariki Sani¹ & Yusuf Babatunde Lateef¹

¹ Department of Economics, Faculty of Social Sciences, University of Abuja, Nigeria

Correspondence Email: bariki.sabiu@uniabuja.edu.ng

Abstract

The study examines the nexus between natural gas consumption and economic growth in Nigeria. The research is conducted using annual time series data running from 1981 to 2019. The paper employs autoregressive distributive lag model (ARDL) as the estimation technique. The variables studied are Real Gross Domestic Product (RGDP), Natural Gas Consumption (NGC) and Oil Price (OP). The results of the analysis shows that natural gas consumption had negative and significant relationship on RGDP on the long run and it is insignificant in the short run because it is a derived demand, while oil price had a positive and significant relationship on the dependent variable both on the short run and the long run. Based on the empirical outcomes of the result obtained, the following recommendations are offered: There is room for massive investment in the oil and gas sector especially in infrastructures with the aim of increasing natural gas consumption through its availability, accessibility and affordability most especially in the rural areas where it is less consumed and also urban areas.

Keywords: Gas, Consumption, Real Economic Growth, Oil Price, ARDL Model

JEL Classification: F43, L95

1. Introduction

The usefulness of energy in human lives cannot be overestimated, it is vital to all aspects of economic growth, progress and development as well as poverty eradication and security (Akinola, Rominiyi & Eiche 2017). Energy is of highest importance in all human existence. Without enough energy in place, life becomes a drag and burdensome. Energy has been a major means of wealth creation, Nigeria inclusive. It becomes imperative, therefore that the role of energy as economic driver especially the natural gas aspect of it be examined (Adelegan 2018). Natural gas is the leading natural resource in Nigeria with a proven gas reserves of 199.090 trillion cubic feet (tcf) of gas comprising of 96.36 trillion cubic feet (tcf) which occurs as Associated Gas (AG) and 102.730 trillion cubic feet (tcf) occurs as Non-Associated Gas (NAG) also, Nigeria is rank as the ninth (9th) largest gas reserve in the world and it is evident, that Nigeria has more gas reserve than oil (Department of Petroleum Resources 2017). There has always been a shortfall in meeting up with the domestic gas obligation in Nigeria and this has affected the economic activities

that would have been triggered, in the form of gas based industrialization (DPR 2016). According to National Gas Policy (2017), Nigeria domestic natural gas performance is currently at 38.18% and the economic recovery and growth plan (2017 – 2020) developed by the federal government of Nigeria, that was framed to support the economy within the short term economic growth framework, did not capture gas exploitation, development and consumption as a means or driver for economic growth in the short term framework (Biose, 2019).

Oil price and natural gas prices are cointegrated as they affect energy consumers, producers and marketers. They are derived demand as both fuels can be substituted in uses. Ramberg and Parsons (2012) establish that the cointegration relationship between Oil price and natural gas prices were unstable base on their study. They estimated an ECM to explain short run dynamic adjustment of natural gas and crude oil prices using variables comparable to those introduced in Brown and Yücel (2008). They wrap up that even if the long run pricing relationship changes, a relationship should eventually re-establish as new technologies introduce new margins of substitution between the fuels.

Given the rising significance of natural gas, many distinctiveness of this precious resource have not been properly investigated in the economic literature. Very limited attempts have been made in the literature in this aspect and without a clear agreement among the researchers over the relationship between natural gas consumption and economic growth (Odhiambo (2009), Noor and Siddiqi (2010), Dantama, Abdullahi and Inuwa (2012), Adamu and Darma (2016)). Instead, significant part of the causality tests has focused on either aggregate energy consumption or electricity consumption with very important policy implications. Hence the burning desire or motivation that triggers this study is to further explore not only aggregate energy consumption or electricity consumption but to analyze the nexus between gas consumption and economic growth in Nigeria. The paper will also look at the relationship between oil price and natural gas consumption in Nigeria. This paper is divided into five sections. Following this introduction is section two which is empirical review. Section three is methodology while section four is data analysis and finally section five is conclusion and recommendation.

2. Literature Review

Empirical Review

Odhiambo (2009) use autoregressive distributed lag (ARDL) bound test and granger causality test to investigate the relationship between energy consumption and economic growth in Tanzania from 1971 to 2006. The result shows a long run relationship between energy consumption and economic growth which the granger causality reveals a unidirectional causality running from energy consumption to economic growth. The outcome implies that energy conservation policies would have damaging repercussions on economic growth for Tanzania. Noor and Siddiqi (2010) employ ordinary least square techniques to analyse the relationship between per capita energy consumption and per capita gross domestic product (GDP) in Nigeria (1971-2006). The OLS result reveals a strong long run relationship between variables in the model. The long run estimated equation show a negative

relationship between the per capita energy consumption and per capita GDP, while the causality test reveal a unidirectional causality running from GDP to EC in the short run. Dantama, Abdullahi & Inuwa (2012) look at the impact of energy consumption on economic growth in Nigeria over the period of 30 years and they use ARDL cointegration technique. Findings reveal a long run relationship exist between energy consumption and economic growth. Also, the speed of adjustment in the model estimated is associated with its expected sign and level of significance.

Abalaba and Dada (2013) in addition investigate the relationship between energy consumption and economic growth in Nigeria, and establish weak evidence to support the presence of relationship between them in the long run, they also found no causal effect in both ways between energy consumption and economic growth in Nigeria, but establish a short-run relationship. Their finding is in line with Aliero and Ibrahim (2012) who found absence of causality between total energy consumption and economic growth in Nigeria using data from 1970 to 2009. Their result on the contrary, contradicts the findings of Olusegun (2008) and Ighodaro and Oveneri (2008). They used aggregate energy consumption, without considering the natural gas consumption as a separate variable in their Johansen cointegration test. Agbonifo (2015) used literatures to review the contributions of the oil and gas to the Nigerian economy as well as its obstacles to sustainable development. The study reveal that obstacle are deeply rooted in dearth of natural gas gathering and distribution infrastructure, fiscal and regulatory policy, funding, and more importantly, the prevailing security situation in the main gas supply source, the Niger Delta region. It conclude that the absence of enabling environment for private participation on natural gas development, lack of energy intensive plants across Nigeria to utilise vast proportion of natural gas and the imposition of price control mechanism are serious threat to natural gas development. Adamu and Darma (2016) establish cointegration between natural gas consumption and economic growth in Nigeria (1981-2013), and the result shows positive and significant long run relationship between the two variables. However, they did not look at the sensitivity between economic growth and gas consumption in the country. This will be useful in identifying the vulnerability of the economic growth to a shock in natural gas consumption in the country, and vice versa. This is useful for policy making and investment priority to identify the resultant effects of investment or growth in one variable on the other, in this case gas consumption and economic growth. The paper uses oil production, natural gas consumption and real GDP while this paper takes into cognisance oil price as its variable and the scope of study is 1981 to 2019.

Theoretical Framework

For the purpose of this paper, the theoretical framework adopted is Energy Ladder model. The energy ladder model was the famous model of explaining household energy choice in developing countries (Hosier 1987; Leach1992) until a decade ago (Elias 2005). The energy ladder describes a pattern of fuel replacement as a household's economic situation changes. The model was developed based on the relationship between income and uptake of modern fuels (e.g. electricity). The energy preference ladder position fuels modern fuels like electricity and LPG are

considered superior fuels thanks to their high efficiency, cleanliness and convenience of storage and usage and are located higher up the ladder than traditional fuels, or lower fuels (Leach 1992). According to this model, households switch from traditional energy systems to modern energy systems up the ladder at the speed and extent acceptable by factors such as household income, fuel and equipment costs, availability and accessibility of fuels, reliability of recent fuel distribution, and, to a lesser extent, relative fuel prices (Masera 2000). The energy ladder model relies on the microeconomic theory of rational choice. Adam Smith, who proposed the idea of “invisible hand” moving free-market economies within the mid 1770s, is more often than not credited as the father of rational choice theory. Rational choice theory states that individuals use their self-interests to make choices that will provide them with the greatest benefit.

The assumption of rational choice theory is that all actions are rational and are made due to considering costs and rewards. Also, the reward of a relationship or action must outweigh the cost for the action to be completed, when the value of the reward diminishes below the value of the costs incurred, the person will stop the action or end the relationship and finally individuals will use the resources at their disposal to optimize their rewards. Rational choice theory shows that individuals are in control of their decisions. They don't make choices because of unconscious drives, tradition or environmental influences; finally consumer uses rational considerations to weigh consequences and potential benefits. However, energy ladder model assumes that all forms of fuel (traditional and modern) are available, that there is a universal set of fuel preferences, and that households will decide to move up the ladder as soon as they can meet the expense to do so. The major success of the energy ladder is its ability to capture the strong income dependency of energy choice in households, particularly in urban areas.

3. Methodology

This paper utilizes ex-post facto research design, which uses secondary data to establish the relationship between the dependent variable and independent variables. The ex-post facto research design is suitable for this paper because of the nature of the study, which shows the following characteristics of the research covering more than one-year period, also the data used are already in existence and cannot be manipulated. This study is fundamentally analytical and it embraces the use of secondary data in examining the Nexus between Natural Gas Consumption and Economic Growth in Nigeria. Descriptive analysis is used to capture the nature and structure of the data, correlation analysis is also carried out to examine the mutual connection between each of the variables and the other, while an Autoregressive Distributed Lag model (ARDL) is employed to show the relationship that exist between dependent and independent variables.

To critically analyse the nexus between Natural Gas Consumption and Economic Growth in Nigeria, this paper adapts the model of Solarin and Shahbaz (2015) which examined Natural Gas Consumption and Economic Growth: The Role of Foreign Direct Investment, Capital Formation and Trade Openness in Malaysia. The model specified in the paper is as follows;

$$Y_t = F(G_t, F_t, K_t, O_t) \dots\dots\dots 1$$

Where; Y is real GDP per capita, G is natural gas consumption (in cubic metres) per capita, K is real capital formation (proxies by real gross fixed capital formation) per capita, F is real foreign direct investment per capita and O is real trade openness (real exports of goods and services plus real imports of goods and services) per capita. Sakiru and Muhammad (2015) model is therefore, modified in this paper by replacing all the independent variables with gas consumption and oil price. For the Analysis of the Nexus between Natural Gas Consumption and Economic Growth in Nigeria, the model is therefore specified as;

$$RGDP = \alpha + \beta_1 NGC + \beta_2 OP + \varepsilon_t \dots\dots\dots 2$$

Where; RGDP is Real Gross Domestic product per capital, NGC is Natural Gas Consumption, OP is Oil Price and ε_t Denotes stochastic disturbance term. The *a priori* expectations of the behavior of the independent variables in term of their parameters to be estimated are; $\beta_1 > 0$; $\beta_2 > 0$; $\beta_3 > 0$.

Natural Gas is measured by volume and is stated in cubic feet. A cubic foot of gas is the quantity of gas needed to fill a volume of one cubic foot under set conditions of pressure and temperature. To measure larger quantity of natural gas, a "therm" is use to denote 100 cubic feet, and "mcf" is use to denote 1,000 cubic feet. To provide greater accuracy in comparing fuels, energy content is measure in terms of British Thermal Units (BTU's). A BTU is the quantity of heat required to raise one pound of water (approximately a pint), one degree Farenheit at or close to its point of maximum density. The energy content of natural gas differs in various locations throughout the country. For the sake of comparison, one average cubic foot of natural gas is about 1,000 BTU's of heat energy.

Oil Price is the spot price of one barrel of the benchmark crude oil. The price is a function of its grade, location and the content of sulfur present in it. Oil price is determined with the help of balance between its demand and supply.

Gross domestic product (GDP) is the monetary measure of the market value of all the final goods and services produced in a specific period of time. Also, Gross domestic product is an aggregate measure of production equal to the sum of the gross values added of all resident and institutional units engaged in production and services (plus any taxes, and minus any subsidies, on products not included in the value of their outputs).

ARDL Cointegration Approach

To test the long run relationship among the variables, this paper deviates from the well-known Engle and Granger (1987) and Johansen and Juselius (1990) approaches of cointegration and make use of new and advanced approach known as autoregressive distributive lag model (ARDL) bounds testing approach developed by Pesaran, Shin & Smith (2001) to test whether long run relationship exist between the variables or not. This method is recently embraced because it is valid if the variables of interest have vague order of integration i.e. purely I(0), purely I(1) or I(0) / I(1) which is not acceptable in previous approaches. Also, as maintain by Haug (2002), ARDL bounds testing approach is more suitable and gives better

results for small sample size while the short and long-run parameters can be estimated simultaneously. Hence, the ARDL representation of equation iii can be presented as thus;

$$\Delta RGDP_t = \alpha_0 + \alpha_1 RGDP_{t-1} + \alpha_2 NGC_{t-1} + \alpha_3 OP_{t-1} + \sum_{i=1}^k \beta_1 \Delta RGDP_{t-i} + \sum_{j=1}^l \theta_1 \Delta NGC_{t-j} + \sum_{j=1}^m \gamma_1 \Delta OP_{t-j} + \varepsilon_t \dots\dots\dots 3$$

While for the equation iii, the ARDL representation is presented as; where; Δ is the first-difference operator, and β 's and α 's shows the long run coefficients and short run coefficients. Hence, the null hypothesis (H_0) of no cointegration states that, $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \beta_1 = \theta_1 = \gamma_1 = 0$ and the alternative hypothesis of existence of cointegration state that; $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \beta_1 \neq \theta_1 \neq \gamma_1 \neq 0$ respectively.

The above hypotheses are tested by comparing the calculated F-statistic with critical values from Narayan (2005) which were produced for small sample sizes of between 30 and 80 observations on the assumption that all variables in the model are I(0) in one side and that all the variables are I(1) on the other side. Following the norms of hypothesis testing, if the calculated F-statistic exceeds the upper critical bounds value, then the H_0 is rejected and we accept H_1 , but if the F-statistic falls within the bounds then the test is inconclusive and lastly if the F-statistic falls below the lower critical bounds value, it implies that there is no co-integration.

ARDL Error-Correction Model (ARDL-ECM) Approach

With cointegrated variables, causal relations among variables can be examine within the framework of ECM (Granger, 1988). This present both the short run and long run relationship among the variables. The individual coefficients of the lagged terms explain the short run dynamics in the model, while the error correction term (ECT) presents the information of long run relationship. In the same vein, the significance of lagged explanatory variable depicts short run causality while a negative and statistically significant ECT is assumed to signify long run causality.

$$\Delta RGDP_t = \beta_0 + \beta_1 \Delta RGDP_{t-i} + \beta_2 \Delta NGC_{t-i} + \beta_3 \Delta OP_{t-i} + \mu_t \dots\dots\dots 4$$

While that of the ARDL model in equation iv is presented in equation v;

$$\Delta RGDP_t = \beta_0 + \beta_1 \Delta RGDP_{t-i} + \beta_2 \Delta NGC_{t-i} + \beta_3 \Delta OP_{t-i} + \rho ECM_{t-1} + \mu_t \dots 5$$

Where, Δ is the difference operator, ECM represent the Error Correction Term (ECT) derived from the long-run co-integrating relation from specified ARDL models equation iv. Equation v, ρ should exhibit a negative and significant sign for causality to exist in the long run.

Lastly, the stability of the model is tested using the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests. This is based on the assertion of Narayan and Smyth (2005) who maintained that, after the error correction models have been estimated, Pesaran(1997) suggest applying the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests to assess the parameter constancy.

4. Result

Table 1: Descriptive Statistics

Statistics	GDP	NGC	OP
Mean	30559.51	11.83144	42.47884
Median	6897.482	10.70900	28.89890
Maximum	144210.5	26.42849	105.0096
Minimum	144.8312	1.447166	13.06444
Std. Dev.	41655.36	5.923969	29.10352
Skewness	1.292604	0.219625	0.971070
Kurtosis	3.429122	2.489378	2.661252
Jarque-Bera	11.15960	0.737223	6.315821
Probability	0.003773	0.691694	0.042514
Sum	1191821.	461.4263	1656.675
Sum Sq. Dev.	6.59E+10	1333.550	32186.57
Observations	39	39	39

Source: Author's own computation

Table 1 shows the descriptive statistics of RGDP, NGC and OP. It is shown that all the variables under consideration contained 39 observations. It can be observed from the table that RGDP, and OP have the highest mean value while NGC has the lowest mean value. In terms of standard deviation, the most volatile series are gross domestic product and OP whereas the least volatile series is NGC. Also, in terms of Jarque-Bera statistic, only NGC follows normal distribution while other variables are not normally distributed because of their low probability value.

Trend Analysis

Graphically, the trend analysis shows that the variables fluctuate at one point or the other during the period under review. This was attributed to the effects of natural gas consumption and economic conditions that would have had attendant effects on some of the variables. These are presented graphically in fig.4.1 to 4.3

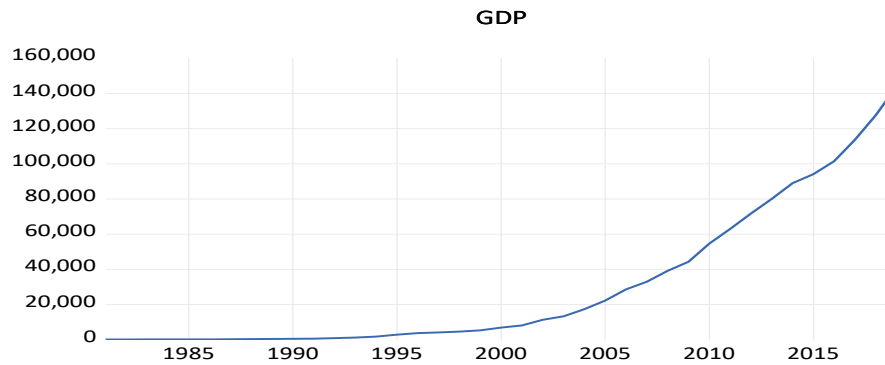


Figure 1: Gross Domestic Product

From figure 4.1, the variable shows a relatively upward trend over the period under study (1981-2019). This can be attributed to the fact that NGC and OP generate

revenue for Nigeria and thus boost economic growth. The minimum was recorded in 1981 and the peak was recorded in 2019.

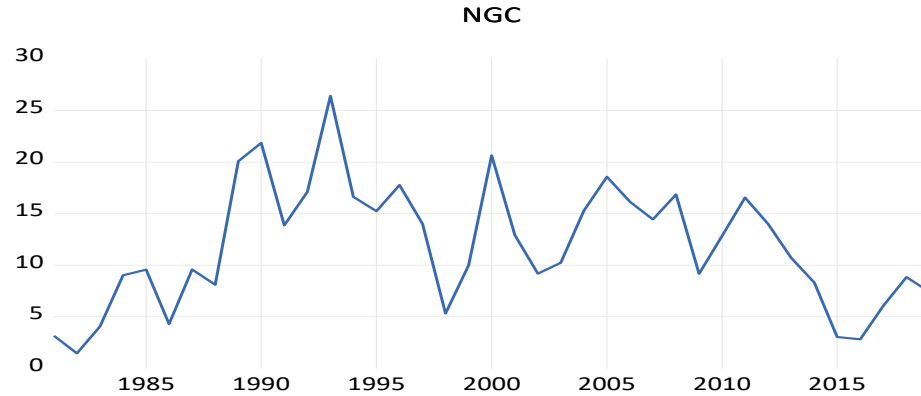


Figure 2: Natural Gas Consumption

Natural Gas Consumption within the period under investigation shows a relatively unstable trend for the period 1986-2019, it recorded its peak in 1993 and lowest in 1982. One of the reasons for the fluctuations on natural gas consumption is that there is seasonal change in demand and consumers are extremely limited in their ability to substitute other fuels when the price of natural gas fluctuates.

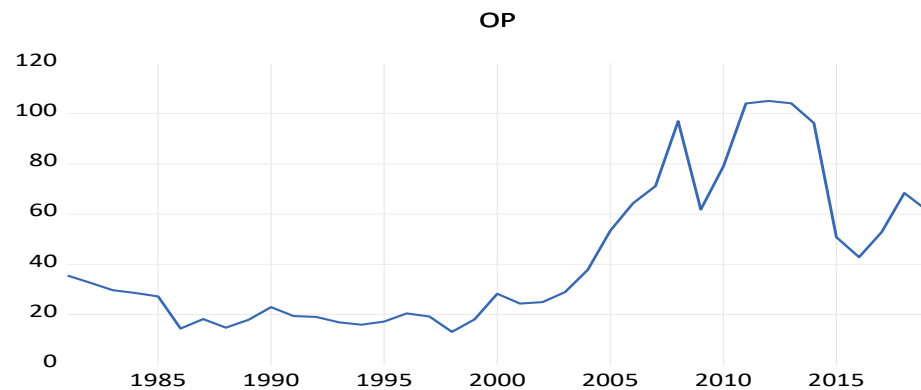


Figure 3: Oil Price

Oil price shows an unstable trend from 1981 to 2019, Nigeria being a net oil-exporting country makes it particularly vulnerable to oil price fluctuations, having its trough in 1986, but moved unexpectedly upwards and its peak around 2012.

Stationarity Test

The Augmented Dickey-Fuller test is use to test for unit root status of the variables. All the variables are regressed on trend and intercept to determine if they have trend, it was discovered that the three variables have trend and intercept, hence the unit root test involve trend and intercept. The result is presented below:

Table 2: Unit Root Stationarity Result

Variables	ADF Statistics	Critical Value	Stationary Status
GDP	-7.115934	-3.626784 (1%)	I(1)
		-2.945842 (5%)	
		-2.611531(10%)	
		-3.626784 (1%)	
NGC	-7.447995	-2.945842 (5%)	I(1)
		-2.611531(10%)	
		-3.629031 (1%)	
		-2.943427 (5%)	
OP	-5.759321	-2.943427 (5%)	I(1)
		-2.610263 (10%)	

Source: Author's computation

Table 2 presents the result of the Augmented Dickey-Fuller unit root test. It can be observed that all the variables were stationary at the 1st difference. Hence, they are said to be integrated of order one, that is I(1). Theoretically, when all variables are integrated of order one, it is expected to conduct cointegration test. However, given the ARDL approach adopted by this research, the validity of this theoretical expectation is validated by conducting a cointegration test in what follows:

ARDL Bounds Test Approach to Cointegration

Table 3: Result of Bounds Cointegration Test

F-statistic	243.2683	
Critical Values		
Significance levels	10 Bound	I1 Bound
10%	2.63	3.35
5%	3.1	3.87
2.5%	2.55	4.38
1%	4.13	5

Source: Author's Computation

The result of Bounds cointegration test is reported in Table 3. Since the F-statistic is greater than the I1 critical bound at 1%, 2.5%, 5% and 10% level of significance, the null hypothesis of no cointegration is rejected. The conclusion can therefore be made that there is long-run relationship between all the variables.

Lag Length Selection Criteria

The information criterion presented in the figure above showed that ARDL (1, 0, 3) is appropriate for the model in this paper. This explains the advantage of ARDL methodology as it is not necessary for all the variables to have the same lag(s). (See appendix 1)

Normality Test

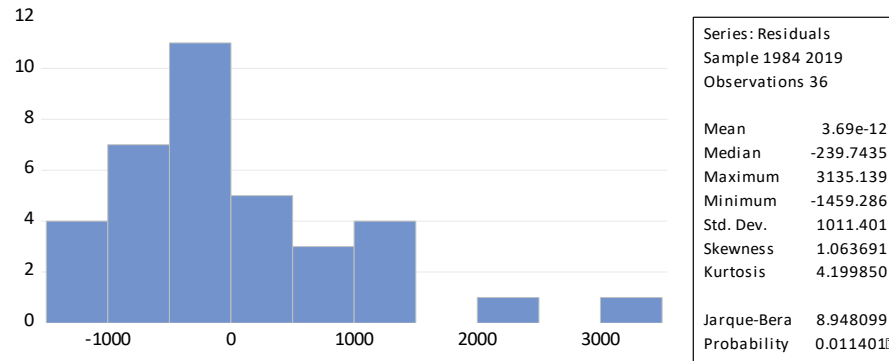


Figure 4: Normality Test
Source: Author's Computation

The Figure 4 shows normality of the model. The probability value of Jarque-Bera (0.01401) indicates that the model is abnormally distributed.

