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Interest Rate and Deposit Money Banks Credit: a study of Nigeria and South Africa

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Abstract: *This study is a comparative examination of the relationship between interest rate components and DMBs credit to the domestic economy in Nigeria and South Africa from 1991 to 2018. The specific objectives of this study analysed both the long run and short run relationship between lending interest rate (LIR), deposit interest rate (DIR), interest rate spread (IRS), risk premium on lending rate (PLR), real interest rate (RIR) and credit ratio of commercial banks to the domestic economy (CBDS). The study sourced data from World Bank Data base and Knoema for Nigeria and South Africa its sample countries and anchored on Portfolio theory and subject them to ARDL Co-integration and ARDL regression techniques at the 5% level of significance. The findings in Nigeria result indicated that interest rate components showed absence of significant long run and short run relationship with credit ratio of DMBs to the domestic economy while the South African interest rates components showed significant presence of long run and Short run relationship with domestic credit provided by the DMBs. The study concluded that interest rate components have significant relationship with credit ratio of DMBs to the domestic economy in South Africa while having insignificant impact in Nigeria. Hence, the study recommends strengthening of the depth of credit capacity of banks as more reduced interest rate components would improve the credit capacity of banks in South Africa while the Nigeria interest rates components should drastically be reduced to exert significant impact and improve credit facilitation of DMBs.*

Keyword: *Interest rate, bank credit ratio, lending rate, deposit rate & risk premium to lending rate*

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I. Introduction

African economy is a continent with countries in dire need of continuous development which cannot overlook the important role interest rates can play on DMBs' credit capacity which improve banks profitability (Acha & Acha, 2011). The commercial banks dominate the financial sector and account for a large proportion (above 90%) of financial transactions within the financial system. This is measured as percentage of total assets of the deposit money banks to other financial institutions within the system. The above clearly shows that the commercial banks dominate the African banking scene.

Deposit money bank (DMBs) are resident depository corporation and quasi-corporations which have any liability in the form of deposits payable on demand, transferable by cheque or otherwise usable for making payments (OECD, 2001). Deposit money bank (DMBs) is the same as commercial bank and share same features in the African investment environment. Deposit money banks (DMBs) are financial institutions that provide services, such as accepting deposits, giving business loans and auto loans, mortgage lending, and basic investment products like savings accounts and certificates of activities deposit. The functions of deposit money banks are however directed and redirected by the fluctuations of the monetary interest rates which influences the spread of its accepted deposits/funds.

Interest rate is the amount charged on borrowed money, expressed as a percentage of the principal, by a lender to a borrower for the use of money. It is often expressed as a percentage of the amount borrowed (principal) for one year or any other time period – month, week, day etc. – as agreed by the lender and borrower at the time of contracting the loan.

Thefluctuations in interest rates and lending rates of deposit money banks (DMBs) determine their credit ratios and therefore profitability. Recently, the growing inconsistencies in deposit money banks (DMBs) profit declaration and the growing trends of Central Banks interfering in the management of commercial banks as a reviving tool to eliminate tension in the financial system facilitate the need to determine the relationship between the function of interest rates on the credit ratio of DMBs and its profitability (Ogunbiyi & Ihejirika, 2014). Various studies have been carried out on lending rate and banks' credit facilities which culminate to profitability with diverse results emanating in the literature, for instance Acha and Acha (2014); Hassan (2016) and Ndubuaku, Ifeanyi, Nze and Onyemere (2017) showed that banks performance (profitability) are not

dependent on lending rates while Okoye and Eze (2013); Obamuyi (2013); Ogunbiyi and Ihejirika (2014) and Oladele, Amos and Adedeji (2017) signify that banks profitability is a subject of interest rates and confirmed by Bikker and Vervliet (2017) and Malik, Khan, Khan and Khan (2014) who holds that low interest rates affects banks profitability in the United States and Pakistan respectively; this therefore constitute more reasons to ascertain the role of lending and deposit rates on DMBs' profitability in the selected developing African economies.