CUSUM and CUSUMSQ Stability Test

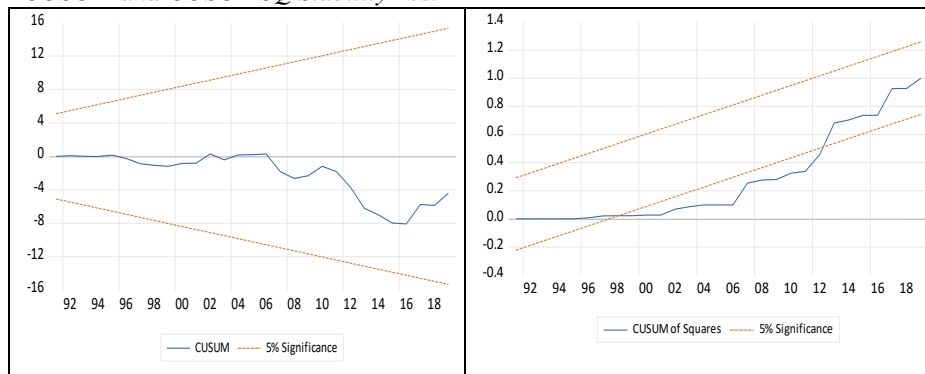


Figure 5: CUSUM and CUSUMSQ Stability test graphs

The Figure 5 indicates the cusum and the cusumq test graph that helps in tracing out the stability of error and its square during the period under study. The null hypothesis is that the regression model fits the data well versus its alternative hypothesis of an invalid regression model. The smooth blue lines show the cumulative sum of recursive residual errors and the cumulative sum of squares of recursive residual errors, and the dotted lines indicate the 5% Bartlett standard error bound.

Estimated ARDL Long Run and Short Run Model

The ARDL short run and long run estimation of the nexus between NGC and economic growth is presented in Table 4 using the ARDL (1, 0, 3) Selected based on Akaike info criterion (AIC). Those lags that are mostly statistically significant are reported in this table (See Appendix 1)

Table 4: Error Correction and Short-Run Analysis (Dependent variable: GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OP)	99.66766	13.38624	7.445530	0.0000
D(OP(-1))	35.31930	13.32466	2.650673	0.0129
D(OP(-2))	43.47052	13.69810	3.173470	0.0036
CointEq(-1)*	-0.111601	0.003406	-32.76791	0.0000
R Squared	0.949607			
Adjusted R-Squared	0.944882			
S.E. of Regression	1057.548			
Diagnostic Tests	DW=1.728249			

Source: Author's Computation

Table 4 shows the short-run relationship among the variables and the error correction mechanism. From the analysis, it is observed that all of the variables were significant at their conventional levels. The Error Correction parameter is negative and significant indicating that short-run disequilibrium in the previous period is corrected to restore equilibrium in the subsequent period. The value of -0.111601 implies that about 11% of the disequilibria in GDP of the previous year's shocks adjust back to the long-run equilibrium in the current period.

Table 5: Long -Run Analysis (Dependent variable is GDP)

Regressor	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	1.111601	0.008771	126.7322	0.0000
NGC	-98.24412	46.86735	-2.096213	0.0375
OP	99.66766	16.73737	5.954798	0.0000
OP(-1)	-62.09078	20.56335	-3.019488	0.0052
OP(-2)	8.151217	20.84147	0.391106	0.6986
OP(-3)	-43.47052	16.57500	-2.622656	0.0138
C	882.8220	745.1038	1.184831	0.2457
R Squared = 0.999431	Adjusted R-Squared = 0.999313	S.E. of Regression = 1111.113	F-statistic (Prob.) = 8490.940 (0.00000)	
Diagnostic Tests	DW=1.728249			

Source: Author's computation

Note: Estimated Long Run Coefficients Using the ARDL Approach ARDL (1, 0, 3) Selected based on Akaike info criterion (AIC)

Table 5 displays the estimated long-run relationship of the nexus between natural gas consumption and economic growth. The results reveal that NGC have negative and significant relationship on GDP, OP had positive and significant relationship on GDP in the long-run

Interpretation of Results

Table 4 and 5 present both short-run and long-run autoregressive distributed lag model (ARDL) estimates of the nexus between natural gas consumption and economic growth in Nigeria. In line with the literatures reviewed above, table 4.4 presents the estimated short-run relationship among Gross Domestic Product (GDP), Natural Gas Consumption (NGC) and Oil Price (OP). The results reveal that all the variables have positive and significant relationship on GDP at conventional level in the short run. The Error Correction parameter is negative and

statistically significant at 1% confidence level indicating that short-run disequilibrium in the previous period is corrected to restore equilibrium in the subsequent period. The value of -0.111601 implies that about 11% of the disequilibrium in GDP of the previous year's shocks adjust back to the long-run equilibrium in the current period.

The results in Table 5 reveal that NGC shows negative and significant relationship on the dependent variable (RGDP) in line with Adamu and Darma (2016). This can be attributed to the pattern of consumption of Natural gas which differs between the rural and the urban dwellers. The consumption of Natural gas is high in the urban areas when compared to the rural areas. OP shows positive and significant relationship on GDP, this is because it is a close substitute to Natural gas. The high adjusted R^2 (0.999431) testify to the high explanatory power and overall significance of the estimated model. In addition, the result of post-estimation tests showed that the outcome of this result was tested using some diagnostic tests such Breusch-Godfrey Serial Correlation LM Test, and Normality Test. The result of these tests as presented in the same Table 5 shows that, the model passes all the diagnostic tests.

Policy Implication of Findings

From the empirical researches conducted, the major findings of the research includes: NGC has a great influence on RGDP and it is highly responsive to its own innovation, which means direct investment in the sector can result to improvement in NGC and thus translate to economic growth. Also, government should help to improve infrastructure and supply of natural gas in the rural areas which will also help to boost the economy. More so, oil price positively impact RGDP in Nigeria indicating the need to invest more in the oil sector as it contributes a large part of Nigeria RGDP and the funds realized from the investments can be used for productive purposes that can lead to economic growth.

5. Conclusion and Recommendations

This paper examined the nexus between natural gas consumption and economic growth in Nigeria. Natural Gas consumption and oil price have a great influence on real economic growth as proven by this research. Also, oil price is one of the greatest catalysts of economic growth. The research shows that natural gas is beneficial and remains an essential tool of economic growth in Nigeria. Augmented Dickey-Fuller (ADF) was employed to test for the stationarity of the variables under study. The result of the unit root test revealed that all the variables were stationary at first difference. Based on this, the long run and short run relationships among the variables were tested using the ARDL model. The following major findings were observed from this study:

NGC has negative and significant relationship on economic growth on the long run, it is insignificant in the short run because energy consumption is a derived demand which is used for further production. Also, this can be attributed to the pattern of consumption and standard of living in the rural and urban areas of the country. There is more infrastructure which aids NGC in urban areas when compared to rural areas. OP has a positive and significant relationship on economic growth both

on the short run and long run. This is because, it is a close substitute to natural gas and it has general acceptability.

Based on the findings, the following recommendations are made: There is room for massive investment in the oil and gas sector especially in infrastructures with the aim of increasing natural gas consumption through its availability, accessibility and affordability most especially in the rural areas and also urban areas. Government should ensure adequate supply of natural gas to stimulate economic growth, they should also create awareness and enlightenment campaign on prudent use of natural gas to avoid wastage, and unproductive consumption should be checked, most especially from the demand side both in the rural and urban areas. The private sectors should also tap in to opportunities that are available in the oil and gas sector. The involvement of the private sector will also help to boost the economic growth and development of the country. Government should create awareness on the need to encourage the use of natural gas over other fossil fuel energy to reduce carbon emission into the atmosphere which in turns causes global warming and climate change.

References

- Abalaba, B. P., & Dada, M. A. (2013). Energy consumption and economic growth nexus: New empirical evidence from Nigeria. *International Journal of Energy Economics and Policy*, 3(4), 412-423.
- Adamu, A., & Darma, M. R. (2016). Inland natural gas consumption and real economic growth in Nigeria: ARDL cointegration test. *Journal of Economics and Sustainable Development*, 7(8), 183-206.
- Adelegan, A. E. (2018). The Role of Natural Gas In Nigeria'Economic Development Calculus: Some Simple Empirics. *Journal of Economics and Finance*, 9(3), 13-21
- Agbonifo, P. E. (2015). Opportunities, challenges and obstacles to economic growth and sustainable development through natural gas in Nigeria. *Journal of Sustainable Development in Africa*, 17(5), 99-114.
- Akinola, A. A. O., Oginni, O. T., Rominiyi, O. L., & Eiche, J. F. (2017). Comparative paper of residential household energy consumption in Ekiti State, Nigeria. *British Journal of Applied Science & Technology*, 21(2). 1-10
- Apergis, N. & James, E., (2010). Natural gas consumption and economic growth: A panel investigation of 67countries. *Energy Policy*, 37, 617-622.
- Biose, H. (2019). Gas Production and Utilization in Nigeria: A Long-term Perspective. *International Journal of Engineering Technologies and Management Research*, 6(5), 58-72.
- Charemza, W. W., & Deadman, D. F. (1997). *New directions in econometric practice. Books*.
- Brown, Stephen and Mine Yücel (2008). "What Drives U.S. Natural Gas Prices?" *The Energy Journal*, 29(2): 45-60.
- Dantama, Y. U., Abdullahi, Y. Z., & Inuwa, N. (2012). Energy consumption-economic growth nexus in Nigeria: An empirical assessment based on ARDL bound test approach. *European Scientific Journal*, 8(12).

- Davidson, J. E., Hendry, D. F., Srba, F., & Yeo, S. (1978). Econometric modelling of the aggregate time-series relationship between consumers' expenditure and income in the United Kingdom. *The Economic Journal*, 661-692.
- Edwards, R. D., Smith, K. R., Zhang, J., & Ma, Y. (2004). Implications of changes in household stoves and fuel use in China. *Energy policy*, 32(3), 395-411.
- EIA (U.S. Energy Information Administration) (2014). International Energy Data and Analysis. U.S. Energy Information Administration.. Availableonline: <http://www.eia.gov> (accessed on 20 January 2016).
- EIA (2008) "[Pricing Differences Among Various Types of Crude Oil](#)". Archived from [the original](#) on 13 November 2010. Retrieved 17 February 2008.
- EIA, (2020). Nigeria: International Energy and Data Analysis. [Online] Available at: <http://www.eia.gov/beta/international/country.cfm?iso=NGA> [Accessed 2020].
- Elias, Rebecca J., Victor, David G., (2005). *Energy transition in developing countries: a review of concepts and literature*. In: *Program on Energy and Sustainable Development, working paper*. Stanford University: Stanford.
- Emeka N. & Uko, A. K. (216). Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric Methods*, 5(4)
- Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 251-276.
- Etokakpan, M. U., Solarin, S. A., Yorucu, V., Bekun, F. V., & Sarkodie, S. A. (2020). Modeling natural gas consumption, capital formation, globalization, CO2 emissions and economic growth nexus in Malaysia: Fresh evidence from combined cointegration and causality analysis. *Energy Strategy Reviews*, 31,.
- Gujarati, D. N., Bernier, B., & Bernier, B. (2004). *Econométrie* (pp. 17-5). Brussels: De Boeck.
- Gujarati, D., (2012). *Econometrics by Example*. Great Britain: Pgrave Macmillan.
- Heltberg, R (2005). Factors determining household fuel choice in Guatemala. *Environ. & Develop. Econ.* 10, 337-361
- Henry Biose. (2019). "Gas Production and Utilization in Nigeria: A Long-Term Perspective." *International Journal of Engineering Technologies and Management Research*, 6(5), 58-72.
- Hosier, R H., & Dowd, J. (1987). Household fuel choice in Zimbabwe: An empirical test of the energy ladder hypothesis. *Res. & Energy*, 9(4), 347-361
- IEA. (2017). WEO 2017 Special Report: Energy Access Outlook. International Energy Agency. Retrieved from <https://www.iea.org/publications/freepublications/publication/weo-2017-special-report-energy-access-outlook.html>
- International Crude Oil Market Handbook", Energy Intelligence Group, 2011*
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with appucations to the demand for money. *Oxford Bulletin of Economics and statistics*, 52(2), 169-210.
- Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with appucations to the demand for money. *Oxford Bulletin of Economics and statistics*, 52(2), 169-210.

- Leach, G. (1992). The energy transition. *Energy Policy*, 20, 116-123.
- Lee, C., Chang, C. (2008), Energy consumption and economic growth in Asian economies: A more comprehensive analysis using panel data. *Resource and Energy Economics*, 30(1), 50-65.
- Liang, F. Y., Ryvak, M., Sayeed, S., & Zhao, N. (2012). The role of natural gas as a primary fuel in the near future, including comparisons of acquisition, transmission and waste handling costs of as with competitive alternatives. *Chemistry Central Journal*, 6(1), 1-24.
- Liang, F. Y., Ryvak, M., Sayeed, S., & Zhao, N. (2012). The role of natural gas as a primary fuel in the near future, including comparisons of acquisition, transmission and waste handling costs of as with competitive alternatives. *Chemistry Central Journal*, 6(1), 1-24.
- Mankiw, Romer, Weil. (1992) A Contribution to the Empirics of Economic Growth, *Quarterly Journal of Economics*, 407-437.
- Masera, O. R., Saatkamp, B. D., & Kammen, D. M. (2000). From linear fuel switching to multiple cooking strategies: a critique and alternative to the energy ladder model. *World development*, 28(12), 2083-2103.
- Narayan, P., & Smyth, R. (2005). *Trade liberalization and economic growth in Fiji. An empirical assessment using the ARDL approach.*
- Nigerian National Gas Policy (2017), 1-8
- Nigerian National Petroleum Corporation (NNPC) Department of Petroleum Resources Annual Report 2016
- Nigerian National Petroleum Corporation(NNPC)Department of Petroleum Resources Annual Report 2017
- Nkoro, E., & Uko, A. K. (2016). Autoregressive Distributed Lag (ARDL) cointegration technique: application and interpretation. *Journal of Statistical and Econometric methods*, 5(4), 63-91.
- Noor, S., & Siddiqi, M. (2010). World academy of science, engineering and technology. *International Journal of Energy and Power Engineering*, 7(4), 1-6.
- Odhiambo, N. (2009), Energy consumption and economic growth nexus in Tanzania: An ARDL bounds testing approach. *Energy Policy*, 37, 617-622.
- Onwukwe, M., Duru, U., & Ikpeka, P. (2015). Natural gas utilization through domestic gas distribution in Nigeria. *Journal of Advanced Research in Petroleum Technology & Management*, 1(1), 1-7.
- Patin, S. A. (1999). *Environmental impact of the offshore oil and gas industry* (Vol. 1). East Nortport, NY: EcoMonitor Pub..
- Pesaran, M. H. (1997). The role of economic theory in modelling the long run. *The Economic Journal*, 107(440), 178-191.
- Pesaran, M. H., & Smith, R. (2001). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of econometrics*, 68(1), 79-113.
- Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.
- Solow, R. (1956). A Contribution to the Theory of Economic Growth. *Quarterly Journal of Economics*, 65-94,.
- Ramberg, D. J. & Parsons, J. E. (2012). The Weak Tie Between Natural Gas and Oil Prices. *The Energy Journal* 33(2): 13-35.

Romer, D. (1994), *Advanced Macroeconomics*. USA: McGraw-Hills Companies, Inc.

Solarin, S. A., & Shahbaz, M. (2015). Natural gas consumption and economic growth: The role of foreign direct investment, capital formation and trade openness in Malaysia. *Renewable and sustainable energy reviews*, 42, 835-845.

The World Bank Group, Global Gas Flaring Reduction Partnership, accessed 1/21/2020.

Toole, R (2015). *The energy ladder: A valid model for household fuel transition in Sub Saharan Africa? MSc thesis submitted to the Department of Urban and Environmental planning and Economics*. Tufts University, USA.

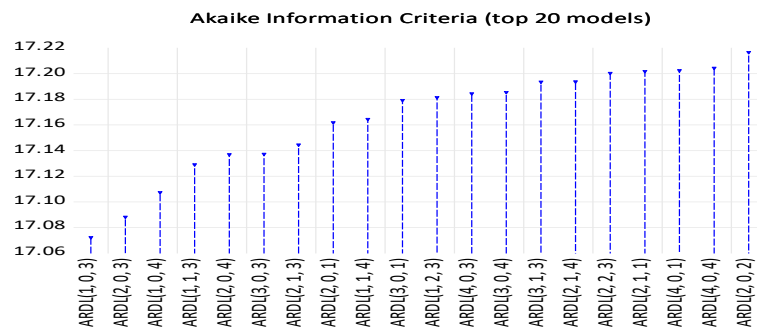
U.S. Energy Information Administration, [International Energy Statistics database](#), accessed 2/5/2020

Vander-Kroon, B., Brouwer, R., & Van-Beukering, J. H. (2013). The energy ladder: Theoretical myth or empirical truth? Results from a meta-analysis. *Renew. & Sustain. Energy Reviews* 20: 504–513.

Wei, W. W. (2006). Time series analysis. In *The Oxford Handbook of Quantitative Methods in Psychology*, 2.

World Economic Forum. (2017), BP Statistical Review of World Energy. 66th ed. London: Centre for Economics Research and Policy.

Appendix 1



Source: Author's Computation

Impact of Capital Structure and Financial Performance of Real Estates Companies in Nigeria

Salma Muhammad¹ & Adamu Garba Zango¹

¹Department of Accounting, Baze University, Abuja-Nigeria

Correspondence Email: zangoage@gmail.com

Abstract

This study examined the impact of capital structure on the financial performance of listed construction and real estate companies in Nigeria from 2015-2019. The study made use of ex-post factor research design which involved gathering panel dataset from published annual reports and accounts of the sampled companies. Purposive/judgemental sampling technique was used to select five (5) listed construction and real estate companies as at December 2019. Descriptive statistics, correlation and regression analysis were used to evaluate the data. The findings revealed that, the capital structure had a negative and insignificant effect on the financial performance of construction and real estate firms in Nigeria for the period under study. Therefore, it was recommended that, management of construction and real estate companies in Nigeria should exercise caution while choosing the amount of debt to be use in their capital structure as it affect their performance negatively.

Keywords: Capital Structure, Financial Performance, Real Estate Companies

JEL Classification: M4

1. Introduction

From inception, companies were usually financed from the equity contributed by owners. With passage of time, companies begin to plough back part of their profits into their business to provide for expansion and to supplement equity finance. Moreover, as global competition heightened, the dream of every company is to increase its performance and competitive advantage. To this end, identifying the determinants of financial performance poised a current research question and the several studies dedicated to this area shows active interest of experts to find an explanation to this pertinent question. The impacts of capital structure on financial performance of businesses have been of particular research interest in the literature of corporate finance. Conflicting theories were proposed on the relationship between capital structure and its value relevance to the firm. The Traditional theorists of capital structure are of the view that capital structure affects firm value. Modigliani and Miller (MM), under the assumptions of perfect markets and no taxes, argue that capital structure decision is of no relevance (Pandey 2011). MM

later changed their stand when they later considered corporate taxes. They further maintained that tax savings resulting from interest paid on debt create value for the firm. They also opined that, tax advantage of debt is reduced by personal taxes and financial distress. Hence, the trade-off between cost and benefit of debt can turn capital structure into a relevant decision.

The construction or real estate sector is very crucial in any nation's social and economic development. Apart from the sector's potential with respect to employment generation, the various activities undertaken are germane to fostering effective sectoral linkages and enhancing, as well as sustaining economic development. The sector deserves attention because Nigeria is qualify for real estate development due to her growing population, rapid urbanization, and for the fact that the sector contributes up to 7.5% to the gross domestic product (Okeke 2016). Rufus and Ofoegbu (2017) noted that construction and estate development is capital intensive and that is one of the major problems confronting the sector in Nigeria is limited sources of funding. Yousef (2019) informed that apart from equity debt financing is also required. The author observed that the two major loans required to finance construction and real estate projects in Nigeria are short-term loan for financing the construction stage, and long-term mortgage loan which is permanent in nature for financing the project over its normal operating life. This expresses that excessive debt financing would definitely erode the profitability performance of the sector. Therefore, it is against this background that this study aims to examine the impact of capital structure on the financial performance of listed construction and real estate companies in Nigeria with a view to understanding how capital structure can be used to improve financial performance of firms.

Next to investment decision function, the second most important function is the financing decision function to be done by managers (Pandey 2011). Broadly, managers must decide when, where and how to acquire funds to meet the firm's investment needs. An appropriate capital structure decision is important for any organization not only in terms of additional value and maximizing returns, but also the impact of such a decision on its ability to compete favourably. Warokka, Herrera and Abdullah (2011) discerned that the subject of optimal capital structure has gained the attention of several researchers. These authors argued that, capital structure of a firm is a combination of debt and equity devoted in financing its operations. According to Akintoye (2008) capital structure decision is fundamental for the growing concern of any business enterprise as to the maximization of returns to stakeholders. Reviewed literature revealed that several studies have been conducted to investigate the relationship between capital structure and financial performance. However, the outcomes of these previous studies have been contradictory and mixed (Nazir 2017; Yousef 2019). While some researchers reported positive relationship between capital structure and company performance (Yimka, James & Victor 2015; Rufus & Ofoegbu 2017; Yousef 2019), others reported that the capital structure is negatively related with performance (Iorpev & Kwanum, 2012; Sadiq & Sher 2016; Nazir 2017; Chang & Wong 2019). More so, some researchers for instance in Pakistan reported that no relationship exists

between capital structure and performance (Khan, 2012). Thus, the relationship that exists between capital structure and performance remain controversial and open for further research. Also vast majority of these studies concentrated on all the listed firms of the developed capital markets, with only a few giving attention to specifically capital markets of developing countries like Nigeria. Okeke (2016) observed paucity of literature on capital structure and performance of listed construction and real estate companies in Nigeria. Furthermore, Nigeria's growing population makes it a perfect place for real estate development due to her, rapid urbanization, and for the fact that the sector contributes up to 7.5% of the gross domestic product (GDP) of Nigeria (Okeke 2016).

Very few studies were conducted in the construction/real estate sector of the Nigerian economy. This study was therefore, motivated by these gaps and was designed to cover these noticeable empirical research gaps in the capital structure of literature in Nigeria. The aim of this study is to investigate the impact of capital structure on firms' performance using (return on capital employed ROCE, return on equity ROE, and return on assets ROA) as measures of financial performance as dependents and (debt-to-equity ratio) as independent variable. The aim of this study is to assess the impact of capital structure on the financial performance of listed construction and real estate companies in Nigeria. The specific objectives of this study are to determine the impact of capital structure of return on capital employed (ROCE) of listed construction and real estate companies in Nigeria; to ascertain the impact of capital structure on return on equity (ROE) of listed construction and real estate businesses in Nigeria; and to assess the impact of capital structure on return on assets (ROA) of listed construction and real estate firms in Nigeria.

2. Literature Review

Conceptual Framework

Capital structure otherwise known as financial structure has been defined by numerous authors. Pandey (2011) views it as the firm's mix of debt and equity. Nirajini & Priya (2013) define capital structure as the way in which an organization is financed. It is a combination of long term capital (ordinary shares and reserves, preference shares, debentures, bank loans, convertible loan stock and so on) and short term liabilities such as a bank overdraft and trade creditors. Dare & Sola (2010) as cited in Akeem, Terer, Kiyajui and kayode (2014) explained that there are various alternatives of debt-equity ratio. These includes; 100% equity: 0% debt, 0% equity: 100% debt and X% equity: Y% debt. From these alternatives, option one is that of the unlevered firm, that is, the firm that shuns the advantage of leverage (if any). Option two is that of a firm that has no equity capital and it's financed exclusively by debts. This option may not actually be realistic or possible in the real life economic situation. This is because no provider of funds will invest his money in a firm without equity capital. This is what is referred to as 'trading on equity'. It means that, it is the equity element that is present in capital structure that motivates the debt providers to give their scarce resources to the business (Chechet & Olayiwola, 2014). Option three is the most realistic one in that, it combines both a certain percentage of debt and equity in the capital structure and the advantages of leverage (if any) are exploited. To further elaborate on capital structure, it is

important to explain the elements: Debt financing which according Cheng (2009) defined debt financing as the borrowing of loans from other companies, banks or other financial institutions. It is a kind of finance that becomes a commitment for the company to repay back interest and principal at the end of a particular period. The inability of the company to repay this commitment and the interest accruable to this commitment would attract distress for the company and this would ultimately lead to bankruptcy (Khan 2012). Equity financing entails the ability of firms to raise its external finance from the public and at the same time issue out a part of the firm's ownership right as evidenced by share certificate. The equity holders are part owners of the company. At the end of each financial period if there is profit, the firm reward the equity holders with dividend from the profit made by the company (Efobi 2008). From the above definitions, it can be deduced that capital structure is simply the proportion of equity and debt that a firm employed to finance its operations.

Theoretical Framework

The publication of "The Cost of Capital, Corporate Finance, and the Theory of Investment" in 1958 by Franco Modigliani and Merton Miller mark the beginning of modern theory of capital structure. Modigliani & Miller's theory argues that changes in capital structure should not affect firm's market value or cost of capital in a perfect capital market without taxes and transaction costs. It implies that the financial instruments issued by the company have no effect on firm's productivity and value. According to Akinlo (2011), the unrealistic assumptions in MM irrelevance theory with respect to capital structure has paved way for the emergence of other principles. Since then several theories exist to guide discussions on capital structure. However, for the purpose of this study, three theories were adopted. These are trade-off theory, pecking order theory and agency theory.

The trade-off theory advocates balancing the cost and benefits by companies when making decision about what percentage of debt and/or equity should constitutes it capital structure (Muritala, 2012). The decision of a firm about the use of debt finance or equity finance should depend on the costs and benefits attached to each source of funds. In the determination of optimal capital structure for instance, the firm should consider the trade-off between costs and benefits of each source of finance since each has some costs and benefits. Tax saving for instance is one of the benefit of using debt but it may lead to bankruptcy as well. To avoid financial distress, the firm should strike a balance at that point where any additional debt becomes riskier and hence more expensive to both creditors and shareholders (Khan 2012).

Pecking order theory does not take an optimal capital structure as a starting point. It rather engages the fact that firms show a distinct preference for using internal sources of funds such as retained earnings and excess liquid assets over external finance. According to this theory, it is only in the absence of internal sources that firms should opt for the acquisition of external financing if the need be or if so desired. Olowe (2011) opined that even the selection of the external fund must follow the ranking of the cheapest to the dearest ones. In Pecking order hypothesis, the expectation is that profitable firms that generate significant earnings should use

less debt capital than those who generate insignificant earnings (Ahmad, Abudullah & Roslan 2012).

The involvement of debt as part of the capital structure of a firm also leads to agency cost. The agency cost theory suggests that due to the effect of the separation of control and ownership, the agents (managers) of a firm will not always work on behalf of the shareholders hence disagreement between the two parties (Rufus & Ofoegbu 2015). The raising of company debts also results into conflicts between the shareholders and debt investors. Thus, the dispute between the interests of shareholders and managers describes the agency problem. The agency problems give rise to agency costs. The principal must incur some agency costs to ensure that the agent acts in his interests. Such costs can be called the expenses of monitoring managers. Without increasing the agency cost, trading off equity to debt controls the principal-agent problem. By increasing the debt to equity ratio, managers will tend to run businesses more efficiently. The use of debt limits the scope of managerial discretion because debt calls for required interest payments which result in cash outflows (Modugu 2013).

Review of Empirical Studies

Capital structure is an important aspect of company's operations. This study is an attempt to identify the impacts of capital structure on companies' financial performance. A lot of researchers have both locally and internationally conducted their work in this area of study with the view of helping both growing and grown firms to structure their finances efficiently yet the results are mixed. Omukaga (2017) scrutinized the effect of capital structure on profitability of firms listed at Nairobi Stock Exchange for the period covering from 2012 to 2016. The study measured capital structure by debt to equity while firm performance was measured by return on equity, earning per share, and profit after tax, and profit before tax. The findings of the study showed that return on equity, profit before tax, and profit after tax are determinants of capital structure. Yousef (2019) investigated the determinants of capital structure in the context of the Gulf Cooperation Council (GCC) and United Kingdom (UK) real estate sectors. The results of a bivariate analysis indicate that leverage in the UK is much higher than in GCC countries. This may be attributable to UK companies facing a lower cost of debt, which facilitates their rising of debt capital from the market. In addition, UK real estate firms tend to be larger and have higher levels of tangibility and retained earnings compared with GCC firms that tend to be more profitable and have more growth opportunities. The results of panel and Tobit regression analyses support both trade-off and pecking order theories in this study. Moreover, company size was found to have a significant positive impact on different types of debt measurements (market and book debt ratios), which is consistent with the trade-off theory, while profitability and retained earnings to total assets exhibited a significant negative impact for GCC and UK real estate firms, which is consistent with the pecking order theory. Importantly, these results hold true regardless of whether the regressions are estimated using random effects, fixed effects, OLS panel estimation or Tobit model technique. Chang and Wong (2019) examined the relationship between capital structure and profitability applying correlation and regression

analysis on dataset from 2003 to 2016 for the firms in the four Asian tiger economies. The data was collected from the Compust at global vantage database and include 46,301 observations. The study found a significant negative relationship between leverage and profitability, a significant positive relationship between growth and leverage in Taiwan, Korea and Hong Kong and a significant positive relationship between size and leverage in each of three countries.

3. Methodology

This study adopted an ex-post facto design to investigate the impact of capital structure on financial performance of listed construction and real estate companies in Nigeria. This is the most widely used design by previous researchers such as Yimka, et.al.(2015), (Muritala, 2012), (Nasimi 2016) and Akeem, et.al. (2014).For the purpose of this study, secondary method of data collection was employed to obtain relevant data. This includes Nigerian Stock Exchange (NSE) fact books and the annual reports and accounts of the sampled companies for the period of five years from 2015-2019. The population of this study comprises of the eight (8) Construction and Real estate companies listed on the Nigerian Stock Exchange (NSE) as at December 2019. These include Arbico Plc, Julius Berger Nigeria Plc, Roads Nig. Plc, SFS Real Estate Investment Trust, Smart Product Nigeria Plc, UACN Property Development Co. Limited, Union Homes Real Estate Investment Trust (REIT) and UPDC Real Estate Investment Trust.

The study employed purposive sampling technique to select five (5) out of total eight (8) listed construction and real estate companies on the floor of Nigerian stock exchange. This is base on their relative size as large, medium and small enterprises to give fair representation of the industry and the fact that their annual reports and accounts disclosed the data needed for the study. The selected five are Arbico Plc, Julius Berger Nigeria Plc, Smart Product Nigeria Plc, UACN Property Development Co. Limited and UPDC Real Estate Investment Trust. This study adopted the technique used byYimka et.al.(2015) to analyse the data which was basically a descriptive statistical technique of ratio analysis. This was done by evaluating the financial performance with respect to the return on capital employed (ROCE), return on equity (ROE) and return on assets (ROA). In addition, correlation and regression analysis was also used in order to determine the relationship between the dependent and the independent variables. This is necessary in order to find the extent to which the independent variable can explain the dependent variable. Regression was used because it will show the extent or degree of relationship between both the independent and the dependent variables.

In this study, the structure of equity and debt is the independent variable while the financial performance proxy by return on capital employed (ROCE), return on equity (ROE) and return on assets (ROA) are the dependent variables. This is hereby operationalized as below;

Pf = f (Eq, Dbt) 1

Where Pf = financial performance, Eq= equity value, Dbt = debt value, and Pf = ROA, ROE & ROCE

This implies that performance is determined by dependent variables such as; return on assets, return on equity & return on capital employed.

Hence;

ROA = f (Eq, Dbt) 2

ROE = f (Eq, Dbt) 3

ROCE= f (Eq, Dbt) 4

The model simply explains that all those dependent variables are subject to respective combination of equity and debt to determine performance.

Such that:

$Y = b_1X_1 + b_2X_2 + \mu$ 5

$y_1 = a + eqt_1 + dbt_2 + \mu$ 6

$y_2 = a + eqt_1 + dbt_2 + \mu$ 7

$y_3 = a + b_1x_1 + b_2x_2 + \mu$ 8

Where $Y = y_1, y_2, y_3$; Y = financial performance; $y_1, y_2, \& y_3$ = ROA, ROE & ROCE.

4. Result

This section deals with the presentation, analysis and interpretation of data. It also discusses the findings with detailed analysis of the relationship between capital structure and financial performance of construction and real estate companies in Nigeria. The results obtained from the analyses were accordingly used to test the hypotheses of the study.

Descriptive Statistics

The summary of the descriptive statistics of the variables are presented in table 4.1.

Table 1: Descriptive statistics

Variables	Min.	Max.	Mean	Std. Dev.
ROCE	-.1283752	2.377297	0.2004526	0.4806913
ROE	-.2781427	5.068578	0.5089980	.2144170
ROA	-.0567575	1.565725	0.1055434	0.3089226
GEARING	-10.68003	32.31706	4.4898380	9.2834150

Source: Authors' Computation

Table 1 presents the descriptive statistics for the dependents and explanatory variables. From the table above, the standard deviation of 0.4807 signifies that the data deviate from the mean value from both sides. This implies that there is no much wide dispersion of the data from the mean even though the standard deviation is higher than the mean value. The table also shows that the mean of return on equity of the sampled firms is 0.508998 with standard deviation of 1.214417. This implies that the performance of the firms in terms of return on equity is on average 0.508998, and the standard deviation value indicates that ROE of the sampled firms deviates from the mean value from both sides by 1.214417, implying that there is

significant dispersion of the data from the mean because the standard deviation is higher.

Moreover, the table shows that the mean of the return on asset of the firms is 0.1055434 with standard deviation of 0.3089226. This implies that return on asset of the sampled firms is on average 0.1055434 and the standard deviation value indicates that the value deviates from the mean from both sides by 0.3089226. This implies that there is no significant dispersion of the data from the mean because the standard deviation is lower. Finally, the table portrays that the mean of the debt-to-equity ratio (gearing) of the firms is 4.489838 with standard deviation of 9.283415 respectively. This implies that long term debt to total assets of the firms is on average 0.8527. The standard deviation indicates that the value of the firms` gearing ratio deviates from the mean value from both sides by 9.283415. This implies that there is significant dispersion of the data from the mean because the standard deviation is higher.

Correlation Matrix

The correlation matrix explains the degree of relationship between the dependent and independent variables of the study as well as the dependent variables among themselves. The summary of the associations among the variables of the study is presented in table B.

Table 2: Correlation matrix

Variables	ROCE	ROE	ROA	GEARING
ROCE	1.0000			
ROE	0.7222	1.0000		
ROA	0.0048	-0.0227	1.0000	
GEARING	-0.0194	0.2110	0.1225	1.0000

Source: Authors' Computation

Table 2 reveals that return on equity and return on asset of the firms are positively correlated with debt-to-equity ratio. The values of 0.2110 and 0.1225 of the variables indicated that an increase in gearing ratio will lead to increase in return on equity and return on asset. In contrast, return on capital employed have negative relationship with gearing ratio, implying an increase in gearing ratio will lead to decrease in return on capital employed of the sampled firms for the period under study. The relationship of the dependent variables among themselves indicates that return on capital employed is positively correlated with return on equity and return on asset. On the other hand, return on equity and return on asset are negatively correlated among themselves.

Regression Analysis

This section presents the regression results from the data that were utilized in examining the impact of the explanatory variable that would help in testing the hypothesis.

Hypothesis 1 is intended to determine the relationship between capital structure and return on capital employed. Regression analysis was conducted in order to

determine the relationship. The output of the regression exercise is represented in the table below:

Table3: Result output for Gearing & Return on Capital Employed

ROCE	Corf. Int	Std Err.	T	p>t	95% conf.
DBTEQT	-.001002	.0107948	-0.09	0.927	-.0233327
	.0213287				
Cons	.2049514	.1094981	1.87	.094	-.0215626
	.4314655				

Source: Authors' Computation

The panel regression of the above estimates showed that there exists a negative relationship between ROCE and gearing. This is indicated by the sign and size of the coefficients, that is $-0.001002 < 0$. The F-statistic p-value shows 92.68% for the sampled companies. This shows that the panel regression result is not statistically significant because it is greater than 5%. The coefficients showed that one unit change in gearing will cause a negative -0.001002 unit changes in ROCE of the sampled companies. This implies that gearing has a negative effect on ROCE. This effect is however not statistically significant for the period of this study. Therefore, from the panel regression estimate, gearing has no significant effect on ROCE, thus, the null hypothesis is accepted. This result is consistent with the findings of Pratheepkanth (2011), Ogebe, Ogebeand Alewi (2013) and Yimka, et. al. (2015). The results of their work also showed a negative relationship between capital structure and firm`s financial performance.

Hypothesis 2 was designed to ascertain the extent to which gearing influences return on equity. Regression analysis was conducted in order to determine the extent of that influence. The output of the regression exercise is represented in the table below.

Table4:Result Output for Gearing and Return on Equity

ROE	Corf. Int	Std Err.	t	p>t	95% conf.
DBTEQT	.0275996	.026663	1.04	0.311	-.0275569
	.827561				
Cons	.3850802	-.2704592	1.42	0.168	-.1744072
	.9445677				

Source: Authors' Computation

The panel regression estimate shows that there exists a positive relationship between gearing and ROE. This is indicated by the sign and size of the coefficients, that is $0.0275996 > 0$. The F-statistic p-value shows 31.14%. This shows that the panel regression result is not statistically significant because it is greater than 5%. The coefficient shows that one unit change in gearing will cause a positive change of 0.0275996 . Although, gearing has a positive effect on ROE, this effect is however not statistically significant for the period studied. Therefore, from the foregoing panel regression estimates, gearing have no significant effect on ROE, thus, the null hypothesis is accepted. This is supported by Alawad (2013), Nirajini and Priya (2013), and Yimka, (2015).

Hypothesis 3 the purpose of research Hypothesis H_{03} was to determine at what level of gearing return on assets (ROA) is enhanced. Regression analysis was conducted in order to determine the level of optimism. The output of the regression exercise is represented in the table below:

Table5: Result Output for Gearing on Return on Asset

ROA	Corf. Int	Std Err.	t	p>t	95% conf.
DBTEQT	-.004754	.0068865	-0.59	0.560	-.0183212
	-00101703				
Cons	.1238414	.0698537	1.77	0.089	-.020662
	.2683449				

Source: Authors' Computation

The panel regression of the foregoing estimates shows that there exists a negative relationship between gearing and ROA of the companies. This is indicated by the sign and size of the coefficients, that is $-0.0040754 > 0$. The F-statistic p-value shows 55.98% for Nigeria sampled companies. This shows that the panel regression result is not statistically significant because it's greater than 5%. The coefficient shows that one unit change in gearing will cause a negative -0.0040754 unit change in ROA of sampled companies. This indicates that gearing has a negative effect on ROA of Nigerian construction/real estate companies sampled. These effects are however not statistically significant for the period in this study. Therefore, from the panel regression estimate, gearing has an insignificant negative effect on ROA for sampled construction/real estate companies in Nigeria, thus, the null hypothesis is accepted. This is supported by Pratheepkanth (2011), Ana, Dragan and Monica (2012), Ogebe, et. al. (2013) and Yimka, et.al. (2015).

5. Conclusion and Recommendations

This study examined the impact of capital structure on financial performance of construction/real estate companies in Nigeria. The study viewed how the dependent variables like ROCE, ROE, and ROA is affected by the independent variable, which is the gearing. The study established that capital structure has negative effect on return on capital employed and return on assets. However, it has a positive effect on return on equity. Findings of this study therefore, provide insight into the effect of capital structure as it influences ROCE, ROE and ROA. The study concludes that overall, individual capital structure does not affect ROA, ROE and ROCE significantly. However, firm specific factors may cause some combined capital structure effect to significantly affect ROA, ROE and ROCE.

The following recommendations are drawn from the conclusions of the study. In line with the findings of the study, the researcher strongly recommends that management of construction and real estate companies in Nigeria should exercise caution while choosing the amount of debt to use in their capital structure as it has an insignificant negative effect on their performance. Also in determining which source(s) of finance to adopt in funding their business activities, managers of construction and real estate companies should consider those sources of funds that can enhance returns and also increase the performance of the organization. The study also recommends that companies should focus on efficient and effective use

of their resources to generate more profits because success may result from improved performance in the use of assets. It was also recommended that, the management of the listed companies in the Nigerian construction and real estate industry should ensure a proper trade-off between equity and debt to reduce the risk of overburdened external financing so as to improve financial performance for the benefit of equity holders. Furthermore, the study recommends that capital structure and its impacts on all the facet of firms' live should move from theoretical level to practical level. In doing this the managers and captains of industries as well as stock exchange operators should be fully involved in the issue of optimal capital structure and how it affects firm performance.

References

- Ahmad, Z., Abdullah, M.H.N. & Roslan S. (2012). Capital structure effect on firm's performance: Focusing on customer and industrial sectors on Malaysian firms. *International journal review of business research papers*, 8(5), 137-155.
- Akeem, L. B., Terer, E., Kiyanjui, M. W. & Kayode, A. M. (2014). Effects of capital structure on firm's performance: Empirical study of manufacturing companies in Nigeria. *Journal of finance and investment analysis*, 3(4), 39-57.
- Akinlo, O. (2011). Determinants of capital structure: Evidence from Nigerian panel data. *AfricanEconomics and Business Review*, 9(1), 1-6.
- Akintoye, I. (2008). Sensitivity of performance to capital structure. *European journal of social science*, 6(1),163-144.
- Alawad, S. (2013). Capital structure effect on firm performance. Research project Saint Mary's University. Saudi Arabia.
- Ana, S., Dragan, G., & Monica, C. (2012). Capital structure and financial performance of agricultural companies: Evidences from the Macedonian agricultural sector in transition. In *European Association of Agricultural Economists 132nd Seminar*.
- Brickstone.com, (2016), Construction Financing in Nigeria. Retrieved from <http://brickstone.com.ng/constructionfinancing-> in- 25th February, 2021.
- Chechet, I. L., & Olayiwola, A. B. (2014). Capital structure and profitability of Nigerian quoted firms: The agency cost theory perspective. *American International Journal of Social Science*, 3(1), 139-158.
- Chang C. & Wong W. (2019). Relationship between capital structure and profitability: evidence from four Asian tigers, *Journal of Management Information and Decision Sciences* 22(2).
- Cheng, M., T. (2009). Relative effect of debt and equity on corporate opening performance: A quantile regression study. *International Journal of Management*, 26(1), 142-145.
- Dare, F.D., & Sola. O. (2010). Capital structure and corporate performance in Nigeria a petroleum industry: Panel data analysis. *Journal of Mathematics and Statistics*, 6(2), 168-173.
- Efobi, R. U. (2008). The impact of capital structure on corporate profitability in Nigeria. *An unpublished M. Sc. Dissertation submitted in impartial fulfilment for the Award of an M. Sc. Degree in Accounting, Department of Accountancy, CBS, CU, OTA, Ogun State.*

- Khan, A.G. (2012). The relationship of capital structure decisions with firm performance: A study of the engineering sector of Pakistan”, *International Journal of Accounting and Financial Reporting*, 2(1), 245-262.
- Modigliani, F & Miller, M. (1958). The cost of capital, corporation finance and the theory of investment. *American economic review*, 48(3), 261- 297.
- Modugu, K.P. (2013). Capital structure decision: An overview. *Journal of finance and bank management*, 1(1), 14-27.
- Muritala, T.A (2012). An empirical analysis of capital structure on firms’ performance in Nigeria. *International Journal of Advances in Management and Economics*, 1(5), 116-124.
- Nasimi, A. N. (2016). Effect of capital structure on firm profitability (An empirical evidence from London, UK). *Global Journal of Management and Business Research*.
- Nazir, U. (2017). Impact of capital structure on firm’s financial performance: Textile, Automobiles, Sugar, Petroleum & Engineering Industry of Pakistan. *European Journal of Business and Management* 9(25), 62-65.
- Nirajini, A. & Priya, K. B. (2013). Impact of capital structure on financial performance of the listed trading companies in Sri Lanka. *International Journal of Scientific and Research Publications*, 3(5), 1-9.
- Ogebe, O. P., Ogebe, J. O. & Alewi, K. (2013). The impact of capital structure on firms' performance in Nigeria. *Journal of Risk Finance*, 6 (5), 438-445.
- Okeke, C. (2016). X-raying real estate contributions to gross domestic product. Retrieved from <http://leadership.ng/news/513409/xraying-real-estate> 21st February, 2021.
- Olowe, R. A. (2011). *Financial Management; Concepts, Financial System and Business Finance* (3rd ed.). Lagos, Nigeria: Brierly Jones Nigeria Limited.
- Omukaga, K. O. (2017). Effect of capital structure on financial performance of firms in the commercial and service sector in the Nairobi securities exchange for the period 2012-2016 (Doctoral dissertation, United States International University-Africa).
- Pandey, I.M. (2011). *Essentials of financial management*, 5th Reprint, New Delhi, Vikas Publishing House PVT Ltd.
- Pandey, I.M. (2005). *Essentials of financial management*, 4th Reprint, New Delhi, Vikas Publishing House PVT Ltd.
- Pratheepkanth, P. (2011). Capital structure and financial performance: Evidence from selected business companies in Colombo stock exchange. *Journal of Arts, Science & Commerce*, 2(2): 171-183.
- Rufus, O. A. & Ofoegbu, G. N. (2017). Impact of capital structure on financial performance of construction and real estate quoted companies in Nigeria. *International Journal of science research and management*, 5(10), 7186-7199.
- Sadiq M. N & Sher F. (2016). Impact of capital structure on the profitability of firms. Evidence from automobile sector of Pakistan. *Global Journal of Management and Business Research: C Finance* 16(1).
- Yimka S. A, James A. O, & Victor A. A (2015). Firms’ capital structure and profitability performance: A study of selected food product companies in Nigeria. *IIARD International Journal of Banking and Finance Research*, 1(7), 14-25

- Yousef Y. (2019). The determinants of capital structure: Evidence from GCC and UK real estate sectors. *Real Estate Management and Valuation*, 2(1) 108-125.
- Warokka, A., Herrera. J. & Abdullah, H.H. (2011). East Asian corporate governance a test of the relation between capital structure and firm performance. *International journal of economics and finance studies*, 3(2), 1-10.