Also, in the literature most studies did not use the nexus of risk premium on lending rate, interest rate spread in Okoye and Eze (2013), Obamuyi (2013), Malik, Khan, Khan and Khan (2014), Ndubuaku, Ifeanyi, Nze and Onyemere (2017) and Bikker and Vervliet (2017); thus, the incorporation of the nexus of risk premium on lending rate and interest rate spread on DMBs credit in the selected developing African economies in Nigeria and South Africa.It therefore becomes very important to study the relationship between interest rates and DMBs credit ratio.

II. Review of Related Literature

Commercial banks are highly leveraged organizations, relying mainly on debt (principal deposits) to support their assets. Their functionalities have proven to respond to the fluctuation of interest rates. This fluctuations in interest rates are deliberate efforts of the monetary policy of economies and reforms of different banking system to address growing needs in the deposit money banks' immediate economy and the larger global economy to boost economic directions. The economies of interest in Nigeria and South Africa's financial development further buttress the position of banking to improve economic situations as influenced by interest rates components. This interest components are however controlled and discussed thus;

Interest Rate Regime in Nigeria

Nigeria's interest rate regime like any developing country has evolved over the years in consonance with the economic situation of the country. The countryhas undergone two different interest rate regimes till date. These are the controlled or fixed regime and deregulated or liberalized regimes.

Controlled Regime: Before the inception of financial liberalization in 1986, the level and structure of interest rates were fixed by the monetary authority. At that time both deposit and lending rates were controlled by the CBN with the aim of: achieving social optimum resource allocation; engendering a systematic development of the financial sector; curbing inflation and reducing the burden of internal debt servicing by government. The economy was classified into preferred, less preferred and others, for purposes of lending. The monetary authority employed direct tools such as credit ceilings and controls; administration of interest and exchange rates; as well as special deposits and cash reserve requirements to achieve price stability and allocate financial resources to the preferred sectors of the economy such as agriculture and manufacturing at concessionary interest rates. The policy regime produced adverse consequences with nominal interest rates dropping to their lowest level before 1986. The fixed interest rates trailed inflation rate, resulting in negative real interest rate which caused financial disintermediation proven by low level of investment, savings and growth coupled with misallocation of resources. Therefore, the interest rate policy objective of improving investment and growth in the real sector was not achieved(CBN, 2016).

Deregulated Regime: The general framework of deregulating the economy under the Structural Adjustment Program (SAP), the CBN introduced a market-based interest rate policy in August 1987. The deregulation of interest rates allowed banks to determine their deposit and lending rates according to market conditions through negotiations with their customers. However, the minimum rediscount rate (MRR) which influences other interest rates continued to be determined by the CBN in line with changes in overall economic conditions.In December 2006, the CBN introduced a new monetary policy implementation framework - with the MPR as the anchor rate. The aim was to achieve a stable value for the domestic currency through short-term interest rates stability, price stability, and efficient transactions in the inter-bank money market as well as stability of other DMBs interest rates.

Nigerian Banking Reform

Banking reform in Nigeria date back to 1892 when the African Banking Corporation and British West Africa, now First Bank of Nigeria, were established in Nigeria. Different banks both foreign and domestic banks emerged over time and these evolvement across history line had necessitated different policies, reforms, enactments, e.t.c. However, the most recent reform in Nigeria are;

Banking reform of 2004 and its effect

This reform focus on bank consolidation through the mechanism of merger and acquisition. This resulted in rebasing of commercial banks from N2billion to N25billion, while the number of existing 89 Commercial banks to 25 in the country. The apex bank apart from capitalization also invested in banking

automation which enhances banking returns. The reform established a reporting portal for bank customers for the purpose of information sharing. Under this reform, deposit from public sectors and government own agencies can be collected by the commercial banks in order to enhance their level of liquidity.

Banking Reform of 2009 and its effect

The Asset Management Corporation of Nigeria AMCON was established in 2009 by the National Assembly of Nigeria. The institution acquires non-performing loans of commercial banks. The financing of AMCON is composed of N50billion CBN fund and 0.3% of total assets of participating commercial banks. It also supports the implementation of International Financial Reporting Standards (IFRS) for global reporting compliance in term of reporting. This reform reviewed the Universal Banking Model by restricting commercial banks to only banking activities.

Interest Rate in South Africa

The South African Reserve Bank (the Bank) plays an important role in determining the level of short-term interest rates as these rates are closely related to the rates at which the Bank lends money to private-sector banks.

South Africa has a small, open economy and domestic interest rates are bound to be affected by events in other countries. If interest rates increase in one country, that country becomes relatively more attractive to international investors than other countries (assuming that the risks associated with investing in that country have not changed) and interest rates in these countries will tend to respond if outflows of capital are to be averted. South African interest rates have therefore become increasingly more sensitive to developments in both developed and emerging financial markets.

The very low saving ratio of South Africa requires relatively high interest rates. The high inflation in South Africa also contributes to high interest rates because interest rates have to be at least higher than current and expected inflation to encourage domestic saving. Inflation in South Africa is well above that in the country's main trading partners, which are typically more economically developed with more diversified sources of saving and tax revenues. It can therefore be expected that South African interest rates will also be much higher than the interest rates of those countries.

The level of interest rates in South Africa is, however, not exceptionally high in comparison with most of the other emerging economies. Prospects for lower interest rates depend onthe maintenance or tightening of discipline in public sector finances;slower growth in bank credit extension and the money supply;a stronger national saving effort;an improvement in the current account of the balance of payments and the level of foreign reserves;relative strength of the currency vis-à-vis other currencies;declines in the rate of inflation; andthe level of interest rates and inflation in other parts of the world.

Attempts to manipulate the general level of interest rates, or any specific interest rate in the financial markets, could easily have an adverse effect on the total amount of funds available and on the allocation of such funds between various potential users. Such distortions could eventually curb total economic growth, which would have a negative effect on all the people in the country (Reserve Bank, 2007).

This study is anchored on the Efficiency Structure and Portfolio theory which assume that bank credit capacity cum performance is influence by internal efficiencies and managerial decisions of monetary policy (interest rates components).

Empirical Review

The empirical review on previous work carried out by researchers to buttress the position of discussion of findings of different researchers are arranged in table form to identify with the different tools and variables used in their studies. These reviews are presented thus;

Authors & Year	Title	Methodology	Variables	Findings
Timsina, N. (2017)	Determinants of Bank Lending in Nepal	Ordinary Least Square regression approach	Dep: PVCT Ind: DEP, IR, CRR, LR, GDP, EXR, INF	The study discovered that Gross Domestic Product and liquidity ratio of banks have the greatest impacts on their lending behavior. Granger Causality Test shows the evidence of unidirectional casual relationship from GDP to private sector credit.
Khan, W. A. & Sattar, A. (2014).	Impact of Interest Rate Changes on the Profitability of four Major Commercial Banks in Pakistan.	Pearson correlation method	Dep: Banks Profitability Ind: Interest rate	The study revealed that there is strong and positive correlation between interest rate and commercial banks" profitability.
Mukhtarov, S., Yuksel, S. & Mammadov, E.	Factors That increase credit risk of Azerbaijan Banks.	Panel Logit Methodology	Dep: Total Assets Ind: DIR, EXR, UR, GDPR, INFR	The study showed that decrease in the capital adequacy ratio, interest rate and total assets leads to increasing credit risk.