Board Attributes and Financial Performance of Listed Oil and Gas Companies in Nigeria

Ali Mahmoud Ali¹ & Ibrahim Yakasai Aminu¹

¹Department of Accounting & Finance, Baze University, Abuja

Correspondence Email: alimahmoudali1995@gmail.com

Abstract

Due to the possible impact on company operations and performance, corporate governance has been at the center of company and academic discussion. This paper looked at how board attributes affect the financial performance of companies within Nigerian oil and gas sector. The paper was anchored on Stakeholder's Theory of Edward Freeman. The paper adopted an expo-facto design as it is focused on a statistical relationship between variables without the manipulation of the independent variable. The paper employed Board Composition and Board Diversity as proxies for Board Attributes while Return on Assets represented the financial performance. However, this paper introduced Firm size as a Control or Moderating Variable to see changes in the performance of the Dependent and the Independent variables. The data from 2010 -2019 financial periods sourced from Machema Ratios were analyzed with the aid of EVIEWS 10.0 software and the findings show that, Board Composition does not affect the financial performance of oil and gas companies in Nigeria. Moreover, there was a significant relationship between Board Diversity and financial performance of Oil and Gas companies in Nigeria. The paper therefore, recommends that for financial performance of the oil and gas industry to increase, there is the need to allow the introduction of foreign directors as the more the proportions of foreign directors on board, the higher the financial performance of the sector.

Keywords: Board Attributes, Corporate Governance, Financial Performance

JEL Classification: G23, L95

1. Introduction

The financial performance of companies is, on one hand, a key instrument for funding the present economic activities which helps to keep the business going and also boost the business value and on the other hand, it contribute to the distribution of dividends, which, in turn, is a key measurement criterion for stakeholders, and for the shareholders in particular (and their funds). Thus, it is important for both practice and academia to identify and analyze those aspects that affect the financial performance of organizations. Although it is logical to assume that, the Board of Directors' managerial capabilities would have a substantial impact on the financial performance of the company. This explains how beneficial or important board

attributes may have on the performance of companies. In order to receive investment capital, many firms around the world need expansion and growth. In this, investors usually ensure that the firm under consideration is financially sustainable, stable, and capable of handling the business and making long-term profit before they invest in a certain business (Mallin, 2007). Therefore, where the situation of the company is not all that promising, it will not be as attractive to possible investors. This explains that, the failure to acquire sufficient money by companies would have a negative impact on the business and on the firm in general. Due to its potential impact on company activity and performance, corporate governance has been noted as a leader for corporate and university discussion. Good corporate governance is primarily focused on leadership capacity to influence firms or establishments in achieving their objectives and to contribute to the organization's efficiency and success. Aliani (2014) opine that, a leader's specific behavior distinguishes him or her from others and this has shown that an effective management is the consequence of an effective role conduct achieved by establishing trust and mutual respect and relations with the group. Recent researches suggest that Nigerian firms' financial performance has an impact on the board of directors (Bebi et al 2015) and that independent board of directors have a substantial positive relationship with market assessment in African companies (Ntim, 2013). Smaili and Sinclair-Desgagne (2014) noted that, the presence of independent financial specialists on the board also reduces the severity of the punishments imposed by financial authorities. Evidence from Chouaibi et al., (2010) and Aliani (2014) indicates that the CEO can influence the tax strategy and amount of innovation of a company. Akileng and Donnelly (2013) also reveal that abnormal accrual chances are perceived by the market to be minimized by good corporate management.

In every firm, the Board is the main component of Corporate Governance whose responsibilities include to design, supervise and implement policies in a manner consistent with the operational policy and guidelines of the organization. It is the Board's power to decide on behalf of the shareholders the operation, administration and strategy of the firm, since it represents its interests. Board composition as one of the corporate governance' mechanisms explained the need for the formation of the board with the aim of ensuring diversity of expertise without compromising the integrity, independence, compatibility and accessibility of members to meetings so as to ensure effective corporate financial performance. For a more effective and efficient composition of the board, Eisenhardt (1989) explained that, non-executive directors make up a larger proportion of effective boards as the support for higher percentage of non-executive directors on the board is founded on agency theory. Due to its independence from company management, the non-executive directors are supposed to offer the company higher performance benefits (Hasssan and Farouk, 2014).

The impact of board composition, board independence, board size, CEO duality on business performance has been investigated in recent studies. In Nigeria, studies such as Sanda, Mukailu and Garba (2005) examined the existing relationship between the two variables (that is, board composition and financial performance)

and the study found board composition to have significant effect on company's financial performance. More so, Ehikioya (2009) noted a positive and significant relationship between the composition of boards, the Board size, CEO duality and performance of a firm. Ohiokho and Ohiokha (2011) had written a work on the impact of corporate governance and firm performance, but the study failed to take diversity and gender into account. This study attempts to analyze the impact of the Boards' composition, diversity of boards, foreign directors and educational backgrounds on the firm performance of oil and gas businesses in Nigeria. This is because, in order to manage the business activities for shareholders, it is an important instrument or process for monitoring, consulting and managing companies (Fama& Jensen, 1983). This study, therefore, aims to fill the gap that for corporate governance to effectively play a major role in firm financial performance, significant elements such foreign directors and directors' educational background, gender and diversity in board composition should have a prime position, and this is the focal point of the study.

It is anticipated that, this study will contribute to existing literature by providing empirical evidence on the relationship between board attributes and firm financial performance in Nigeria, with the oil and gas companies as the focal point. This study assesses the impact of board attributes on the financial performance of listed oil and gas marketing firms in Nigeria. The specified objectives are to examine the effect of board composition on the financial performance of oil and gas companies in Nigeria; to determine the extent to which board diversity influences the financial performance of oil and gas companies in Nigeria.

2. Literature Review

Concept of Board Attributes

The need for deeper separations between ownership and control is expanding in modern society due to the increasing size and complexity. In recent years, millions of investors, in particular in North America and Europe, have been affected by aberrant and illegal conduct of large corporations (Picard, 2005). Recently, due to company scandals and the wrongdoing of management, the subject of board attributes has become more significant. Fenwick, McCahery and Vermeulen (2019) noted that hidden debt, inflated earnings, insider trading, tax evasion, misuse of money, and violations of fiduciary obligations have all been the subject of criminal and civil lawsuits against companies, board members, and executives. Enron, WorldCom, and Tyco became well-known as a result of massive governance failures (Garg, 2007). Corporate scandals and financial crises involving multiple banks and others in Nigeria have sparked interest and research into the function of corporate governance in firms. The connection between the owner and the management, as well as the allocation of authority and responsibility in organizations, are all topics covered by corporate governance (Picard, 2005). The corporate governance study is comprehensive since a range of theoretical views have been taken to examine the structure, role and impact of boards and this lead to several competitive hypotheses regarding best corporate governance practices. Consequently, it is important for researchers to notify existing management practices (Kiel and Nicholson, 2003). Some ideas see corporate administration as a

relationship between certain board and business success qualities. Corporate management relies, for example, on structures such as the ownership structure, the composition of boards, the Board size, debt and CEO duality (Ehikioya, 2009). Others place corporate governance as the total package that derives organizations to attain their objectives. Example; (Al-Azzam and Al-Qura'an, 2015) and (Fenwick, McCahery & Vermeulen, 2019)

Concept of Board Composition

The term board composition could be seen as the portion of executive, non-executive and independent directors (outside directors) when expressed as a proportion to the total board membership. Shah et al., (2011) explained dependent directors as executive directors while independent directors were seen as non-executive directors. The majority of the literature agrees that effective boards have a higher share of outside directors. Studies such as Jensen and Meckling (1976) and Eisenhardt (1989) explained that the agreement on a higher share of outside directors on the board is based on agency theory, which encourages ownership and control separation that could lead to self-interested conduct by responsible people. Outside directors, according to the agency theory, will make up effective boards. The Management Committee should be large enough and composed so that the diversity of expertise is guaranteed, so also, the independence, compatibility, integrity and availability of the members of the Board of Management are not affected by the meetings of Securities and Exchange Commission members under the Corporate Governance Code published in Nigeria. The board shall consist of a blend of managers and non-management directors, headed by the Chairman.

Board Composition and Financial Performance

Many corporate governance investors see corporate management as a means to extract value from underperforming, undervalued corporations for shareholders. Targeting organizations that perform and analyze business governance can lead to improvements that unleash the hidden worth of a company. Often, these reforms entail replacing badly functioning managers and ensuring that organizations follow some guided rules of practice for the organization to be considered best of practice in corporate management (Fosberg, 2004). In their analysis, MacAvoy and Millstein (2005) found that companies with active and independent members looked to do far better than those with passive, unrelated board members. Most investors prefer to pay a premium in order to invest in a well-managed company (MacAvoy and Millstein 2005). Often scheduled meetings generate the management time-consuming opportunity expenses and cash costs for board members in form of travel allowances and charges. However, genuine benefits might come through meetings such as conferences, strategies and management monitoring opportunities. For example, Vafeas (2004) discovered that, meeting frequently influences in a way that is compatible with agency theory in the improvement of operating performance.

Concept of Board Diversity

In recent years, studies of women on board have been brought to the attention of regulators in certain nations the studies recommended that, women be board member of public firms. Countries such as Norway and Sweden on the Board of

Directors of list corporations have mandated a gender quota (Rondoy, Oxelheim and Thomson, 2006). The problem of having more women on boards and in top executive positions has become a hot topic of discussion. In Norway, for example, governmental measures are restricting the proportion of women on board of directors. The results for Danish companies also suggested that wider gender differences in top management roles would boost financial performance to some level (Smith, Smith and Verner, 2006). Huse and Solb (2006) explained that women directors on corporate boards could make significant contributions that will create competitive advantage for firms. Burke (2003) noted that women on boards have an impact on a business's reputation, provide strategy for women's product/market issues, lead the company, improve board processes and discussions and contribute to the work of the companies. Companies that are customer-driven have more women managers that are recognized as employers of choice. With more women on board, the reputation of an organization can be enhanced, above all, as a symbol of good governance and a sign for excellent management (Vinnicombe, Singh, Burke, Bilimoria, and Huse, 2008).

Board Diversity and Financial Performance

The board is diversified by women in the board of directors. Joecks et al., (2012) reveals that women have a favorable impact on company success in German Boardrooms. A study by Mahadeo et al. (2012) in an emerging economy, found women in the board of directors to have a positive relationship with firm performance. Carter et al. (2003) and Erhardt et al. (2003) both discovered a significant relationship between the number of women on the board of directors and firm performance in U.S. firms. Other studies (Ahern & Dittmar, 2012; Bhern & Staubo, 2014) unveil that between women and company performance there is a negative relation. Both of these studies are based on Norwegian businesses. A study of US companies also indicates a detrimental connection (Adams & Ferreira, 2009). There are similar results in the research conducted by the US companies in Shrader et al. (1997). Carter et al. (2010) whose studies discover that, there is no connection between women on boards of directors and firm performance in recent study. This study is based on companies in the United States. This finding holds true for Miller & del Carmen Triana's (2009) research on US enterprises and Randøy et al (2006)'s research on Danish, Norwegian, and Swedish firms. The varied research findings indicate that the linkage that women on boards and business success have is yet to be known. Some studies show a beneficial link between women on boards of directors and company performance, while others show a negative link. A few research, on the other hand, found no link at all.

Concept of Financial Performance

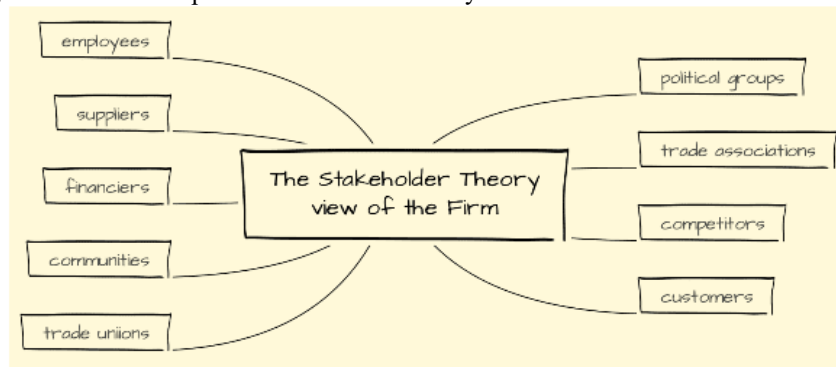
Financial performance could be explained as a means by which interested parties view and assess how much a firm attains its objectives, vision, mission, policies and targets. Different studies such as Matolcsy & Wright (2011), Bhagat & Black (1999), Yasser et al., (2011) and Shah (2011) had measured firm performance using different measures such as return on assets, market performance, industry performance and so on. Matolcsy & Wright (2011) employed Return on Assets, Return on Equity, Change in market value of equity and Change in market value of

equity, adjusted for dividends and risk as proxies for firm performance while Yasser et al. (2011) employed Profit Margin and Return On Equity as proxies for financial performance. This explains the various profitability ratios engaged by the scholars (Matolcsy & Wright (2011) and Yasser et al. (2011)) in determining the performance of a firm. In same way, Shah et al. (2011) made use of market-based measures of companies' performance such as Return on Equity, Return on Investment, Marris ratio which is calculated by dividing Market value of equity by book value of equity and Tobin's Q which is calculated as the sum of market value of equity and book value of debt/total of assets. This shows that Shah et al. (2011) looked at many profitability ratios for determining the performance of a firm. Bhagat & Black (1999) employed Return on Assets, Growth of Assets, Tobin's Q, Operating Income, Turnover Ratio, Operating Margin, Sales per Employee, Sales, Employees and Cash Flows as proxies for firm performance.

Theoretical Framework

Stakeholder Theory of Edward Freeman covers several sectors, including employees, vendors, local community, creditors and other organizations, and is a theory of organizational governance and business ethics. The theory addresses issues such as social responsibility in corporations, market economy, social contract theory, morality and management ideals (Mitchell, Agle and Wood, 1997). Philips (2003) noted that, the concept of managing or engaging stakeholders is widely accepted and utilized at tactical and strategic levels in today's enterprises. Stakeholders have become an important factor for project managers working on small tactical tasks and CEOs developing business strategies.

Figure A: The Concept of Stakeholder's Theory



Source: Philips (2003)

3. Methodology

The study adopted the expo-facto design as it is focused on a statistical relationship between variables without the manipulation of the independent variable. The population of this study comprises of all the twelve (12) oil and gas companies as listed on the floors of the Nigeria Stock Exchange (NSE) as at December 31, 2020. These companies include 11 Plc, Ardoya, Capital Oil, Caverton Offshore Support Group, Conoil, Eterna, Japaul Gold and Ventures, MRS Oil Nigeria, Oando, RAK

Unity Petroleum, Seplat Petroleum Development and Total Nigeria. This study will focus on the 5 oil and gas companies listed on the floor of the Nigerian Stock Exchange within the Period of 10 years (that is 2010-2019). The Companies include Total Nigeria, Con Oil, Oando Plc, MRS Oil Nigeria and 11 Plc. The 5 Companies are being chosen because of their active shares and availability of Financial Statements.

This study used basically secondary data sourced from Machame Ratios and annual reports of the listed oil and gas companies. Other relevant data were sourced from Journals, Internet, Text books and previous research works. This study employs the Ordinary Least Square (OLS) method of Regression analysis and the Descriptive Statistics. The choice for the descriptive analysis is to explain the individual performance of the various variables employed in the study while the current relationship between the variables was estimated by means of a regression analysis. On the technique for data analysis, the defined statistical tests were employed using the EVIEWS 10.0 software. The OLS model for this study is specified thus:

$$\text{Financial Performance} = f(\text{Board Attributes}) \dots\dots\dots 1$$

Linearly, this could be further specified as thus:

$$\text{Financial Performance} = \beta_0 + \beta_1 \text{BoardComposition} + \beta_2 \text{BoardDiversity} + \beta_3 \text{Firm Size} + e_i \dots\dots\dots 2$$

Where Financial Performance is the dependent variable or proxy for Financial Performance of listed Oil and Gas Companies in Nigeria. On this, Return on Assets was chosen as the profitability ratio for financial performance. Board Composition and Board Diversity represent the Board Attributes Mechanism which serves as the independent variable or budget mechanisms. Firm Size serves as a Control or Moderating Variable. β_0 , β_1 , β_2 and β_3 are the correlation coefficients; and the random variable is denoted by the letter e_i . This is the error term that represents the dependent variable variability that cannot be explained by the linear influence of a separate variable.

4. Result

This section presents and discusses the outcome of the descriptive and regression analyses gotten from the secondary data employed. More so, the hypotheses were also tested in this section.

Table 1: Descriptive Statistics

	ROA	Board Diversity	Board Composition	Firm Size
Mean	23.49775	0.148430	1.098030	1.35E+08
Std. Dev.	4.564051	0.177197	1.233297	1.03E+08
Jarque-Bera	1.686619	1.547036	3.729376	1.373901
Probability	0.430284	0.461387	0.154945	0.503108

Source: Authors Computation

The descriptive statistics of the variables used for this analysis as shown in Table 1 reveal that all of the variables are of a positive average and have a net difference during the time under consideration. The mean which explains the performance of

the variables shows that Return on Assets had a better performance than other variables. This is proved by the high mean value of 23.49775. However, the study noted a lower performance of Board Diversity as the mean value of 0.148430 explains. On the consistency in performance, Table A above shows that, the analysis with Board Diversity is more consistent in performance than other variables. This is proved by the low Standard deviation value of 0.177197. Also, the skewness result shows that all variables were positively skewed. The skewness explains that, the shift or the movement on the right hand of the variables employed, are longer than the left side. Equally, the Jarque Bera analysis informs that the variables of this study were not normally distributed. This is proved by their corresponding Jarque Bera_{probability} of 0.430284, 0.461387, 0.154945 and 0.503108 for Return on Assets, Board Diversity, Board Composition and Firm Size respectively which are greater than the 5% Level of Significance.

Table 2: Extracted Regression results

	R ²	F-Statistic	t-Statistic	Relationship with the DV
Without Control Variable	81%	14.45951 (0.003267)	Board Diversity: 4.982626 (0.0016) Board Composition:- 0.381026 (0.7145)	Board Diversity: 22.52002 Board Composition: - 0.247431
With Control Variable	91%	19.23907 (0.001761)	Board Diversity: 3.599993 (0.0114) Board Composition: 1.537327 (0.1751) Firm Size: - 2.533256 (0.0445)	Board Diversity: 73.57453 Board Composition:1.116790 FirmSize: -8.54E-08

Source: Authors Computation

The relationships between the dependent variable, the independent variables, and the control variable are explained in the table above. The result shows that the introduction of the control variable did not cause much change to the existing variables. Without the variable, there exists a strong model or analysis as reported by the R² value of 81% and the independent variables were significantly enough in explaining the performance of the dependent variable (with the probability of the F-statistic of 0.003267). More so, the relationship between Board Diversity and the Dependent Variable remained significant even with the introduction of a control variable. However, the relationship between Board Composition and the Dependent Variables remained insignificant in the two analyses. This shows that the introduction of Firm Size as the control variables did not contribute significant change in the model regressed.

A slight difference in the two models is at the nature of the relationships existing between Board Composition and the dependent variable. With the employment of a control variable, there was a positive relationship existing amongst them where as there exists a negative relationship before the introduction of a control variable. In this scenario, the control variable ‘firm size’ was seen to cause a significant change. This explains that any unit change or variation in Return on Assets of the

chosen oil and gas companies in Nigeria (that is, the analysis without the control variable), can cause an increase in Board Diversity by 22.52002 and a decrease in Board Composition by 0.247431. With the introduction of the control variable, the analysis explains that for every unit variation in Return on Assets of the selected companies, there would be an increase in both Board Diversity and Board Composition by 73.57453 and 1.116790 respectively.

From Table 2 above, it could be seen that, the existing relationship between Board Composition and the dependent variable has a t-value of -0.381026 and a corresponding probability value of 0.7145. From the probability value, it is seen that it is greater than the 5% level of Significance, and as such, Board Composition did not significantly contribute to the performance of the Dependent Variable. With this, the null hypothesis was accepted and the study concludes that Board Composition does not affect the financial performance of oil and gas companies in Nigeria.

From Table 2 above, it could be observed that the existing connection that Board Diversity and the dependent variable have is t-value of 4.982626 and a corresponding probability value of 0.0016. From the probability value, it is seen that it is less than the 5% Level of Significance, and as such, Board Diversity significantly contributes to the performance of the Dependent Variable. With this, the alternative hypothesis was accepted and the research settles that, Board Diversity has a significant influence on the financial performance of oil and gas companies in Nigeria.

5. Conclusions and Recommendations

This study was set to investigate the effect of board attributes on the financial performance of oil and gas companies in Nigeria. The independent variables; Board composition and Board diversity were used to represent board attributes in relation to firm performance. The literature reviewed showed that, arguments such as Yasser et al (2011), Khan and Awan (2012) and Cramer (2010) states that board attributes impact financial performance positively while some literatures like Pathan, Haq and Gray (2011) and Uwuigbe and Fakile (2012) states the negative impact of board attributes on financial performance. However, the view of this paper, given the issues considered, prefer to consider board attributes comprising of board composition and diversity have various roles to play in the financial performance of the oil and gas sector of the Nigerian economy. The findings show that Board Diversity has a prominent role in determining the performance of a firm.

Assessing from the two points of view (board composition and board diversity) in predicting the financial performance of Oil and Gas companies in Nigeria, the conclusion is as follows; Board composition appears to have an insignificant impact on financial performance of firms in Nigeria; and there was a significant relationship between proportion of female directors as well as independent directors on board and financial performance of firms in Nigeria. As such, the number of female / independent directors influences the financial performance of the companies.

Having thoroughly appraised the effect of board attributes on the financial performance of listed Oil and Gas sectors in Nigeria, this study therefore, recommends that for financial performance of the oil and gas industry to increase, there is the need to allow the introduction of foreign directors. Thus, the more the proportions of foreign directors on board the higher the financial performance and vice-versa.