(2018).				
Ayodele, C. J. (2014).	Effects of monetary policy on the commercial banks' lending in Nigeria.	Vector Error Correction Mechanism and Ordinary Least Square econometric technique	Dep: CBLA, Ind: EXR, INTR, LR, M2	The findings revealed that exchange rate and interest significantly influenced commercial banks' lending, while liquidity ratio and money supply exert negative effect on commercial banks' loan and advances.
Ahmed, A., Rehan, R., Chhapra, I. U. & Supro, S. (2018).	Interest rates and Financial Performance of banks in Pakistan.	Correlation and Regression analysis	Dep: ROA, ROE, EPS Ind: INT, DWOB, ADV, INV	The result shows that deposits with other banks and interest rate are negatively affecting the profitability of banks, while advances and loans and investment are having positive influence over profitability of banks.
Olokoyo, F. O. (2011).	Determinants of Commercial Banks' Lending Behavior in Nigeria.	OLS Regression Analysis	LOA, VD, LP, LR, RR, LR	The model was found to be significant and its estimators turned out as expected and it was discovered that commercial banks deposits have the greatest impacts on their lending behaviour.
Onyango, P. O. (2015).	The Relationship Between Loan Duration and Interest Rates for Commercial Banks in Kenya.	regression model	Dep: Loan duration Ind: Lending interest rate	The study found that there exists a positive relationship between the lending interest rate and average loan duration. This implies that an increase in lending interest rate in months results to a decrease in average loan duration and vice versa. It found that increase in regulatory framework results to an increase in average loan duration
Mazreku, I., Morina, F., Misiri, V., Spiteri, J. V. & Grima, S. (2018).	Determinants of the Level of Non-Performing Loans in Commercial Banks of Transition Countries.	Fixed and Random Effects Models and Arellano-Bond Dynamic Panel estimation	Dep: NPL Ind: GDP, INF, U, EG	Findings show that GDP growth and inflation are both negatively and significantly correlated with the level of NPLs, while unemployment is positively-related to NPLs.
Ojeaga, P. & Odejimi, O. (2014).	The Impact of Interest Rate on Bank Deposit: Evidence from the Nigerian Banking Sector.	Quantile regression estimation method	Dep: CBL Ind: AI, CL, LRS, CBMP,	The study find that interest rates were probably increasing bank deposits while income was also found to affect bank deposits in general.
Bhattarai, Y. R. (2015).	Determinants of Lending Interest Rates of Nepalese Commercial Banks.	pooled OLS model, fixed effects model and random effects model	Dep: LR Ind: OCTAR, DIR, ROA, DR	The estimated results of these three regression models reveal that operating costs to total assets ratio, profitability (ROA) and default risk have significant positive impact on the commercial bank lending rate.
Nguyen, T. N., Vu, N. H., & Le, H. T. (2017).	Impacts of Monetary Policy on Commercial Banks' Profits: The Case of Vietnam.	Panel regression model	Dep: PROFIT Ind: RRR, DIS, MB	The results show that there is a positive relationship between banks' profits and monetary policies.
Eke, F. A., Eke, I. C. & Inyang, O. G. (2015).	Interest Rate and Commercial Banks' Lending Operations in Nigeria: A Structural Break Analysis Using Chow Test.	The Chow test	Dep: CBL Ind.: IntR InfR, MPR	The empirical result obtained for the interest rate regulation era showed that interest rate spread and statutory liquidity ratio had negative and significant effect on the volume of commercial banks' loans, while fixed exchange rate had negative and insignificant impact on banks' loans and advances. It was found that Monetary Policy Rate (MPR) and inflation rate exert a positive and significant impact on banks' loans for the period.
Onodugo, I. C., Okoro, O. E. U., Amujiri, B. A. & Onodugo, A. V. (2015)	Impact of Monetary Policy regimes on performance of commercial banks in Nigeria	Regression and Pearson product moment correction technique	Ind: MPR Dep: TAV, DM, LA, CPS	The study discovered that monetary policy Regimes During SAP period did not have significant impact on the TAV, DM, LA & Credit to the Private Sector. However, monetary policy Regimes post SAP period did have significant impact on the TAV, DM, LA & Credit to the Private Sector
Ghasemi, A. & Rostami, M. (2015).	Determinants of interest rate spread in banking industry.	Multiple Regression analysis	Dep: ROA Ind.: NPLR, RDDD, NII, IAA, CAR, InfR, EXR	the results show that despite the effect of inflation and exchange rate on spread rate's banks is slight, but the relationship between them is significant.
Altavilla, C., Boucinha, M. & Peydró, J. L. (2017).	Monetary policy and bank profitability in a low interest rate environment.	VECM	Dep: ROA Ind.: GDPr, STR, Inf, default R	The analysis indicates that the main components of bank profitability are asymmetrically affected by accommodative monetary conditions, with a positive impact