References

- Adams, R.B. & Ferreira, D. (2009). Women in the boardroom and their impact on governance and performance. *Journal of Financial Economics*, 94(2), 291-309.
- Ahern, K. R., & Dittmar, A. K. (2012). "The changing of the boards: The impact on firm valuation of mandated female board representation". *Quarterly Journal of Economics*, 127(1), 137-197
- Akileng, G. & Donnelley, R. (2013). The Valuation of Abnormal Accruals and Corporate Governance. *International Journal of Managerial and Financial Accounting*, 5(4), 391 – 394.
- Al-Azzam, Z. & Al-Qura'an, N. (2015). How the Corporate Governance Affects Organizational Strategy: Lessons from Jordan Environment. *Journal of Business and Management*, 17, 7-15
- Alexander, J. M., Diez, J. M., & Levine, J. M. (2015). Novel competitors shape species' responses to climate change. *Nature*, 525, 515–518.
- Aliani, B. (2014). Effects of Board Structure on Firm Performance: A Comparison between Japan and Australia. *Asian Business & Management*, 3, 105-125.
- Asaolu, R. & Ilo, M. (2012). Director ownership, governance, and performance. *Journal of Financial and Quantitative Analysis*, 48(1), 105-135.
- Bathula, H. (2008). Board characteristics and firm performance: Evidence from New Zealand. *Journal of University of Technology Auckland*, 12(5), 5-28.
- Baysinger, B.D. & Butler, H.N. (1985). Corporate Governance and the Board of Directors: Performance Effect of Changes in Board Composition. *Journal of Finance and Accounting*, 2(4), 82-99.
- Bebeji, E. Ismail, F. & Danladi, M. (2015). The Effect of Board Size and Composition on the Financial Performance of Banks in Nigeria. *African Journal of Business Management*, 9(16), 590-598.
- Bhagat, G. & Black, P. (1999) "Corporate governance and firm performance in developing countries: evidence from India". *Corporate Governance: The International Journal of Business in Society*, 16(2), 420-436.
- Bøhern, V. & Staubo, N. (2014). Does mandatory gender balance work? Changing organizational form to avoid board upheaval. *Journal of Corporate Finance*, 28, 152-168.
- Burke, H. (2003). What Will Consumers Pay for Social Product Features?. *Journal of Business Ethics*, 42, 281–304.
- Burmajster, D. (2009). Outsiders on the board of directors and firm performance: Evidence from Spanish non-listed family firms. *Journal of Family Business Strategy*, 1(4), 236-245.
- Chouaibi, J., Affes, H. & Boujelbene, Y. (2010). Characteristics of the board of directors and involvement in innovation activities: A cognitive perspective. *International Journal of Managerial and Financial Accounting*, 2(3), 240-255

- Coffey, C. & Wang, N. (1998). Corporate governance and performance of UK listed small and medium enterprises". *The international journal of business in society*, 15(5), 719-733.
- Curseu, P. L., Raab, J., Han, J., & Loenen, A. (2012). Educational diversity and group effectiveness: a social network perspective. *Journal of Managerial Psychology*, 27(6), 576– 594.
- Ehikioya, V. (2009). Corporate governance, board diversity, and firm value. *Financial Review*, 38(1), 33-53.
- Eisenhardt, F. (1989). The impact of director and board structure, ownership structure and corporate control on the performance of listed companies on the Ghana stock exchange. *The international journal of business in society*, 16(2), 259-277.
- Fama, G. & Jensen, W. (1983). Corporate board diversity and financial performance of insurance companies in Nigeria: An application of panel data approach". *Asian Economic and Financial Review*, 4(2), 257-277.
- Ferreira, D. (2010). "Corporate governance structure and performance of Malaysian listed companies". *Journal of Business Finance and Accounting*, 33(4), 1034-1062
- Fosberg, B. (2004). "Locating audit expectations gap within a cultural context: The case of Saudi Arabia". *Journal of International Accounting, Auditing and Taxation*, 16(2), 179-206
- Garg, T. (2007). The Role of Firm Characteristics on the Relationship between Gender Diversity and Firm Performance. *Management Decision*, 54, 1407-1419.
- Goergen, M. & Renneboog, C. (2000). Is the German system of corporate governance converging towards the Anglo-American model? *Journal of Management and Governance*, 12 (1), 50-62.
- Hambrick, D.C. & Mason, P.A. (1984). Upper echelons: The Organization as a Reflection of its Top Managers. *The Academy of Management Review*, 9(2), 193–206.
- Hassan, S. U. & Farouk, M. A. (2014). Board of Director's Characteristics and Performance of Listed Deposit Money Banks in Nigeria. *Journal of Accounting, Finance and Auditing Studies*, 4(1), 14-39.
- Herrmann G. & Datta, A. (2005). Board heterogeneity, corporate diversification and firm performance. *Journal of Management Research*, 14(2), 121-139.
- Levi, M. Li, K. & Zhang, F. (2014). Derivatives usage in risk management by US and German non-financial firms: A comparative survey. *Journal of International Financial Management & Accounting*, 10(3), pp.153-187.
- Kyereboah-Coleman, A. and Biekpe, N. (2006). Institutional activism types and CEO compensation: A time- series analysis of large Canadian corporations. *Journal of Management*, 35 (1):36.
- Hermalin, B. E. & Weisbach, M. S. (1988). Assessing the relationship between firm size, age and financial performance in listed companies on Tehran stock exchange. *International Journal of Scientific Management and Development*, 2(11), 631-635.

- Huse, N. & Solb, R. (2006). Impact of corporate governance on intellectual capital efficiency and financial performance. *Pakistan Journal of Commerce and Social Sciences*, 8 (2), 305-330.
- Kyereboah-Coleman, A. & Biekpe, N. (2006). Determinants of capital structure: a study of Nigerian quoted companies. *European Journal of Business and Management*, 7(23), 170-183.
- Ingle, C. & Van-der-Walt, N. (2001). The strategic board: The changing role of directors in developing and maintaining corporate capability. *Italian Journal of Corporate Governance Review*, 9(3), 174-185.
- Jensen V. & Meckling, B. (1976). Outside directors and corporate board decisions. *Journal of Corporate Finance*, 11(1-2), 37-60
- Joecks, J., Pull, K. & Vetter, K. (2013). Gender Diversity in the Boardroom and Firm Performance: What Exactly Constitutes a “Critical Mass”? *Journal of Business Ethics*, 118, 61-72.
- Khan, K. & Awan, U. (2012) and Cramer (2010) Board size and the variability of corporate performance. *Journal of Financial Economics*, 87(1), 157-176.
- Kiel, G. C. & Nicholson, G. J. (2003). Board Composition and Corporate Performance: how the Australian experience informs contrasting theories of corporate governance. *International Journal of Corporate Governance*, 11, 189-205.
- Kumar, P. & Zattoni, A. (2013). Derivative usage and firm value: The influence of agency costs and monitoring problems. *Journal of Corporate Finance*, 16(5), 719-735..
- MacAvoy, D. & Millstein, B. (2005). Board characteristics and the financial performance of Nigerian quoted firms. *Corporate Governance: The International Journal of Business in Society*, 12 (5), 656 – 674
- Mahadeo, J., Soobaroyen, T., & Hanuman, V. (2012). Board composition and financial performance: uncovering the effects of diversity in an emerging economy. *Journal of Business Ethics*, 105(3), 375-388.
- Mallin, C. A. (2007). *Corporate Governance. 2nd Edition*, Oxford University Press, Oxford.
- Matolcsy, A. & Wright, G. (2011). The Separation of Ownership and Control. *Journal of Law and Economics*, 26, 301-325.
- Mazur, W. & Bialostocka, F. (2010). Measuring organizational performance in the absence of objective measures: The case of the privately-held firm and conglomerate business unit. *Strategic Management Journal*, 5 265-273.
- Mitchell, R., Agle, B. R. & Wood, D. J. (1997). Toward a Theory of Stakeholder Identification and Salience: Defining the Principle of Who and What Really Counts. *Academy of Management Review*. 22(4), 853–886
- Miller, N. & Carmen-Triana, K. (2009). Larger Board Size and Decreasing Firm Value in Small Firms. *Journal of Financial Economics*, 48, 35-54.
- NAPIMS (2021). *Bulletins, Abuja Nigeria*.
- Naseem, G., Xiaoming, F., Riaz, D. & Rehman, S. (2017). Agency problems and the theory of the firm. *Journal of Political Economy*, 88, 288- 307
- Nederveen, A., Knippenberg, V. K & Van, D. (2013). Board Composition and Commission of Illegal Acts: An Investigation of Fortune 500 Companies. *Academy of Management Journal*, 29(4) 50-67

- NGSEOILG5 (2021). Corporate Governance Structure. *Quarter III Bulletin*, 13-18
- Nigerian Stock Exchange (2021). *Fact books, Various Issues, Lagos Nigeria*.
- Ntim, E.(2013). Effects of Board Structure on Firm Performance: A Comparison between Japan and Australia”. *Asian Business & Management*, 3, 105-125.
- OECD (2004). The Relationship between Governance Structure and Corporate Performance in Entrepreneurial Firms. *Annual Bulletin*, 7(5), 3-9
- Ogbechie, N. & Koufopoulos, H. (2010).The effect of board size on firm performance: Evidence from Turkey. *Middle Eastern Finance and Economics*, 14(1), 1450-2889.
- Ohiokho, N. & Ohiokha, B. (2011). Determinants of board size and composition: a theory of corporate boards. *Journal of Financial and Quantitative Analyses*, 40(2), 283-306.
- Oxelheim, L., & Randoy, T. (2003). The impact of foreign board membership on firm value. *Journal of Banking & Finance*, 27(12), 2369-2392.
- Pablo, D. Valentin, A & Lopez-Iturriaga, F. (2005). The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, 48, 831–880.
- Pathan, B.Haq, D. & Gray, J. (2011). Women on boards and firm performance. *Journal of Management and Governance*, 17(2), 491-509.
- Phillips, R. (2003). Stakeholder Theory and Organizational Ethics. *Journal of Management Studies*, 39 (1), 1–21
- Picard, M. (2005). Globalizing the boardroom – The effects of foreign directors on corporate governance and firm performance. *Journal of Accounting and Economics*, 53(3), 527-554.
- Randoy, O., Thomsen, S., & Oxelheim, L. (2006). A Nordic perspective on corporate board diversity. *Age*, 390(0.5428), 1-26.
- Randoy, O., Sanda, M. & Garba, F. (2005). Board diversity and corporate performance: The Indian evidence. *IUP Journal of Corporate Governance*, 11(3), 71-79.
- Shah, S. Z. A. & Rehman, A. (2011). Board independence, ownership structure and firm performance: evidence from Pakistan. *Institute of Interdisciplinary Business Research*, 832-845.
- Shah, S. Z. A. (2011). Boards of directors and firm performance: Integrating agency and resource dependence perspectives. *Academy of Management Review*, 28(3), 383-396.
- Shrader, C. B., Blackburn, V. B. & Iles, P. (1997). Women in management and firm financial performance: an exploratory study. *Journal of Managerial Issues*, 9(3), 355-372.
- Smaili, F. & Sinclair-Desgagne, B. (2014). “The influence of corporate board characteristics on firm performance of publicly listed property companies in the Philippines”. *Academy of Accounting and Financial Studies Journal*, 16(4), 123-142.
- Smith, N., Smith, V. & Verner, M. (2006). Do women in top management affect firm performance? A panel study of 2,500 Danish firms. *International Journal of Productivity and Performance management*, 55(7), 569-593.
- Thomson, P. (2006). Board size and the variability of corporate performance. *Journal of Financial Economics*, 87(1), 157-176

- Uwuigbe, O. & Fakile, C. (2012) Boards of directors, market discipline and firm performance. *Journal of Business Finance & Accounting*, 32, 9-15
- Vafeas, N. (2004). An Empirical Analysis of the Relation Between the Board of Director Composition and Financial Statement Fraud. *The Accounting Review*, 71 (4), 443-465.
- Vinnicombe, P., Singh, C., Burke, H., Bilimoria, D. & Huse, F. (2008). "Corporate governance and performance of UK listed small and medium enterprises". *The international journal of business in society*, 15(5), 719-733.
- Waine, P. & Green, H. (2012). *Directors heterogeneity and its impact on board effectiveness*. London: Kogan Page.
- Yasser, Q. R., Entebang, H., & Abu Mansor, S. A. (2011). Corporate Governance and Firm Performance in Pakistan: The case of Karachi Stock Exchange (KSE)-30. *Journal of Economics and International Finance*, 3(8), 482-491.

Dynamic Economic Models: The Derivational Steps of Time Path with Numerical Example

Muktar Bala

Department of Economics, IBB University, Lapai, Niger State, Nigeria

Correspondence Email: muktarbala@yahoo.co.uk

Abstract

Studies that explain the derivation of the general solution formula of time path in dynamic economic models are fragmented, with some explanations found in economics, mathematics and physics. This creates phobia among economists on the dynamic concept, with many economists only applying the dynamic formula without comprehending the intricacies involved in its derivation. The result of this may be the wrong application of the formula or inability to make good interpretation. This paper has applied the most elementary approach in exploring the derivational steps of dynamic economic models using micro economics examples (time path of price).

Keywords: Dynamic, Economic, Model, Derivation

JEL Classification: C61

1. Introduction

Dynamic economic models are models that show the effect of changes in economic variables over time. Unlike the static economic models that view economic variables as being constant and unchanging, dynamic models conceive economic variables as being evolving over time (Hansen & Sargent, 2013). For instance, prices, level of output, employment level, exchange rate, income and the rest, all change over time. That is, the variables either increase or decrease with time. Therefore, dynamic economic models deal with realistic economic condition whereby the economy is said to be in motion and unexpected changes in any of its variables can occur over time. The question of whether economic variables may bounce back to their original equilibrium after experiencing shock is answered by dynamic economics (Ferguson & Lim, 2003). Dynamic economics thus explain the time path of economic variables.

In most of the literature explaining the concept of dynamic economic models, steps are often skipped or the formula explaining the evolutionary processes of economic variables is only presented for application (Azariadis & Chakraborty, 1999; Boldrin, 2018; Dieckmann & Law, 1996; Ferguson & Lim, 2003; Judd, Maliar & Maliar, 2011; Judd, Maliar, Maliar, & Valero, 2014; Ludwig, 2007; Maliar & Maliar, 2014; Safiullin & Safiullin, 2018). Therefore, economists, especially those with shallow background in mathematics tend to develop phobia for the dynamic concept and may apply them wrongly to the dynamic formula or may be

incapacitated in their ability to interpret its result. This paper therefore, sets to explore the derivational steps of the dynamic economic model and thus help learners understand how its results could be interpreted.

2. Literature Review

There is a lot of literature discussing dynamic economic models; however, most of the literature is saturated with studies that discussed some components of the derivational steps, with many steps being ignored. Other studies are application based studies that only apply the already derived model. Hansen and Sargent (2013) for instance only apply the model and also aligned the application with econometrics, whereas readers who might be interested in only the mathematical aspect of the model might miss out. Safiullin and Safiullin (2018) also applied the dynamic principle in finding the effect of advertising in reviving the Russian economy back to its growth track. Ferguson and Lim (2003) have tried in explaining the mathematical details of the derivation of the dynamic model, cited many empirical examples, but did not explain the key organs of the derivational process, such as the particular integral, complementary function and the general solution. Gradus (1991) also focused only on the application of dynamic model to game theory, with the derivation heading towards solving game problems. Similarly, the work of Ludwig (2007) focused on the development of dynamic algorithm for solving large scale economic data. However, the derivational steps of the algorithm are tricky and are not dynamic model specific. Also Judd *et.al* (2011) developed a simulation for solving dynamic economic models. Their work bypassed the derivation of dynamic model. Furthermore, Judd *et.al* (2014) focused on enhanced *Smolyak* method for solving dynamic economic models, which is at variant with the conventional derivational process of dynamic model.

The work of Boldrin (2018) was interested in finding an economic model that predicts cycles and also testing such model to determine its efficiency. Although dynamic in nature, the model his study proposed was different from the conventional time path, which explains the behavior of economic agents after the equilibrium has been distorted. The study of Azariadis and Chakraborty (1999) also follows a fashion similar to that of Boldrin (2018). Therefore, studies on the derivational steps of dynamic economic models, particularly, that of the time path is very rare thus the need for this paper.

3. Derivation of the General and Final Models of Time Path of Price with Interpretation

The general and final models of time path in dynamic economic models can be set with the aid of an example. In microeconomics for instance, let us assume that an economy experiences price shock (i.e an increase or decrease in price away from the equilibrium), then over time, the price may bounce back to the original equilibrium or may never. When the prices have the tendency to bounce back to the original state after shock, the equilibrium is said to be “convergent or stable equilibrium”. If the prices have no tendency to bounce back to the original state then we have an unstable or divergent equilibrium.

The General Model

The time path of price shows whether a particular equilibrium price has the tendency of re-bouncing back to its equilibrium state after experiencing shock or not. To show this, let us assume that we have the following demand and supply functions:

$$Q_d = c - bP$$

$$Q_s = g + hP$$

Where Q_d and Q_s are quantity demanded and quantity supplied respectively.

Equilibrium price (\bar{P}) is obtained at a point where $Q_d = Q_s$

$$\therefore c + bP = g + hP$$

We collect like terms

$$bP - hP = g - c$$

We factorize

$$P(b - h) = g - c$$

We divide both sides by $(b - h)$:

$$\frac{P(b - h)}{b - h} = \frac{g - c}{b - h}$$

$$\bar{P} = \frac{g - c}{b - h} \dots\dots\dots 1$$

The rate of price change over time is then assumed to be a function of excess demand, and is expressed as:

$$\frac{dP}{dt} = M(Q_d - Q_s) \dots\dots\dots 2$$

where M is the adjustment coefficient and is > 0 .

We are interested in finding the condition under which price at any time (P_t) will move or tend towards the equilibrium price (\bar{P}) as time continues. That is, $P_t \rightarrow \bar{P}$ as $t \rightarrow \infty$.

Substituting Q_d and Q_s functions in Equ. (ii) gives:

$$\frac{dP}{dt} = M[(c + bP) - (g + hP)]$$

Opening bracket:

$$\frac{dP}{dt} = M(c + bP - g - hP)$$

Rearranging:

$$\frac{dP}{dt} = M(bP - hP) + M(c - g)$$

Factorizing:

$$\frac{dP}{dt} = MP(b - h) + M(c - g)$$

Taking $MP(b - h)$ to the left:

$$\frac{dP}{dt} - MP(b - h) = M(c - g)$$

Let us now assume that: $V = M(b - h)$ and $Z = M(c - g)$

$$\therefore \frac{dP}{dt} - VP = Z \dots\dots\dots 3$$

Equation (3) is the general form of the first order differential equation of dynamic equilibrium models

The Final Model

To find the final model of the time path of price, we get the first order difference equation by first, finding the particular integral, then the complementary function and consequently, the general solution.

1 Particular integral (P.I)

Particular integral provides the intertemporal equilibrium and is obtained by assuming that ($\frac{dP}{dt} = 0$) in the general model given by Equation (3)

Therefore, from the general model in equation (3), we only have: $VP = Z$. We then make P the subject of the formula as follows:

$$P = \frac{Z}{V} \dots\dots\dots 4$$

Note that Equation (1) = Equation (4): $P = \frac{Z}{V} = \bar{P} = \frac{g-c}{b-h}$

Therefore, Equation (4) is the particular integral

2 Complimentary function (C.F)

Complementary function explains the dynamic evolution of the system (price system in this example) over time. To get the complementary function, we consider the homogenous part of equation (3). That is Equation (3) whose R.H.S is zero:

$$\frac{dP}{dt} - VP = 0 \dots\dots\dots 5$$

The next step is to assume a trial solution, and we let the trial solution to be that:

$$P = Ae^{rt} \dots\dots\dots 6$$

Where A is a constant

And $\frac{dP}{dt} = r.Ae^{rt}$

From Equation (5)

$$r.Ae^{rt} + VAe^{rt} = 0 \dots\dots\dots 7$$

By factorizing we have:

$$Ae^{rt} (r + V) = 0$$

Note: $r = -V$ because $Ae^{rt} \neq 0$. The reason for that is explained as follows:

From Equation (7):

$$r \cdot Ae^{rt} + VAe^{rt} = 0$$

$$r \cdot Ae^{rt} = -VAe^{rt}$$

$$r = -\frac{VAe^{rt}}{Ae^{rt}}$$

$$r = -V(1)$$

$$r = -V$$

Now from the trial solution in Equation (6) we substitute for r :

$$P = Ae^{-Vt} \dots\dots\dots 8$$

Equation (8) is the complementary function.

General Solution (G.S)

The general solution shows the price at time t (i.e P_t). It explains the evolution of price over time. It describes what happens to price in the long run after experiencing shock, whether it would bounce back to the original equilibrium or not. The *G.S* is given by the following formula:

$$G.S = P.I + C.F \dots\dots\dots 9$$

By substituting the values of Equations (4) and (8) into Equation (9) we have:

$$P_t = \frac{Z}{V} + Ae^{-Vt} \dots\dots\dots 10$$

Now. Let us assume that $t = 0$, then:

$$P_0 = \frac{Z}{V} + Ae^{-V(0)} = \frac{Z}{V} + Ae^{-0} = \frac{Z}{V} + A \frac{1}{e^0} = \frac{Z}{V} + A \frac{1}{1} = \frac{Z}{V} + A(1) = \frac{Z}{V} + A$$

$$\therefore P_0 = \frac{Z}{V} + A$$

$$P_0 - \frac{Z}{V} = A \quad \text{or} \quad A = P_0 - \frac{Z}{V} \dots\dots\dots 11$$

By substituting Equation (11) in Equation (10), we have:

$$P_t = \frac{Z}{V} + (P_0 - \frac{Z}{V})e^{-Vt} \dots\dots\dots 12$$

Note that: The *P.I* or the equilibrium price is given by $\frac{Z}{V}$. So:

P.I = $\bar{P} = \frac{Z}{V}$, Hence Equation (xiii) can be written as:

$$P_t = \bar{P} + (P_0 - \bar{P})e^{-Vt} \dots\dots\dots 13$$

Also note that:

$$-V = \text{constant, assuming } V = 2 \text{ and } t = 1$$

$$-Vt = -2(1) = -2$$

$$\therefore e^{-Vt} = e^{-2} = \frac{1}{e^2} = \frac{1}{(2.718)^2} = \frac{1}{7.387524} \approx 0.135 \quad [\text{Given that } e \approx 2.718]$$

The final answer of the exponent above shows that since V is constant, as time (t) increases, the negative power of the exponent gets bigger. When the negative power of the exponent is solved, the exponent becomes the denominator of the fraction and since the numerator is constant (i.e 1), an increase in the value of t decreases the value of the final answer. The value of e^{-Vt} above when $V = 2$ and $t = 1$ is approximately 0.135 , which means that as t increases and tends towards infinity (i.e $t \rightarrow \infty$) the value of e^{-Vt} becomes almost zero. The implication is that over time, the second part of the Equation (13), that is $(P_0 - \bar{P})e^{-Vt}$ becomes zero with e^{-Vt} becoming almost zero as explained. Therefore, only the first term of the right hand side of Equation (13) will be left (i.e \bar{P}). When only \bar{P} is left, it means that over time, the current price will be equal to the equilibrium price ($P_t = \bar{P}$). In that case, the equilibrium is said to be stable or convergent. If on the other hand, the opposite of this scenario happens, the equilibrium is said to be unstable or divergent. Generally therefore, when the value of $V > 0$ in Equation (13), we have a dynamically stable equilibrium, but when the value of $V < 0$ in Equation (13) we have a dynamically unstable equilibrium. Consequently, Equation (13) is the general formula for the time path of price, which shows how price will be have over time after experiencing shock.

4. Time Path of Price with Numerical Example

Assuming we have the following demand and supply functions:

$$Q_d = 7 - P$$

$$Q_s = 1 + P$$

Let us assume that price is ~~N6~~ $\text{N}6$ at time $t = 0$ and also price is ~~N4~~ $\text{N}4$ at $t = 4$. If we are interested in finding the time path of price (P_t) we do as follows:

We know that in a market system, the rate of change in price ($\frac{dp}{dt}$) is explained by the differences between quantity demanded and quantity supply ($Q_d - Q_s$). Let us also assume that there is an adjustment coefficient (α) and is > 0 .

So that:

$$\frac{dp}{dt} = \alpha(Q_d - Q_s) \dots\dots\dots 14$$

By substituting the Q_d and Q_s functions we have:

$$\frac{dp}{dt} = \alpha(7 - P - 1 + P)$$

$$\frac{dp}{dt} = \alpha(6 - 2P)$$

$$\frac{dp}{dt} = 6\alpha - 2\alpha P$$

By re-arranging we have:

$$\frac{dp}{dt} + 2\alpha P = 6\alpha$$

$$\text{Let } V = 2\alpha \text{ and } Z = 6\alpha$$

$$\therefore \frac{dp}{dt} + VP = Z \dots\dots\dots 15$$

Equation (15) is the general model of the time path of price.

Now let us apply the general formula of the time path of price obtained in Equation (13) above. We noticed that the formula requires us to obtain $\frac{Z}{V}$ which is equal to \bar{P} . From demand and supply functions in this example, we know that at equilibrium: $Q_d = Q_s$

$$\therefore 7 - P = 1 + P$$

$$-P - P = 1 - 7$$

$$-2P = -6$$

$$P = \frac{Z}{V} = \bar{P} = \frac{-6}{-2} = 3 \dots\dots\dots [\text{Check Equation (4) \& (13)}] \dots\dots\dots 16$$

We now apply the general formula obtained in Equation (13), but we allow $V = \alpha$ in order to maintain the fashion of our current example.

$$P_t = \frac{Z}{V} + (P_0 - \frac{Z}{V})e^{-\alpha t}$$

$$P_t = 3 + [P_{(0)} - 3] e^{-(2\alpha t)} \dots\dots\dots 17$$

At $P = 0, t = 6$

$$\therefore P_t = 3 + [P_{(0)} - 3] e^{-2\alpha(0)}$$

$$P_t = 3 + [P_{(0)} - 3] e^{-0} = 3 + [P_{(0)} - 3] \frac{1}{e^0} = 3 + [P_{(0)} - 3] \frac{1}{1} = 3 + (P_{(0)} - 3)1 = 3 + (P_{(0)} - 3)$$

But price at time $t = 0$ is equal to ~~N~~6. Therefore:

$$P_0 = 3 + (6 - 3) = 3 + 3 = 6 \dots\dots\dots 18$$

Equation (18) shows that at time $t = 0$ (i.e current period) the price is ~~N~~6.

However, four years later ($t = 4$) the price is ~~N~~4 (i.e $P = 4$). When we substitute the current time and price in the general formula we have:

$$P_t = 3 + (6 - 3) e^{-2\alpha(4)}$$

$$P_t = 3 + (3) e^{-8\alpha} \dots\dots\dots 19$$

By substituting $P_t = 4$, we have:

$$4 = 3 + (3) e^{-8\alpha}$$

Dividing both sides by 3 gives:

$$\frac{4}{3} = \frac{3}{3} + (\frac{3}{3}) e^{-8\alpha}$$

$$\frac{4}{3} = 1 + e^{-8\alpha}$$

We collect like terms and find the LCM of the left hand side¹:

¹ The LCM is: $\frac{\frac{4}{3} - 1}{\frac{1}{3}} = \frac{1}{3}$

$$\frac{4}{3} - 1 = e^{-8\alpha}$$

We then return the right hand side of the equation as follows:

$$e^{-8\alpha} = \frac{1}{3}$$

We find the natural logarithm (\ln) of both sides. Note that: $\ln e^{-8\alpha} = -8\alpha \ln e$ and $\ln e = 1$

$$\therefore -8\alpha(1) = \ln \frac{1}{3}$$

$$\text{Note that: } \frac{1}{3} = 3^{-1}$$

$$\text{Hence: } -8\alpha = \ln 3^{-1}$$

$$\therefore \alpha = \frac{\ln 3^{-1}}{-8}$$

When we substitute the value of α into Equation (17), expand the power of e and substitute for the value of P_0 as obtained in Equation (18), we then have:

$$P_t = 3 + [P_{(0)} - 3] e^{-(2\alpha)t}$$

$$P_t = 3 + [6 - 3] e^{-2 \left(-\frac{\ln 3^{-1}(t)}{8}\right)}$$

$$P_t = 3 + [6 - 3] e^{\frac{t \ln 3^{-1}}{4}}$$

$$\therefore P_t = 3 + (6 - 3) e^{\left(\frac{t \ln 3^{-1}}{4}\right)}$$

With $t = 4$,

$$P_4 = 3 + 3 e^{\frac{4 \ln 3^{-1}}{4}} \dots\dots\dots 20$$

$$P_4 = 3 + 3 e^{\ln 3^{-1}} = 3 + 3 e^{-1.09861} \dots\dots\dots 21$$

But $e \approx 2.718$

$$\therefore P_4 = 3 + 3 \frac{1}{2.718^{1.09861}} \dots\dots\dots 22$$

$$P_4 = 3 + 3(0.333334) \dots\dots\dots 23$$

$$P_4 = 3 + 1.000002 \dots\dots\dots 24$$

$$P_4 = 4.000002 \approx 4.00$$

Notice from Equations (20 & 21) that the size of the negative power of e depends on (t). As t increases, the size of the negative power gets bigger so that when the negative power of e is worked out, the result of the division is almost zero (i.e 0.333334 in Equa. 23) and when such value is multiplied by $[P_{(0)} - 3]$ in Equation (17), or 3 in Equation (23), the second term of the right hand side (RHS) of Equation (10), that is $(3)0.333334$ will continue to decrease until it becomes zero. Equation (10) shows that at time $t = 4$, $P_4 \approx 4$ but the current price will continue to fall as the size of 0.333334 falls over time so that price at anytime in the long-run

will be $P_t = 3$. This means that the second term of the RHS of Equation (23) dies leaving only the first term (i.e 3). Since the equilibrium price is 3, when P_t becomes 3, the equilibrium price has been restored after shock.

Generally therefore, Equations (20 & 21) shows that as time tend towards infinity ($t \rightarrow \infty$), $\frac{1}{2.718^{1.09861}}$ will be almost zero and when such happens, we will have e^{-0} so that:

$$P_{t=\infty} = 3 + 3(0 \ln e^{-0})$$

$$P_{t=\infty} = 3 + 3[0(1)^{-0}]$$

$$P_{t=\infty} = 3 + 3\left[0\left(\frac{1}{1^0}\right)\right]$$

$$P_{t=\infty} = 3 + 3[0(1)]$$

$$P_{t=\infty} = 3 + 3(0)$$

$$P_{t=\infty} = 3$$

Therefore, as time (t) tends towards infinity ($t \rightarrow \infty$), current price tends towards the equilibrium price (i.e $P_{t=\infty} = \bar{P}$). In this case, the equilibrium is said to be dynamically stable or convergent since it bounces back to its original state over time after experiencing shock.

5. Conclusion

Dynamic economic models explain the behavior of changes in economic variables over time. Dynamic models therefore, show the path through which economic variables evolve over time. Sometimes, economic variables bounce back to their original state after experiencing shock (i.e stable or convergent equilibrium) while in other situations they do not (i.e unstable or divergent equilibrium). The mathematical procedure that explains the evolutionary processes of economic variables is often tricky with many steps being skipped by the literature on the guise that readers either have the mastery of the mathematical procedure that is being skipped or should apply the readymade formula as a dogma. The result of which is often a wrong application of the formula or a development of natural phobia for the dynamic concept itself. However, using dynamic evolution of price as an example, this paper has explored the various steps involved in the derivation of the time path of price in dynamic models and above all, cited a numerical example for easy understanding by the readers and for more accurate application of the formula to solving economic problems.

References

- Azariadis, C., & Chakraborty, S. (1999). Agency costs in dynamic economic models. *The Economic Journal*, 109(455), 222-241.
- Boldrin, M. (2018). Persistent oscillations and chaos in dynamic economic models: notes for a survey. In *The economy as an evolving complex system* (pp. 49-75). CRC Press.
- Dieckmann, U., & Law, R. (1996). The dynamical theory of co-evolution: a derivation from stochastic ecological processes. *Journal of mathematical biology*, 34(5), 579-612.
- Ferguson, B., & Lim, G. (2003). *Discrete time dynamic economic models: Theory and empirical*

- Gradus, R. H. (1991). The derivation of feedback Stackelberg equilibria in dynamic economic games. In *Dynamic Games in Economic Analysis* (pp. 193-203). Springer, Berlin, Heidelberg.
- Hansen, L. P., & Sargent, T. J. (2013). *Recursive models of dynamic linear economies*. Princeton University Press. *applications*. Routledge.
- Judd, K. L., Maliar, L., & Maliar, S. (2011). Numerically stable and accurate stochastic simulation approaches for solving dynamic economic models. *Quantitative Economics*, 2(2), 173-210.
- Judd, K. L., Maliar, L., Maliar, S., & Valero, R. (2014). Smolyak method for solving dynamic economic models: Lagrange interpolation, anisotropic grid and adaptive domain. *Journal of Economic Dynamics and Control*, 44, 92-123.
- Ludwig, A. (2007). The Gauss–Seidel–quasi-Newton method: A hybrid algorithm for solving dynamic economic models. *Journal of Economic Dynamics and Control*, 31(5), 1610-1632.
- Maliar, L., & Maliar, S. (2014). Numerical methods for large-scale dynamic economic models. In *Handbook of computational economics* (Vol. 3, pp. 325-477). Elsevier.
- Nickell, S. J. (1986). Dynamic models of labour demand. *Handbook of labor economics*, 1, 473-522.
- Safiullin, N. Z., & Safiullin, B. L. (2018). Static and dynamic models in economics. In *Journal of Physics: Conference Series* (Vol. 1015, No. 3, p. 032117). IOP Publishing.

The Nexus between Taxation, Government Expenditure and Economic Growth in Nigeria (1981 to 2016)

Walid Gbadebo Adebosin¹, Anu Keshinro Toriola², Lateef Abiodun Salami²,
Veronica Titilayo Akingbade³ & Felix O. Ajayi⁴

¹Department of Business Education, MOCPED, NOFORIJA-EPE

²Department of Economics, Hallmark University, Itele, Ogun State

³Lagos State Cooperative College, Agege, Lagos State

⁴Department of Economics, Olabisi Onabanjo University, Ago-Iwoye

Correspondence Email: ddwalid3@gmail.com

Abstract

This paper examines the relationship between taxation, government expenditure, and economic growth in Nigeria. The study used linear regression model in which economic growth is a function of taxation, government expenditure, investment, and export, following descriptive research design and using the national income accounting framework. The time series data used in the study was sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin, and the analysis was conducted using Fully Modified Ordinary Least Squares (FM-LS) estimation technique. It was discovered that investment and export had a significant positive impact on economic growth, however government expenditure exerts a negative impact on growth in Nigeria. Meanwhile, taxation has no effect on economic growth in Nigeria, according to the estimate. As a policy tool, far-reaching effective internal control measures are needed to establish fiscal discipline in government expenditure. In addition, all non-productive activity and expenditures in government agencies and machinery must be discouraged.

Keywords: Taxation, Expenditure, Economic growth, Investment, FM-LS

JEL Classification: H50, H20, O40, C22

1. Introduction

The world is in a period of global rivalry, in which every country strives for growth and survival in order to maintain a competitive position in the global market. Economic growth is critical since it is a requirement for long-term development without which people's living standards will not increase. A high rate of economic growth not only attracts international attention, but it also prepares the route for development (Udoffia & Godson, 2016). Economic growth is described as a gradual rise in the economy's productive capacity through time, resulting in an increase in national output (Todara & Smith, 2006). The quantity of revenue earned for infrastructure provision determines a country's political, economic, and social progress. A well-structured tax system, on the other hand, is one way of producing

cash to fund needed infrastructure (Edame & Okoi, 2014). Without a feasible method of revenue to support the national expenditure that will achieve the desired aim, the goal of having a vibrant economy may be unreachable.

Taxes are a major source of revenue for the federal government (Nzontta, 2007). The government uses tax revenue to carry out its traditional functions, which include providing public goods, defending against external attack, and maintaining law and order. Taxation aids in resource mobilization, income inequality reduction, social welfare improvement, foreign exchange, regional development, and inflation management, among other things. One of the primary goals of taxing, according to traditional economists, was to increase government revenue (Edame & Okoi, 2014). Apart from the goal of producing money, the level of taxes has an impact on consumption, production, distribution, and, consequently, economic progress of a country (Edame & Okoi, 2014).

Taxation and government borrowing, according to the literature, distort economic activities because greater taxation in an attempt to support government expenditure reduces consumer income and aggregate demand, and so the economy's overall performance deteriorates. According to the Wagnerian school of thought, increased national output stimulates government spending (Udoka & Anyingang 2015). This shows that taxation and growth have a bi-causality relationship. Expansion of government spending leads to an increase in economic growth, which leads to an expansion of government spending via the multiplier effect, which was suggested by Keynes. As a result, allocating government spending into non-essential economic sectors results in a state budget imbalance and an increased risk of economic recession (Al-Fawwaz., 2016). The economic impacts of taxes, according to Musgrave and Musgrave (2004), include micro effects such as income distribution and resource efficiency, as well as macro effects such as capacity production, employment, pricing, and growth.

Government spending has grown in scope, scale, and magnitude over the years, thanks to changes in its size, structure, and growth. However, this increase has not resulted in significant economic progress, as many Nigerians continue to live in poverty (Udoffia & Godson, 2016). It appears that either these monies are not issued, or that they are released to fund an improper spending item, or that the funds have been misused, wasted, diverted, or are not completely utilized (Udoka & Anyingang 2015). The Nigerian government spends a significant amount of money that is mismanaged, misappropriated, misplaced, or even wasted, resulting in unsuccessful and unfinished government project execution. Despite the fact that the economy is expected to develop, the wealth gap between the rich and the poor continues to deepen (Udoffia & Godson, 2016). This was exacerbated by the issue of tax avoidance and evasion, as some Nigerians avoid and evade tax because they do not perceive the impact of paying tax and are unsure of how the funds will be used to help the economy improve (Abata, 2014). Table 1 shows that when the economic growth rate is 9.6, the growth rates of expenditure and taxation are 2.2 and 1.7, respectively, but when the economic growth rate is 9.9 in 1990, the growth rates of expenditure and taxation are 2.6 and 2.7, respectively, according to data from the Central Bank of Nigeria Statistical Bulletin. When the economy grew at a

faster rate in 2015, taxation and spending increased to 6.4 and 8.5 percent, respectively. This implies that if Nigeria's economic growth rate rises, so will its tax and expenditure rates.

Table 1: Growth of Economic Growth, Taxation and Government Expenditure 1985 to 2015

Year	Economic growth	Taxation	Government expenditure
1985	9.612728	1.76815	2.236445
1990	9.868152	2.65886	2.637628
1995	9.920993	4.334542	5.491991
2000	10.07274	4.919178	5.975208
2005	10.53143	5.133914	6.91085
2010	10.90801	5.691271	8.483047
2015	11.14221	6.443893	8.483047

Source: Central Bank of Nigeria Statistical Bulletin

Current study on this topic (Iyidogan & Turan, 2017; Adejare & Akande, 2017; Udoffia & Godson, 2016; Saidin, Basit & Hamza, 2016) focuses on how the composition of public expenditure influences a country's growth rate, as well as the distinction between productive and wasteful expenditures. The research is based on the idea that a distinction between productive and unproductive expenditures is especially important today as governments around the world scramble to get their fiscal systems in order by cutting parts of government spending that are deemed inefficient, unsustainable, or simply less likely to help them achieve their goals (Bojanic, 2013). It is worth noting, however, that no empirical effort has been made in Nigeria to analyze the influence of taxation and government spending on economic growth in one research while also accounting for the causal relationship between the variables.

The broad objective of this research is to look into the relationship between taxation, government spending, and economic growth in Nigeria. The study's specific goals are to examine the trend of taxation, government spending, and economic growth in Nigeria; investigate the impact of taxation on economic growth in Nigeria; and examine the impact of government spending on economic growth in Nigeria.

The report will be extremely useful to the government, the monetary authority, and policymakers in their efforts to develop solid and effective policies to address the country's inefficient government spending problem. From 1981 through 2016, the study looks at taxation, government spending, and economic growth in Nigeria. The choice of this time period was motivated by the need to cover the period during which several tax laws were enacted, including the petroleum profit tax law (later changed to Petroleum Profits Tax Act (PPTA), Value Added Tax decree 102, and Nigerian National Petroleum Corporations (Projects), among others, all of which have an impact on the country's overall tax revenue.

2. Review of Literature

The expenses incurred by the government in the provision of public goods and services (its maintenance and provision of public goods, services, and works required to boost or support economic growth and increase the welfare of people in society) are referred to as government expenditure (Udoffia & Godson, 2016). Government expenditures, according to Okoh (2008), are the costs incurred by the government in carrying out its programmes. Anyafo (1996) divided government revenue into twelve broad categories: customs and excise tariffs; licenses and internal revenue; direct taxes; fees; mining royalties; earnings and sales; armed forces revenue; general interest and repayment; states interest repayment; reimbursements; rent on government property; statutory and non-statutory financial transfers; statutory and non-statutory financial transfers; statutory and non-statutory financial transfers; statutory and non-statutory financial transfers; statutory and non-statutory financial transfers. Tax, on the other hand, is a mandatory levy imposed by the government on a subject or his property in order to provide security, social amenities, and establish circumstances for the society's economic well-being (Appah & Oyandonghan, 2011). According to Bhatia (2003), a tax is a mandatory levy paid by an economic unit to the government in exchange for a defined and direct 'quid pro quo' from the government. Furthermore, economic growth as a term is seen differently by different scholars in the literature, depending on the situation at the time of these authors. The majority of people define economic growth as an increase in a country's national income and output. Economic growth, according to Dewett (2005), is defined as a rise in the net national product over time. Todaro and Smith (2006) defined economic growth as a gradual rise in the economy's productive capacity through time, resulting in rising levels of national production and income.

According to Wagner's Expenditure Led Growth Theory, when the economy develops, as demonstrated by a high rate of industrialization and rising per capita income, the share of government expenditure in the gross national product tends to climb in lockstep. The increase in government spending is attributed to economic growth and development in this case. Peacock and Wiseman, on the other hand, believe that government spending evolves in a step-like pattern as a result of differences in government spending patterns during periods of upheaval and periods of relative calm. According to Keynesian theory, government spending, particularly deficit financing, can provide short-term stimulus to assist prevent a recession or depression. The Keynesians, on the other hand, recommended policymakers to be ready to cut government spending once the economy rebounds in order to avoid inflation (Mitchell, 2005). On the other hand, according to Bhatia (2009), there are two theories that explain the relationship between taxes paid and benefits gained from government activities: socio-political theory and expediency theory. According to the sociopolitical theory of taxation, the primary considerations in deciding on taxes should be social and political goals. The notion proposed that a tax system should not be designed to benefit individuals, but rather to address the problems that plague society as a whole. According to expediency theory, any tax plan must satisfy a practicality test. It must be the only factor weighing on the authorities' minds when deciding on a tax plan. The state's

economic and social goals, as well as the repercussions of a tax system, should be ignored (Bhartia, 2009).

There are numerous empirical studies that link growth to taxation and spending. Razzaq, Ahmed, and Razzaq (2015), for example, looked at household and government consumption with income in the short and long run individually. The study's findings show that in the short run, household consumption exceeds income, but in the long run, with a 7% adjustment rate, consumption falls short of income. In the long run, however, the government's expenditures and consumption exceed its revenue, and vice versa. Because of the debt financing, there will be greater spending in the long run. Abbas, Yuansheng, Abdul, and Luan (2016) look at the impact of government spending on Pakistan's agriculture sector and economic growth. Agricultural outputs and government spending have a major impact on economic growth in Pakistan, according to empirical findings. It was also discovered that the agriculture industry continues to face issues such as insufficient finance, underdeveloped agriculture marketing, bad infrastructure, and irrigation shortages, among others. In addition, Saidin, Basit, and Hamza (2016) examine the role and impact of taxes on economic growth in 27 Asian nations over a five-year period (panel data) (2011-2015). Although empirical studies imply that a ranking of different types of taxes in terms of their long-term effects on the level of per capita income, the findings cast doubt on the robustness of this empirical result. Udoffia and Godson (2016) explored the impact of federal government spending on Nigerian economic growth in a similar vein. The regression analysis reveals that capital and recurrent expenditures by the federal government have a favorable impact on real GDP. The regression analysis reveals that capital and recurrent expenditures by the federal government have a favorable impact on real GDP. Adejare and Akande (2017) looked at the influence of personal income tax on government spending in Oyo State from 1990 to 2015. Pay As You Earn (PAYE) has a positive significant influence on government expenditure in Oyo state, according to the findings. In Oyo State, the road charge has a negligible impact on government spending. Finally, personal income tax has a statistically significant positive impact on government spending in Oyo State. Iyidogan and Turan (2017) used the Threshold regression model and quarterly data to evaluate the association between government size and economic development in Turkey from 1998 to 2015. The findings support the presence of a non-linear relationship. When the government size is below (above) the threshold level, we observe that an increase in government size leads to a large rise (drop) in economic growth rate, validating the Armeij curve predictions.

3. Methodology

Because descriptive survey research does not include experimental manipulation in groups, as does in experimental research, this study uses a descriptive survey research design. To examine the impact of taxation and government spending on economic growth, a growth model was developed by modifying a Keynesian national income accounting model based on evidence from Venkatraja's (2015), which assumes that economic growth is determined by the demand side of the economy. As a result, the total demand for national goods is recast as follows:

Dd=C+I+G+X 1

Where, Dd= domestic demand for national goods, C= household consumption expenditure, I=private investment expenditure and G=Government spending; while, export represents the export demand for national goods.

Ed=X 2

Where, Ed= export demand for national goods, X= exports of national goods. Aggregation of equation (1) and equation (2) indicates that economic growth (GDP) can be represented as:

GDP= Dd + Ed 3

Therefore, from this it can be derived that domestic economic growth is the function of rise or fall in domestic and export demand for national goods.

The model specify for this study can be re-written as:

GDP = $\beta_0 + \beta_1 \text{TAX} + \beta_2 \text{GOV} + \beta_3 \text{INVST} + \beta_4 \text{EX} + \mu_i$ 4

The log-linear transformation of the model is presented below:

LOG(GDP) = $\beta_0 + \beta_1 \text{LOG(TAX)} + \beta_2 \text{LOG(GOV)} + \beta_3 \text{LOG(INVST)} + \beta_4 \text{LOG(EX)} + \mu_i$ 5

β_0 = the interception of the model, β_1, \dots, β_4 = the coefficient of the independent variables, and μ_i = Error term (stochastic term) assumption to be normally distributed in zero and constant variance.

The a priori expectations of the variables are summarized below: Taxation (TAX) is expected to have a Negative impact on economic growth in Nigeria i.e $\frac{\partial \text{GDP}}{\partial \text{TAX}} < 0$, government expenditure (GOV) is expected to have a positive impact on economic growth in Nigeria i.e $\frac{\partial \text{GDP}}{\partial \text{GOV}} > 0$, investment (INVST) is expected to have a positive impact on economic growth in Nigeria i.e $\frac{\partial \text{GDP}}{\partial \text{INVST}} > 0$, and export (EX) in line with economic theory is expected to have a positive impact on economic growth in Nigeria i.e $\frac{\partial \text{GDP}}{\partial \text{EX}} > 0$.

The annual time series data was taken from the publication of the Central Bank of Nigeria Statistical Bulletin and covered the years 1981 to 2016. The study used real gross domestic product at 1990 constant prices as a surrogate for gross domestic product. The overall tax revenue was used to assess taxation. The gross fixed capital creation was used as a proxy for investment in the model. The net export of goods and services will be used to calculate export. All of the figures were in million Naira.