				on loan loss provisions and non-interest income largely offsetting the negative one on net interest income.
Kimutai, C. J. & Jagongo, A. (2013).	Factors Influencing Credit Rationing by Commercial Banks in Kenya	Descriptive research design		The study established that the key factors that influenced credit rationing by commercial banks in Kenya are loan characteristics, firm characteristics and observable characteristics.
Li, F. & Zou, Y. (2014).	The Impact of Credit Risk Management on Profitability of Commercial Banks: A Study of Europe	Ordinary Least Squares (OLS).	Dep: ROE & ROA Ind.: NPLR and CAR	The findings reveal that credit risk management does have positive effects on profitability of commercial banks. Between the two proxies of credit risk management, NPLR has a significant effect on the both ROE and ROA while CAR has an insignificant effect on both ROE and ROA.
Stijn, C., Coleman, N. & Donnelly, M. (2017).	"Low-For-Long" Interest Rates and Banks' Interest Margins and Profitability: Cross-Country Evidence.	Regression Analysis	Dep: ROA Ind.: Monthly rate, Rate spread and GDPr	The study find that a one percentage point interest rate drop implies an 8 basis points lower net interest margin, with this effect greater (20 basis points) at low rates. Low rates also adversely affect bank profitability, but with more variation. And for each additional year of "low for long", margins and profitability fall by another 9 and 6 basis points, respectively.
Murty, A. V. N. & Chowdary, R. E. (2018).	Effective of Interest Rates Changes on Profitability of Banking Industry in India (An Empirical Research on the Profitability Performance of Nationalized Banks in India)	OLS	Ind.: ROA, ROCE, ROE Dep: Intr	The Results During the Period of the study supported in case of some Years And didn't support in case of Some Years At 0.05% level of Significance.
Itimu, S. M. & Abdul, F. (2018).	Determinants of Average Lending Rates among selected Commercial Banks in Kenya	Correlation and multiple regression analysis	Dep: Reference Rate and Central Bank Rate Ind.:	Credit information sharing as one of the recent banking developments this study found out it does determine average lending rates charged by commercial banks in Kenya as credit scores of borrowers on which lending rates to individuals are premised are based on credit information shared among financial institutions.
Nguyen, T., Tripe, D. & Ngo, T. (2018).	Operational Efficiency of Bank Loans and Deposits: A Case Study of Vietnamese Banking System	Corrected Ordinary Least Squares (COLS); Three-Stage Least Squares (3SLS)	Dep: LOAN, Deposit Ind.: TA, LOA, DOL, BRANCH, ILL, LR, UNEMP	Our findings suggest that, in an underdeveloped banking system such as Vietnam, bank deposits have a positive and significant impact on bank loans, but the reverse relationship is not significant.
Messai, A. S. & Jouini, F. (2013).	Micro and Macro Determinants of Non-Performing Loans.	Panel data analysis	Dep: LLR/TL Ind.: GDPgr, UR, RIR	we found the problem loans vary negatively with the growth rate of GDP, the profitability of banks' assets and positively with the unemployment rate, the loan loss reserves to total loans and the real interest rate.
Bikker, J. & Vervliet, T. (2017)	Bank profitability and risk-taking under low interest rates	dynamic and static modeling approaches and various estimation techniques,	Ind.: *TCR, PCL* Dep: *Profit, ROE, ROA, NIM*	we find that the low interest rate environment indeed impairs bank performance and compresses net interest margins.
Beutler, T., Bichsel, R.,Bruhin, A. & Danton, J. (2017).	The Impact of Interest Rate Risk on Bank Lending	Multiple Regression Analysis	Dep: LGR Ind.: NIR, LTR, STR, LR, CPI	First, the impact of an interest rate shock on bank lending significantly depends on the individual exposure to interest rate risk. The higher a bank's exposure to interest rate risk, the higher the impact of an interest rate shock on its lending. Second, bank lending appears to be mainly driven by capital rather than liquidity, suggesting that a higher capitalized banking system can better shield its creditors from shocks in interest rates.

Total capital ratio (TCR), Credit loss provisions to total loans ratio (PCL), Return on equity (ROE), Net interest margin (NIM), Total assets (TA), the ratio of loans to customers to total assets (LOA), the ratio of deposits from customers to total liabilities (DOL), the number of branches a bank has (BRANCH), the ratio of deposits and borrowings from other credit institutions to total liabilities (ILL), the lending rate (LR), the unemployment rate (UNEMP), rate of growth of GDP (GDPgr), unemployment rate (UR), Real Interest rate (RIR), Return On Capital Employed (ROCE), NPL ratio, ratio of demand deposits on deposits, non-interest income, and interest assets to assets, capital adequacy ratio, ROA ratio, commercial banks' lending (CBL), Monetary base (MB), discount rate (DIS) and required reserve ratio (RRR), Profit before tax (PROFIT), operating cost to total assets ratio (OCTAR), deposit interest rate (DIR), default risk (DR), Average Income (AI), Commercial Lending (Cl), Legal Rights Strength (LRS), Central Bank Monetary Policy (CBMP), Commercial Bank Losses (CBL), Gross Domestic Product (GDP growth), inflation (INF), export growth (EG), non-performing loans (NPL), Exchange Rate (EXR), liquidity ratio (LR), money supply (M2), commercial bank loan and Advances (CBLA), deposits with other banks (DWOB), advances and loans (ADV),Investment (INV), earnings per share (EPS), volume of deposits (VD), investment portfolio (IP), cash reserve requirements ratio (CRR), private sector credit (PVCT), deposits (DEP).

III. Methodology

The study employed *ex-post facto* research design which sourced data from World Bank Data base, and Knoema. The study covers the period of 29 years from 1991 to 2018 for Nigeria and South Africa. The study adapted and modified the study of Beutler, Bichsel, Bruhin and Danton (2017) study on interest rates and bank lending. Their equation is stated thus;

$LGR = \beta 0 + \beta_1 NIR + \beta_2 LTR + \beta_3 STR + \beta_4 LR + \beta_5 CPI + et$ ……(i) (Beutler, Bichsel, Bruhin & Danton, 2017)

Where; LGR = Loan Growth Rate, NIR = Nominal Interest Rate, LTR = Long term rate, STR = Short Term Rate, LR = Liquidity Ratio, CPI = inflation rate.

However, our study is country specific as thus the modified model is stated as follows;

RBCD = f(RPL, IRS, RIR, DIR, LIR) …….. (1)

The mathematical form is stated thus;

$RBCD = b_0 + b_1 RPL + b_2 IRS + b_3 RIR + b_4 DIR + b_5 LIR + U$ ……. Equation 1

Where; RBCD = Rate of Bank Credit to the Domestic economy, RPL = Risk Premium on Lending Rate, IRS = Interest Rate Spread, RIR = Real Interest Rate, DIR= Deposit Interest Rate, LIR = Lending Interest Rate, b_0 = Constant, b_0 = Intercept and U = Error Term.

Presentation and Analysis of Results

This study is analyzed by looking at the stationarity position of the study of the individual country before testing for the long run cointegration tests and conducting the ARDL regression model for the two countries compared.

Table 1: Unit Root Tests for Nigeria Data

Variables	ADF Test Statistics	Critical Values @5%	P-value	Order of Integration
LIR	-3.702367	-3.587527	0.0396	**I(0)**
IRS	-3.831286	-2.976263	0.0073	**I(0)**
DIR	-6.109615	-2.981038	0.0000	**I(1)**
RIR	-3.660259	-3.587527	0.0431	**I(0)**
RPL	-3.549655	-2.976263	0.0142	**1(0)**
DCBS	-4.391506	-2.981038	0.0020	**1(1)**

Source: Researcher's E-view 9.5 Computation

Table 1 reports the tests for stationarity properties of the series following the Augmented Dickey Fuller (ADF) statistics. All the variables were found to be stationary at level except DIR and DCBS which are stationary at order one (1). At both the level and first difference as reported, the ADF Statistics for all the respective variables were all negative as the critical values at 5% significance level. The reported P-values were all less than 0.05 chosen level of significance for which cause, the Null Hypothesis of the presence of unit root in all the variables are convincingly rejected. Due to the presence of mixed stationarity position the regression for Nigeria will be subjected to ARDL regression model.