In the analysis, the fully modified OLS approach (FMOLS) was applied. The fully modified OLS technique (FMOLS) adjusts least squares to account for serial correlation effects and endogeneity in repressors due to the presence of a cointegrating link/

4. Results

Pre-Estimation Tests

Table 1: Descriptive statistics

Statistics	RGDP	TAX	GOV	INVST
Mean	31757.15	187.0581	1359.446	2246.903
Median	22391.14	114.6200	385.6650	242.5800
Maximum	69023.93	688.1300	4987.160	10571.74
Minimum	13779.26	4.300000	7.580000	8.800000
Std. Dev.	18151.71	199.8926	1900.843	3730.563
Skewness	0.874864	1.002080	1.127501	1.472268
Kurtosis	2.318378	2.934773	2.518149	3.367802
Jarque-Bera	5.289230	6.031365	7.975816	13.20836
Probability	0.071033	0.049012	0.018538	0.001355
Sum	1143257.	6734.090	48940.07	80888.49
Sum Sq. Dev.	1.15E+10	1398496.	1.26E+08	4.87E+08
Observations	36	36	36	36

Source: Author, 2019

As it can be seen from Table 1 above, the mean for economic growth, taxation, government expenditure and investment respectively are within their minimum and maximum. The standard deviation of economic growth, taxation, government expenditure and investment are very high which indicates that most of the observations on each of these variables do not concentrate around the mean value which indicates high degree of dispersion. The Jarque-Bera P-value for taxation, government expenditure and investment respectively are statistically significant since they are greater than 0.05 as such the variables are normally distributed around the mean except for economic growth which was 0.071033.

Table 2: Correlation Analysis Matrix

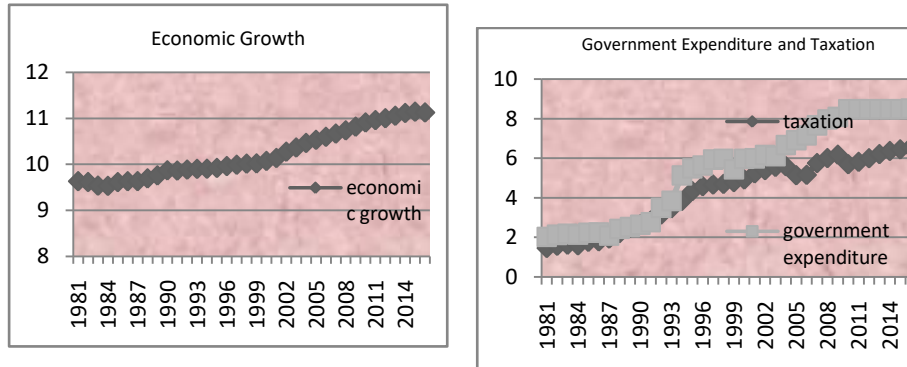
	RGDP	TAX	GOV	INVST
RGDP	1			
TAX	0.858140	1		
GOV	0.868960	0.503007	1	
INVST	0.830959	0.860092	0.767699	1

Source: Author, 2019

Table 2, illustrates the correlation of the variable used in the empirical analysis in order to determine the direction of relationship among different variables and for the presence or otherwise of collinearity between variables. Correlation coefficient ranges from -1 to +1, indicating perfect negative correlation and a perfect positive correlation respectively. Also when the correlation coefficient between two variables is low it suggest low chances of multicollinearity while high correlations between two variables indicate high chances of multicollinearity. In the study the correlation coefficient ranges from ± 0.5 to ± 0.86 indicating the absence of perfect positive or perfect negative association between any two variables in the study implying low possibility of multicollinearity problem in the model.

The trend of economic growth in Nigeria is presented using the line graph as follows:

Figure 1: Trend of Economic Growth, government expenditure and Taxation in Nigeria 1981-2016



Source: Author, 2019

Figure 1 showed that between 1981 and 1999, the level of economic growth has been relatively low but relatively stable. From this period to 2014 there was a sharp rise in the level of economic growth in Nigeria. However, between 2015 and thereafter, there was a sharp fall in economic growth in Nigeria. Figure 2 showed that between 1981 and 1987 both taxation and government expenditure were at their minimum level but government expenditure was above taxation. However, from 1988 to 2016 both government expenditure and taxation rose rapidly in an unstable manner but government expenditure still rose above the tax level. Worth to be noted is the fact that in 1987 and between 1989 and 1992 there was an equilibrium level of government budget as there was equality between government expenditure and taxation in Nigeria which can be attributed to rise in government revenue as a result of the boom in the international oil market.

Empirical Results

In line with the result of the descriptive analysis of the data, the trend and correlation analysis conducted earlier in this chapter, the estimation of the model is based on the Fully Modified Ordinary Least Squares (FMOLS) estimation technique.

The result of the Fully Modified Ordinary Least Squares (FMOLS) estimates presented in Table 4 showed that government expenditure ($\beta = -0.107284$, $t = -2.055999$, $p < .05$), investment ($\beta = 0.232251$, $t = 4.453699$, $p < .05$) and export ($\beta = 3.30E-05$, $t = 2.891477$, $p < .05$) have a significant effect on economic growth in Nigeria. While the influence of government expenditure on economic growth was negative, the effect of investment and export on economic growth in Nigeria is positive. The estimations also shows that taxation ($\beta = 0.042153$, $t = 0.578179$, $p > .05$) does not have a significant effect on economic growth in Nigeria. The implication of this study is that, while taxes does not exhibit any effect on economic growth, government expenditure demonstrated a positive effect on

economic growth in Nigeria. The result of the Adjusted R-squared demonstrated that there is good correlations between dependent and independent factors, where all independent variables can explain around 98 percent of the changes in the pace of economic growth. The remaining 2 percent of the fluctuations in the pace of economic growth in Nigeria is explained by other factors that are not included in to the regression model.

Table 4: Result of FMOLS Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TAX	0.042153	0.072907	0.578179	0.5675
GOV	-0.107284	0.052181	-2.055999	0.0486
INVST	0.232251	0.052148	4.453699	0.0001
EX	3.30E-05	1.14E-05	2.891477	0.0071
R-squared			0.979595	
Adjusted R-squared			0.976875	
Long-run variance			0.009423	

Source: Author, 2019

The implication of this study is that, taxation does not have any effect on economic growth, while government expenditure demonstrated a negative effect on economic growth in Nigeria. This result is in contrast to the findings of Agbonkhese and Asekome (2014) on the impact of public expenditure on the growth of the Nigerian economy. Their study suggests that there is a positive association between the government expenditure and economic growth or gross domestic product. It also disapprove the findings of Udoffia and Godson (2016) on the influence of federal government expenditure on the Nigerian economic growth where it was observed that federal government capital and recurrent expenditures have a favorable effect on real GDP. However, the outcome was in line with the findings of Abdulrahman (2016) on the impact of government expenditure on economic growth in Nigeria where the study found that government expenditure had a negative and small impact on the economic growth of a country.

5. Conclusion and Recommendations

This study indicated that taxation does not exhibit any effect on economic growth but government expenditure had an unfavorable effect on economic growth in Nigeria. This result suggests that government expenditure has been unproductive in Nigeria which can be attributed the rise in corrupt practices among public office holders and in the award of government projects.

Following the empirical findings, the following recommendations are offered for effective policy formulations. It is critical to inculcate fiscal discipline in government spending by implementing broad-based effective internal control mechanisms as well as more aggressive economic management coordination and implementation. All non-productive activities and expenditures in all levels of government must be discouraged immediately. In order to fulfill Nigeria's macroeconomic goals, both the federal government and the Central Bank of Nigeria

(CBN) need be more articulate in managing the country's exports. To make taxes successful as a tool for rapid economic growth, the government must ensure that tax avoidance and evasion are avoided, and tax collection costs are kept to a minimum.

References

- Abata, M. A (2014). The impact of tax revenue on Nigerian economy (Case of federal board of inland revenue), *Journal of Policy and Development Studies*, 9(1), 1-14
- Adejare, A. T. & Akande, S. S. (2017). The impact of personal income tax on government expenditure in Oyo State. *Account and Financial Management Journal*, 2(4), 635-643 doi: 10.18535/afmj/v2i4.02
- Al-Fawwaz., T. M (2016) The Impact of Government Expenditures on Economic Growth in Jordan (1980-2013), *International Business Research*, 9(1), 1-16
- Anyafu, A. M. O (1996). *Public Finance in Developing Economy, the Nigerian Case*, Enugu: Department of Banking and Finance, University of Nigeria.
- Anyanwu, J.C, S.A. Oyefusi, H.E. Oaikhena, & F.A. Dimowo (1997). *The structure of the Nigerian Economy (1960-1997)*. Joanee Educational Publishers Ltd.
- Appah, E. & J.K. Oyandonghan I. (2011) The challenges of tax mobilization and Management in the Nigerian Economy, *Journal of Business Administration Management*, 6(2), 128-136.
- Bhatia, H. L. (2002). *Public Finance (25th ed.)*. India: Vikas Publishing House, PVT Ltd.
- Bhatia, M. (2003). The peace allergy. *Bulletin of the Atomic Scientists*, 59(4), 52-59 <https://doi.org/10.2968/059004014>
- Bojanic, A.N (2013). The composition of government expenditures and economic growth in Bolivia, *Latin American Journal of Economics*, 50(1), 83–105
- Chaido, D. & Melina, D (2012). Government expenditure and national income: Causality test for twelve new members of European Union. *The Romanian Economic Journal* 13 (38),27-34
- Dewett, K. K., (2005). *Modern Economic Theory*, ShyamLal Charitable Trust, New Delhi, India.
- Edame, G. E & Eturoma, A. D (2014). The determinants of public expenditure on educational infrastructural facilities and economic growth in Nigeria, *E3 Journal of Business Management and Economics*, 5(6), 152-161
- Iyidogan, P. V. & Turan, T. (2017). [Government size and economic growth in Turkey: A Threshold regression analysis](#). *Prague Economic Papers*, Prague University of Economics and Business, 2017(2), 142-154.
- Musgrave, R & Musgrave P. B (2004). *Public Finance in Theory and Practice, 5th Edition*, Tata Mcgraw Hill Education Private Ltd, New Delhi. 627 pages
- Nwaeze, C. & Njoku, R. & Nwaeze, O.P (2014). Impact of government expenditure on Nigeria's economic growth (1992 – 2011). *The MacrotHEME Review* 3(7), 1-14
- Nzontta, O. (2007). *Individual Tax Payers Attitude and Companies behavior in Nigeria*. Novel publishers: Onitsha.
- Okoh, S. E. N. (2008). *Public Sector Economics*. Mindex Publisher Co., Benin City

- Razzaq, A., Ahmed, F. & Razzaq, A. (2015). Dynamic Relationship between Income and Consumption: A Time Series Analysis of Spain, *Management and Administrative Sciences Review*, 4(2): 404-411
- Saidin, N.A.B., Basit, A & Hamza, S.M (2016) The role of tax on economic growth. *International Journal of Accounting & Business Management*, 4(2) doi: 10.24924/ijabm/2016.11/v4.iss2/242.250
- Todaro, M. P. & Smith, S. C., (2006). *Economic Development, 9th Edition*. Pearson Educational Limited England
- Udoffia, D.T & Godson, J.R (2016) The impact of federal government expenditure on economic growth in Nigeria (1981-2014), *Greener Journal of Social Sciences*. 6(4), 092-105
- Udoka, C.O & Anyingang, R.A (2015). The effect of public expenditure on the growth and development of Nigerian economy (1980-2012), *International Review of Management and Business Research*, 4(3), 1-12

The Role of Port Infrastructural Quality on GDP Per Capital in West African Countries: A Static Model Approach

Yusuf Ndagi Baba

¹Department of Transport Management, IBB University Lapai, Nigeria

Correspondence Email: babayusuf89@gmail.com

Abstract

This study seeks to examine the effect of quality Port Infrastructure on growth using panel data of 15 West African countries. This study employed the random effect model and vector autoregressive model for the period 2006 to 2019. The result of the study revealed that air transportation posits a negative and significant effect on GDP per capital. Infrastructural quality of port had a positive and significant effect on GDP per capital. However, working poverty had a negative and significant impact on GDP per capital in West African countries. On the causality relationship, air transport freight does not granger causes GDP per capital. Quality of port infrastructure and GDP per capital has a bi-directional relationship. There is also a bi-directional relationship between Inflation and GDP per capital. Similarly, a bi-directional relationship also exists between working poverty and GDP per capital.

Keywords: Port Infrastructure, Air Transport, GDP Per capital, Working Poverty

JEL Classification: H54

1. Introduction

The sub-Sahara Africa received the highest number of transport commitments in 2016 (\$6.6 billion or 26.9 percent of the total), as such it is expected that this policy response blend with increased GDP per capital in the region. West African markets remain one of the largest markets for commodity goods hitherto, records the lowest air transport services world over. This assertion reflects its poor income and inadequate air transport infrastructure hence has continued to reduce growth prospects. For instance, It is shocking that the region accounted for 4.1% of the total world passengertraffic in year 2002 and just 1.6% of the world air cargo traffic (See Oxford Economic Forecasting, 2003).

The West Africa's inflationary pressure was at the highest inthe year 2018 across all the sub regions, it stood at 13.4 percent but remained static. In the same year, Nigeria recorded (16.2%), Sierra Leone (11.7%), Liberia (11.2%) and, Ghana (8.3%). The inflation rate was driven by poor harvest in the Sahel region that led to an increase in food prices, higher import prices and an increase in production costs. In 2019 and 2020, inflation is expected to decrease, but still maintain its double digits.

Infrastructure such as airports and air-traffic management - is essential to the growth and functioning of air transport services. In many African countries, more than elsewhere in the world, infrastructure inefficiencies coupled with limited competition are making market access both difficult and expensive. In addition, safety issues are a source of concern, particularly given the prospective growth in demand for air services (Oxford Economic Forecasting, 2003). Improvements in the air transport infrastructure have a key role to play as a facilitator of and complement to policies that aim to improve living standards and alleviate poverty. The poor Infrastructure continued to deplete possible sustainability of good functioning port Infrastructure in the region. Even with the regional dependence on primary commodities, exchange rates remained stable to certain extent in several francophone countries, cushioned by an appreciating euro that continued in 2019.

In Nigeria, exchange rates remained stable with stronger oil prices in year 2018, but sensitive to political events in the country (African economic outlook, 2018). Following the uncertainty and poor conditions of port Infrastructure in the region, it is on this note that this study intends to investigate the effect of quality infrastructure of port on economic growth in West African countries.

2. Literature Review

Sharapiyeva, Antoni and Yessenzhigitova (2019) estimated the effect of quality of the port infrastructure on economic growth using sample of 37 landlocked employing the Structural Equation Model (SEM). Result of the study showed that quality port infrastructure indicated a positive and significant effect on economic growth. Ola (2018) in a study examined the impact of transportation on economic growth using data on Nigeria spanning from the period 1985 to 2010 and applying the Ordinary and Least Square (OLS). The result of the study revealed a positive relationship between transportation and economic development in Nigeria.

Gizem Akbulut (2015) employed the panel data analysis using 26 sub-regions at NUTS 2 level in Turkey for the period between 2004 and 2011 to explore the nexus between air transport and economic growth, using Turkey as a case study and applying the least square method, fixed effect, 2SLS and GMM. Results of the study showed increasing number of active airports and its traffic frequency has a positive effect on regional economic growth. Munim and Schramm (2018) examined the effect of port infrastructure and logistic on economic growth using the structural equation model (SEM) on 91 countries, result shows a positive relationship between port infrastructure and logistic on economic growth.

Artar, Uca, and Taşçi (2016) explored the effect of air freight transport on economic growth using data on Turkey as well as USA and EU for the period 1980-2014 applying Ordinary Least Square regression and generalized method of moment. The result of study revealed that freight transport has a positive relationship with GDP. Ishutkina and Hansman (2009) in their study investigated the Interaction between Air Transportation and Economic Activity using 139 countries for the period 1975 to 2005 applying system GMM. Result of the study shows a positive relationship between air transport and GDP.

Stevens and Sessions (2005) in their study on the relationship between working poverty and GDP, using Error Correction Model in US Data in the period 1980s economic expansion, they found that there is a significant long run relationship between working poverty and GDP per capital during the period.

Theoretical Framework

According to neo-classical theory, transport infrastructures are investment in port infrastructure which is assumed to be exogenous, investment improves the quality of port infrastructure (QPI). To better QPI such as modern technologies and equipment would facilitate the logistics performance (LP) of a country (that is, greater reliability, less damage, ability to track and trace shipments, timeliness of delivery etc.) thus, Improved QPI and LP would increase the local and global accessibility of a country, including opportunities to expand markets worldwide.

The realization of those opportunities can be expressed in the form of a country's total international trade (herein, seaborne trade). Gains from trade can be characterized by improved labor supply, expanded production, diffusion of innovation, competitive pressures, economic restructuring, etc., leading to total factor productivity and GDP growth.

3. Methodology

This study covers 15 West African countries spanning the period 2006 to 2019 the rationale of employing this data sample is due to availability of data inform of non-probability sampling technique. The data are sourced from the World Development indicators. For instance, GDP per capita (current US\$): GDP per capita is gross domestic product divided by midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes, minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current U.S. dollars (WDI, 2019) Air transport is measured as freight (million ton-km) (WDI, 2019) Quality of port infrastructure, WEF (1=extremely underdeveloped to 7=well developed and efficient by international standards) (WDI, 2019)

Fixed Effects Within-Group Model

The heterogeneity of the data has characteristics of individual country specificity thus, the fixed effects in essence overcomes the challenges of unobserved heterogeneity. To estimate fixed effect with large sample size we specify model as:

$$y_{it} = \alpha_0 + \sum_{j=2}^k \alpha_j x_{jit} + \sum_{p=1}^s \beta_p z_{pi} + u_{it} \dots\dots\dots 1$$

Y denotes the dependent variables; X_j represents the observed explanatory variables, while Z_p represents the unobserved explanatory variables.

It is assumed that the unobserved effect which is a challenge in panel estimation does not vary over time and given that it is unobserved and difficult to measure, hence the model can be re-written as:

$$\delta_i = \sum_{p=1}^s \beta_p z_{pi}$$

$$y_{it} = \alpha_0 + \sum_{j=2}^k \alpha_j x_{jit} + \delta_i + u_{it} \dots\dots\dots 2$$

Where δ_i is described as an individual unobserved specific effect which mitigate the robustness of estimation hence can be controlled in the following approach. Some of which include the use of dummy variable as different variables in the model. For instance, within-groups with fixed effects, the change or variation is therefore explained on the mean of the dependent variable. However, this method has potential problems such as the loss of the x variables that remains constant.

$$y_{it} - \bar{y} = \sum_{j=2}^k \beta_j (x_{ijt} - \bar{x}_{ij}) + (u_{it} + \bar{u}_i) \dots\dots\dots 3$$

The unobserved country specific effect disappears from this model and is known as the within-groups regression model since it explains the changes or variations about the mean of the dependent variable resulting from the changes or variations about the means of the explanatory variables for the group of observations relating to a given individual.

However, taking first-differences of the variables, the problem with the x variable persist; similarly, this technique removes any problem of first-order autocorrelation. If the unobserved effects are distributed randomly, we can treat the α_i as random variables, drawn from a given distribution. This involves subsuming the unobserved effects into the disturbance term to give:

$$y_{it} = \alpha_0 + \sum_{j=2}^k \alpha_j x_{jit} + v_{it} \dots v_{it} = \delta_i + u_{it} \dots\dots\dots 4$$

This is a random effects type of model and is in general better than the fixed effects model as characteristics that remain constant for each individual that remain in the model but have to be removed for fixed effects models (Nwakuya and Ijomah, 2017). In the case of selecting the most appropriate technique of estimation to be adopted, the Hausman specification test is employed and the rule of thumb state that, If the probability value <0.05 , then FE otherwise RE model should be selected.

4. Results

From the result of the descriptive statistics, the minimum value of working poverty exert on GDP per capital is 1.9, while the maximum value is 69.3. The mean average value of working poverty is 37.07762, while its standard error is 16.80925.

The minimum value of inflation on GDP per capital is -3.231812, while the maximum value is 34.69527. The mean average value of inflation is 5.428511, while its standard error is 5.8067.

The quality of port infrastructure on GDP per capital has a zero minimum value, its maximum value is 5.23413. The mean average value for quality of port infrastructure is 3.703219, while its standard error is .8411533.

Table 1: Descriptive Statistics

Variable	Obs	Mean	Std Dev	Min	Max
Gdpperc	210	1136.529	820.0598	323.3892	3740.389
airtrafrie~t	130	4.851562	10.08072	0	53.71972
Qua	107	3.703219	.8411533	0	5.23413
Infla	197	5.428511	5.8067	-3.231812	34.69527
Worpoov	210	37.07762	16.80925	1.9	69.3

Source: Author's Computation

Air transport services also have zero minimum value on GDP per capital, with a maximum value of 53.71972. The mean average value of air transport services is 4.851562, while its standard error is 10.08072.

Table 2: Static Models

Variable	Fixed effect	Random effect
Airtrafrieghtc	-.0461656*** .0222908	-.0373159*** .0218735
Qual	.6185498*** .2770639	.4739731*** .2645242
Inflat	.0028767* .0271591	.0041811* .0271137
Worpoverty	-.3555131*** .1826369	-.308061*** .1321287
Constant	7.582661 .5656551	7.511472 .5283921

Source: Author's Computation

Notes ***, **, * are statistical significance at 1%, 5% and 10% level respectively, t-statistic (in parenthesis) are based on white heteroscedacity consistence (HAC) standard errors, p-values reported for AR(2) and Hansen statistics.

The rule of thumb says If in any case, the probability value <0.05, FE should be selected and if otherwise, the RE model should be selected

Test: Ho: difference in coefficients not systematic

$$\begin{aligned} \text{chi2}(4) &= (b-B)'[(V_b-V_B)^{-1}](b-B) \\ &= 3.11 \\ \text{Prob}>\text{chi2} &= 0.5392 \\ & (V_b-V_B \text{ is not positive definite}) \end{aligned}$$

Thus, the random effect is selected in this case to posit relationship among regressors. From the result in table 1, air transportation posits a negative and significant effect on GDP per capital.

Infrastructural quality of port has a positive and significant effect on GDP per capital. However, working poverty has a negative and significant impact on GDP per capital in west African countries.

Table 3: Panel Vector Auto Regression Causality Test

<i>Var</i>	Coefficient and Z statistics
Gdpperca	.1351886*
	.5723952
Airtrafrieghtc	-.0382762*
	.0625547
Gdpperca	.8555142***
	.4147862
Qual	.8555142***
	.4147862
Gdpperca	.8223546***
	.1683467
Infla	-.0651474***
	.0216911
Gdpperca	.8202475***
	.1643344
Worpoverty	.809693***
	.0712496

Source: Author Computation

Notes: *** ** *denotes statistical significance at 1%, 5% and 10% respectively Z statistics (n parentheses).

The result of the panel vector autoregressive model shows that air transport freight does not granger causes GDP per capital. Quality of port infrastructure and GDP per capital has a bi-directional relationship. There is also a bi-directional relationship between Inflation and GDP per capital. Similarly, a bi-directional relationship also exists between working poverty and GDP per capital.

Table 4: Postestimation Test

Variable	Coefficients
Airtrafrieght	-18.9471
	7.501681
Qua	255.5912
	172.9085
Infla	3.469419
	14.94063
Worpov	-20.2753
	27.51026

Source: Author's Computation

Since the houseman specification test reported that, the random effect regression model is the most appropriate, this study includes the time varying effect and country specific effect and VCE robust option to account for auto correlation and heteroscedastic problem. From the result, significant changes have revealed the standard errors coefficient and significant p-values

5. Conclusion and recommendations

West African region may have recorded growth in GDP as a result of key performance indicators, but the most supportive mechanism that has yielded this

progress is a quality and well function port system in the last four decades. This implies that, despite the dwindling trade cycle and recessionary period, the region still maintain a fair stable growth amidst increased cost of imported and exported goods and by virtue of the nature of commodity goods. This questions how much impact the port services have on GDP for the period 2006 to 2019? From the findings, the following conclusions can be deduced.

Infrastructural quality of port has a positive and significant effect on GDP per capital. This shows that investing in port Infrastructure cannot be understated. More so, it has implication in facilitating foreign investors, goods and services into the region thus reducing the cost of import and export as well.

This study also shows that, quality port is a great asset to West African economies owing to too much dependence on commodity goods and land lock nature. Not only port Infrastructural has contributed to successful growth in GDP. Rather, other complements such as logistics infrastructure leading to ports, Customs and security clearing, Safety and regulations also drive growth. Therefore, implication is that there is need for a liberalization of port will strengthen supply chain.

However, working poverty has a negative and significant impact on GDP per capital in West African countries. The negative sign of poverty can be associated with a large decline in the share of labour force in agriculture, industry and small scale businesses in West Africa. Implication is that, if any success in growth is to be attained, inclusive growth, Labour force reallocations from the traditional, subsistence, low-productivity sectors to the modern high-productivity sectors must bear key part of African growth accelerations and a key strategy to attaining this goal.

References

- African Economic Outlook (2018). Africa's macroeconomic performance and prospects.
- Artar, O. K., Uca, N., & Taşçı, M. E. (2016). The impact of the airline freight transportation on GDP in Turkey. *Journal of International Trade, Logistics and Law*, 2(2), 143-148.
- Gizem Akbulut, N. O. (2015). The relationship between air transport and economic growth in Turkey: Cross-regional panel data analysis approach. *Journal of Economics and Behavioral Studies*, 7(1), 89-100.
- Ishutkina, M. A. (2009). Analysis of the interaction between air transportation and economic activity: A worldwide perspective. The work presented in this report was also conducted in collaboration with the members of the Doctoral Committee.
- Munim, H. Z., & Schramm, H. (2018). The impacts of port infrastructure and logistics performance on economic growth: the mediating role of seaborne trade. *Munim and Schramm Journal of Shipping and Trade*, 3 (1).
- Ola, A. (2018). The impact of transportation on economic development in Nigeria. *International Journal of Contemporary Applied Researches*, 5(8), 140-154.

- Oxford Economic Forecasting (2003). The contribution of air transport to sustainable development in Africa:Final report on study for the air transport action group.
- Sharapiyeva, M. D., Antoni, A.,&Yessenzhitova (2019). The impact of port transport-logistics infrastructure and LPI for economic growth on the example of landlocked countries.*Scientific Journal of Maritime Research*, 3 (3), 63-75.
- Stevans, L., & Sessions, D., N. (2005). The relationship between poverty and economic growth revisited. Zarb school of business, 1-27..

An Assessment of the Patterns and Determinants of Public Expenditures and Revenues in Nasarawa State of Nigeria: 1997-2004

Ahmed Baba El-Yaqub

Department of Economics, Faculty of Social Sciences, University of Abuja

Correspondence Email: elyaqubbahmad@gmail.com

Abstract

The study has examined the patterns and determinants of Public Expenditure and revenues in Nasarawa State where it focuses on the statutory allocations received by the State government from the consolidated revenue accounts of the federation, the value added tax (VAT) proceeds and the internally generated revenues (IGR) on the one hand vis-a-vis the total expenditure disbursements of the State. The study employed regression analysis. The study subjected the annual budget estimate of Nasarawa State government (1997-2004) to a thorough scrutiny. The study discovered that the State government is over-dependent on the oil monies coming into the State from the consolidated revenue accounts of the federation and the value added tax proceeds in order to execute both its capital as well as the recurrent programmes. This study therefore recommends an over-haul in the entire processes of revenue collection by diversifying its internal revenue base in order to reduce the over-dependence on the revenues from the federation account. Also, the state government should revolutionize in solid minerals development, and hasten the development of its tourism potentials.

Keywords: Expenditure, Revenue, Value Added Tax

JEL Classification: E62, H71

1. Introduction

This study of public expenditures and revenues in Nasarawa State of Nigeria focuses on the profile of monthly and yearly statutory allocations received by the State government from the Consolidated Revenue of the Federation (CRF), the Value Added Tax (VAT) proceeds and the Internally Generated Revenues (IGR) vis-a-vis the total expenditure disbursements to both the recurrent and capital programmes of the State. Some welfare Economists, such as Abizadeh and Yousef (1988), opines that governments exist to correct the failures of the free market in the efficient allocation of scarce resources, ensure equitable distribution of income and economic growth and stability. They further opine that government has three major functions to perform viz: allocation, distribution and stabilization. These roles are performed with the presumption that they would improve or maximize social welfare.

According to Garba (1995), public expenditures refer to the expenses which the government incurs for its own maintenance for the society and the economy as a whole. Garba went further to say that, public expenditures are important mechanisms through which governments use to have significant effects on the lives of the people in terms of their standard of living and better opportunities. The components of public expenditures are the recurrent capital expenditures.

In Nasarawa State for instance, the study discovered that most government hospitals and clinics lack essential drugs and equipment, while there is no portable drinking water in the major towns and villages. Similarly, there is epileptic and erratic power supply and lack of good access roads, drainages and bridges linking one place to another in order to transport both food and cash crops from the rural to the urban markets. Furthermore, the primary and secondary schools in the State are grossly inadequate. Where the schools are available, there are no qualified teachers and the laboratories are ill-equipped. To further compound problems, the state government has not provided fertilizers, pesticides and other agricultural inputs to our farmers in good record time given the fact that the States is an agrarian one. To further worsen the matter, as a newly created state, the government did not assist and encourage private developers nor has it on its own built sufficient houses for the civil servants who are trooping into the State capital in order to work at the various ministries and parastatals.

Evidently and more worrisome are the abandoned projects seen as common sights at the mercy of termites and other reptiles. On the who, contractors maintained that the State government failed to pay them promptly and adequately huge sums of money for executing various projects awarded to them across the State.

2. Literature Review

The study of public expenditures is one of the most interesting objects in the economic literature. A considerable number of Economists have engaged in extensive theorizing in order to provide some explanations as to why there is disequilibrium between the available revenues and physical projects executed by governments, either at the Federal, States or Local government levels.

Some researchers have developed and empirically tested various models to explain the public expenditure behaviour in developed countries such as Landau (1986), Fountas and Jyn-Linwu (1995), Musgrave (1969), and Wassdijk (1964). Other researchers have also carried out surveys on various states' public expenditures in order to unravel the mysteries as to why there is an uneven development in some states and why particular attention is not paid to the public sector. Among such indigenous scholars are Alade (1999), Aigbokhan (1996), and Lambo (1987).

The investment multiplier holds well not only for net investment, but also for additional government expenditures whether for the purposes of consumption, transfer or investment. Public expenditure is important for economic development of the country. Through public expenditures, most government's policies, programmes and objectives are achieved via the long-term development plans and poverty alleviation programmes.

Public expenditures are therefore, seen as a means of executing government's policies and programmes with the aid of the available revenues at any given period of time. In spite of its obvious importance, the study of the behaviour of public expenditure appears to have received little attention among Economists throughout the first half of the 20th century. However, there are two important and well-known theories of public expenditures. These are: Adolph Wagner (1971), law of expanding States activities and that of Wiseman and Peacock (1967) on the theory of concentration and displacement effect.

Empirical Studies of Determinants and Patterns of Public Expenditures

The determinants of public expenditures vary between developed and developing countries as well as among the developing countries overtime. It is assumed that as governments continue to expand their activities in order to improve the quality of life of the people, public expenditures are bound to increase. Hence, the public expenditure theories provide the analytical framework under which changes in government expenditures are viewed. Wagner (1971); Wiseman and Peacock (1961) propounded two of such theories.

Anyanwu (1999), examined the various facets of fiscal relationships among the various tiers of government in Nigeria using mainly descriptive tools. The study reveals that the degree of decentralization of spending is higher than the degree of decentralization of revenues, resulting to over dependence by the sub-national governments on central financial allocation for their expenditure needs. This according to the study leads to the problem of non- correspondence or vertical fiscal imbalance since there is a considerable divergence between the sources of revenue and functional expenditure obligations in the states and local governments. The study observed that, a cut in the capital expenditure component has adverse effect on capital formation.

Alade (1999) examines the causes of State Government's financial problems in Nigeria using descriptive statistics "between" 1980-1997. The study revealed that, state governments' expenditure have passed the potentials of their sources, leaving a substantial gap between their needs and fiscal capacity. It showed that while States revenue has declined in real terms, the demand for government services has continued to grow. The study observed that several factors are responsible for the increase in State governments' expenditures. For instance, the rising cost of providing public services due to inflation, unprecedented increase in the demand for public services as a result of the growing population, and the problem of over-staffed public sector.

Ndebbio (1998) examines the full impact of fiscal deficit, money supply and inflation in Nigeria for the period 1970-1992. Using the deficit, money supply and inflation, further results showed that, when the money stock (M2) was increased by 10%, the price level (PL) increased substantially, followed by significant increase in government expenditure (GE) and government revenue (GR). Imports (IMP) also increased though not as high as the rates of PL and GE. The study also showed that a decrease in money stock (M2) by 10% on the other hand, had a depressed impact on prices, government expenditures, government revenues and imports.

The study has therefore filled the gap in existing literature by considering other aggressive efforts aimed at boosting the State's weak internally generated revenues since it is believed that with a vibrant (IGR) in place, the state will depend less on the federation accounts for its survival which will in turn make it less vulnerable to all sorts of manipulations by the Federal government. Furthermore, it is believed that it will be less susceptible to the politics and vagaries of crude oil in the world market. Consequently, the state will be able to meet up the expenditure requirements for service provision and delivery to the people.

3. Methodology

This study used annual budget estimate of Nasarawa State government from 1997-2004. In determining the regression model, Total revenue (TR) was used as the dependent variable while capital expenditure (CE) and consolidated revenue funds (CRF) were used as the independent variables.

$$TR = C + \beta_1 CE + \beta_2 CRF + e_i \dots\dots\dots 1$$

Where, TR = Total Revenues, CE = Capital Expenditures, CRF = Consolidated Revenue Funds, e_i = Stochastic error term with mean = 0 and variance σ^2

Table 1: Anova Table for Single - Factor Analysis

Sources of Variation	Sum of Squares (SS)	Degrees of Freedom (D.F)	Mean Squares (MS)	Variation or F- Ratio
Between Treatments	$SST = \sum_{j=1}^r \frac{T^2_j}{n_j} - \frac{T^2}{N}$	r-1	$MST = \frac{SST}{r-1}$	$F^* = \frac{MST}{MSE}$
With-in Treatments (Erros)	$SSE = \sum_{j=1}^r \sum_{i=1}^{n_j} X_{ij}^2 - \sum_{j=1}^r \frac{T^2_j}{n_j}$	N-r	$MSE = \frac{SSE}{N-r}$	
Total	$SS_{Total} = \sum_{j=1}^r \sum_{i=1}^{n_j} X_{ij}^2 - \frac{T^2}{N}$	N-1		

4, Results

Table 2: Revenue structure and contribution in Nasarawa State (1997-2004)

Sources of Variation	Sum of Squares	Df	Means Squares	F	Sig.
Between Groups	32541.477	2	16270.738	2722.712	0.000
Within Groups	125.495	21	5.976		
Total	32666.971	23			

Source: Using data obtained from Nasarawa state budget estimates

Note: Rev = Revenues

Table 3: Multiple Comparisons (Dependent Variable: REV)

(I) CAT	(J) CAT	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
1.00	2.00	5.5125	1.22229	0.000	2.9706	8.0544
	3.00	-75.2100	1.22229	0.000	-77.7519	-72.6681
2.00	1.00	-5.5125	1.22229	0.000	-8.0544	-2.9706
	3.00	-80.7225	1.22229	0.000	-83.2644	-78.1806
3.00	1.00	75.2100	1.22229	0.000	75.6681	77.7519
	2.00	80.7225	1.22229	0.000	78.1806	83.2644

Source: Using data obtained from Nasarawa State Budget Estimates

Note: Rev = Revenues; LSD = Least Square Difference; The mean difference is significant at 05 level.

From the result presented in Table 2, it shows that the F-statistic is 2722.71 with P = 0.000 which is less than 0.05 level of significance. This signifies that the null hypothesis is rejected because there is no difference in the three (3) components of revenues generated in Nasarawa state for the period under review and the alternative hypothesis is therefore accepted.

From the multiple comparison tests in Table 3, it also appears that there is significant difference among the three (3) groups of revenue components generated in Nasarawa state during the eight years of the research study. The three (3) revenue components in Nasarawa state are the consolidated.

Based on Table 2 and 3 and also Fig 1, it shows that bulk of the revenues in Nasarawa state is coming into the State on yearly basis from the consolidated revenue funds of the federation. Fig. 1 shows that the consolidated revenue (CRF) contributes about 80% to 89% 'between' 1997-2004. This clearly signifies that the state has a very weak internally generated revenue base. Based on the foregoing, it means that the state is vulnerable and susceptible to all kinds of manipulations by the Federal government because of the state's over-dependence and over-reliance on the consolidated revenues from the federation accounts. This shows that, the state government might not be able to stand on its own to execute most of its recurrent and capital programmes without receiving funding from the federation accounts. See table for the revenue sharing formula from the consolidated revenue accounts of the federation below.

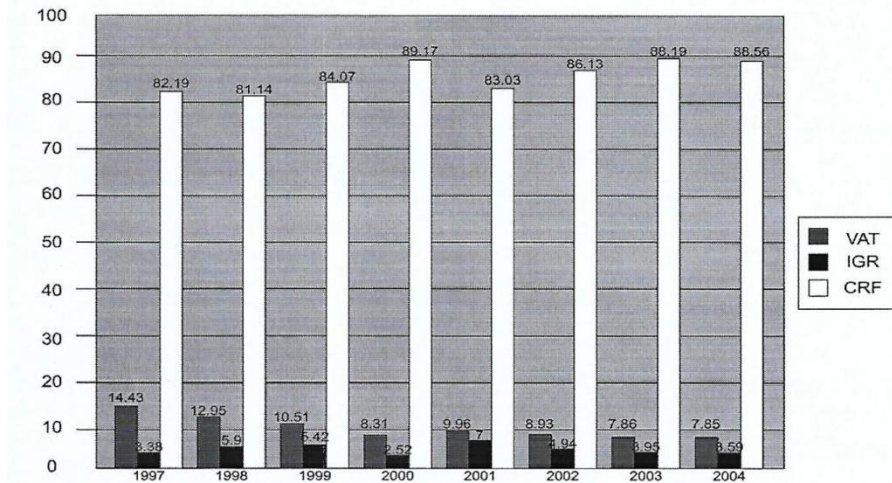
Revenue Sharing Formula from the Consolidated Revenue Accounts of the Federation

Table 4: Revenue Formula Table as at 2004

Tiers of Government	Old Formula	New Formula
Federal	53.69%	55.0%
State	31.10%	24.0%
Local Government	15.21%	21.0
Total	100%	100%

Source: Revenue Mobilization Allocation and Fiscal Commission

FIG: Pattern of Revenue Distribution in Nasarawa State in %



Source: Computed from Appendix 2 using data obtained from Nasarawa State Budget Estimates

As presented in Figure 1, it can be seen from the bar-chart that, in 1997, the consolidated revenue funds (CRF) came first with the state government having 82.12%, as the revenue received from the federation account. This was followed by the value added tax (VAT) proceeds which came second, with 14.43% of the total revenue. The last position went to the internally generated revenues (IGR) with 3.3% of the total revenue. This is actually not encouraging at all. It implies that the state government is seriously over-dependent on the consolidated revenue funds from the federation account in order to execute both its recurrent and capital programmes. It also shows that the state government will not be able to stand on its own without receiving funds from the federation account.

Similarly, Figure 1 shows that, the revenue pattern is the same throughout the study period. For instance, the consolidated revenue funds contributed about 81.1% in 1998, 84.0% in 1999, 89.1% in year 2000, 83.0% in 2001, 86.1% in 2002, 88.1% in 2003 and 88.56% in 2004. This therefore goes to show that the state government may not be able to stand on its own, without the consolidated revenues coming into the state from the federation account. The state government must generate revenues and reduce over dependence and over reliance on the oil monies coming into the state government coffers from the federation account.

Table 5: Recurrent and Capital Expenditures Comparison in Nasarawa State

Sources of Variation	Sum of Squares	D.F	Mean Squares	F	SIG
Between Groups	932.081	1	932.081	31.45	0.000
Within Groups	414.936	14	29.638		
Total	1347.016	15	-		

Source: Using data obtained from Nasarawa State Budget Estimates

Comparison is also made between the recurrent and capital expenditures profits of Nasarawa State government based on the annual budget estimates for the period of eight years 1997-2004.

From the SPSS results in Table 5, we identify that the F-statistics gave 31.45 and P = 0.000, which is less than the 05% level of significance. This shows that there is difference between the allocations to the recurrent and capital expenditures. Although, the result shows that, there is no significant difference between the allocations to the recurrent and capital expenditures, figure 2 in the bar chart shows that, the capital programmes between 1997 and 2004. The percentage difference on yearly basis between the recurrent and capital expenditures ought to have been very much in favour of the capital programmes, since priority is supposed to be given to the capital programmes as against the recurrent.

This is so because when, emphasis is given to the capital programmes, it means that priorities will be given to education, agriculture, health care, water supply, electricity, housing and roads/bridges will be provided to the people in order to improve the lives of the citizenry across the state. However, if the recurrent programmes are getting allocation almost at par with that of the capital programmes, it then means that, the bulk of the money coming into the state will be used to pay only salaries/wages and also settle the over-head cost of ministries and parastatals.

Discussion of Result Using Correlation Matrix

The correlation matrix shows that there is a strong positive relationship between the variables. A glance at Table 6 below reveals the Table degree of correlation.

Table 6: The Correlation Matrix of the Variables

	CE	CRF	TR	RE
CE	1.000000	0.946569	0.948645	0.960726
CRF	0.946569	1.000000	0.999692	0.944030
TR	0.948645	0.999692	1.000000	0.946348
RE	0.960726	0.944030	0.946348	1.000000

Source: Author's computation

The correlation matrix shows that, there is a strong positive relationship between the Capital Expenditure (CE) and Total Revenues (TR) and also between the Recurrent Expenditures (RE). Similarly, there is also a strong relationship between the Total Revenues (TR) and Recurrent Expenditures (RE) and a high positive correlation exist between the Consolidated Revenue Funds (CRF) and the Total Revenues. This therefore signifies that as one variable increases or decreases, the other one will also increase or decreases.

5. Conclusion and Recommendations

This study has examined the patterns and determinant of public expenditures and revenues in Nasarawa State of Nigeria. This study uses the analysis of variance (ANOVA) technique, regression analysis and the correlation technique. The findings revealed that Nasarawa State has a very weak and poor internally generated revenue mechanism among others. That, if adequate and proper

measures are not put in place to boost the internally generated revenue base of the state, then the government would have to resort to substantial borrowing in order to execute its capital as well as the recurrent programmes.

In order to boost and improve the Internally Generated Revenues (IGR), the entire processes involved in the collection of the state should be over-hauled completely. Accountability, prudence, economy, efficiency and effectiveness should be the guiding principles by all the operators of government machineries in the state. The state government should look inwards with respect to boosting its Internally Generated Revenues (IGR) in order to avoid over-reliance and over-dependence on the oil revenues which can make the state vulnerable and susceptible to the vagaries and instability of prices of crude oil in the international markets. The international market complex at Karu, near Abuja, should commence commercial activities immediately to beef up the state's IGR. In order to attract and stimulate private foreign investments, the state government should devote a large proportion of its annual budget for the provision of basic infrastructures and other services such as roads, health care, education, housing, water, electricity and industries.

The state government should revolutionize agriculture, encourage irrigation farming, and set up agro-based industries in order to boost the internally generated revenue base of the state. The state government should either increase taxes to raise revenues or reduce her expenditures to the size of its realizable revenues in order to avoid high fiscal deficits which may have destabilizing effects on the state's economy. The expenditure programmes of the state should always be tailored towards the available resources in order to achieve a fiscal balance. The state government should hasten the development of the tourism potentials i.e. the "FARIN-RUWA" water falls at Wamba in conjunction with the Federal Tourism Corporation. There should be deliberate policy by the state government to reduce recurrent expenditures and give more preference to the capital programmes since much of the spending in the recurrent expenditures may not improve the living standards of the people. It is our belief that effective implementation of the recommendations will go a long way in improving the living standards of the people of Nasarawa state in particular and Nigeria in general.

References

- Abizadeh, S. & Yousef, M. (1998). "Growth of Government Expenditures in Case of Canada". *Public Finance Quarterly* Vol. 16. No 1 (January).
- Aigbokhan, E. B (1996). *Government Size and Economic Growth. The Nigerian Experience*. Nigeria Economic Society 1996 Annual Conference Paper Ibadan
- Alade S.O (1999). *The State Government's Financial Crisis. Causes and Consequences for Economic Growth and Development: Nigerian Economic Society Annual Conference Paper, 1999, Ibadan.*
- Anyanwu, C.N.D (2003). *The Law Makers, Federal Republic of Nigeria 1999-2003*. Korea: Startcraft International.
- Central Bank of Nigeria (1970-1978). *Infrastructure Expenditure, Policy and Private Sector Output in Nigeria 1970- 1998*. Research Department and International Economic Relation Department, CBN, Abuja.

- Central Bank of Nigeria (2000). *The Changing Structure of the Nigerian Economy and Implications for Development*, CBN, Abuja.
- Central Bank of Nigeria (2001), *Economic and Financial, Review* Vol. 17 No. 2.
- Fountas S. & Jyh-Linwu, (1995), "Are the Greek Budget deficits too large." *Applied Economic Letters*, Vol. 3, No. 7 1995, Rontledge, London.
- Garba. A (1995). *The Determinants of Nigerian Federal Government Expenditure. 1970- 1993. Proceedings of a Seminar Paper on National Policy Workshop (Nigeria Economic Society).*
- Lambo. T. (1987). *Nigerian Economy*. Evans Nigeria Ltd, Ibadan.
- Lambo. T. (1987). *Federal Government spending in Nigeria (1961-1973)*. Evans Nigeria Ltd, Ibadan.
- Landau D. (1986). *Government and Economic Growth in Less Developed Countries: An Empirical Study for 1960-1980. Economic Development and Cultural Changes* 35. Pp. 35-75.
- Landau D. (1983). *Government Expenditure and Economic Growth: A cross Country Study*. *Souther Economics Journal* 49 Pp 783-92.
- Musgrave, R.A. (1969). *The Theory of Public Finance*. Macmillan, New York.
- Musgrave, R.A (1969) *The Causes of Public Expenditures in Germany, United Kingdom and USA between 1890-1963*. Macmillan, New York.
- Nasarawa State Government (1997-2004): *Nasarawa State Approved Budget Estimates (1997-2004)*
- Ndebbio J. (1988) *Full Impact of Deficit, Money Supply and Inflation in Nigeria Between 1970-1992*. Nigerian Economic Society.
- Olaoku, F.A (1975) *Pattern of Public Expenditures in Nigeria between 1966-1973*. Macmillan Press London.
- Peacock, A. P. and Wiseman, J. (1967). *The Growth of Public Expenditure in the United Kingdom*, Printon, Princeton University Press.
- United Nations Organisations, (1954). *United Nation Taxes and Fiscal Policy in Under-Developed Countries*, New York.
- Wiseman, J.A. and Peacock A.T.(1961). *The Growth of Public Expwnditure in United Kingdom*, Princeton University Press