Table 2: Unit Root Tests for South Africa Data

Variables	ADF Test Statistics	Critical Values @5%	P-value	Order of Integration
LIR	-3.884511	-2.981038	0.0067	**I(I)**
IRS	-4.690061	-3.587527	0.0045	**I(0)**
DIR	-3.770471	-2.981038	0.0087	**I(1)**
RIR	-6.080649	-2.981038	0.0000	**I(I)**
RPL	-5.695113	-3.587527	0.0004	**1(0)**

DCBS	-6.865242	-2.981038	0.0000	**1(1)**

Source: Researcher's E-view 10.0 Computation

Table 2 reports the tests for stationarity properties of the series following the Augmented Dickey Fuller (ADF) statistics. The variables were found to be stationary at level for IRS and RPL except LIR, DIR, RIR and DCBS which are stationary at order one (1). At both the level and first difference as reported, the ADF Statistics for all the respective variables were all negative as the critical values at 5% significance level. The reported P-values were all less than 0.05 chosen level of significance for which cause, the Null Hypothesis of the presence of unit root in all the variables are convincingly rejected. Due to the presence of mixed stationarity position the regression for South Africa will be subjected to ARDL regression model.

Tests for Cointegration

This looks at the ARDL co-integration method which test for the existence of long-run equilibrium relationship before we can proceed with ARDL regression analysis.

i.) Individual Country Cointegration Tests

Table 3: ARDL Cointegration Test Result for Nigeria @ 5% level

ARDL Long Run Form and Bounds Test				
Dependent Variable: D(DCBS)				
F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	1.547763	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Actual Sample Size	27		Finite Sample: n=35	
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419
			Finite Sample: n=30	
		10%	2.407	3.517
		5%	2.91	4.193
		1%	4.134	5.761

Source: Researcher's E-view 10.0 Computation

The results of the ARDL bounds testing approach as shown in table 3 indicated that the F-statistic with a coefficient of 1.547763 is less than the lower bound value 2.39 and upper bound value of 3.38 at 5% level of confidence. Thus, no level of long run relationship was established in the study for Nigeria. This is also evidenced in the case 2 of the table 3. However, none of the variables have significant t-bound distributional relationship. Therefore, the empirical findings provide that there is no long run relationship between interest rate components and ratio bank credit to domestic economy of Nigeria.

Table 4: ARDL Co-integration Test Result for South Africa @ 5% level

ARDL Long Run Form and Bounds Test				
Dependent Variable: D(DCBS)				
F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	4.241953	10%	2.08	3
K	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Actual Sample Size	27		Finite Sample: n=35	
		10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419
			Finite Sample: n=30	

10%	2.407	3.517
5%	2.91	4.193
1%	4.134	5.761

Source: Researcher's E-view 10.0 Computation

The results of the ARDL bounds testing approach as shown in table 4 indicated that the F-statistic with a coefficient of 4.241953 is greater than the lower bound value 2.39 and upper bound value of 3.38 at 5% level of confidence. Thus, long run relationship was established in the study for South Africa. This is also evidenced in the case 2 of the table 4. However, DIR, IRS and LIR with t-statistics with p-value of 2.697100 (0.0159), 2.750211 (0.0142) and -2.840244 (0.0118) have significant t-bound distributional relationship at significance level which is less than the confidence/significance of the study which is also higher the lower bound test. Therefore, the empirical findings provide that there is long run relationship between interest rate components and ratio bank credit to domestic economy of South Africa.

Test of Hypotheses

In testing for the comparative hypotheses, we proceeded to test the data for each country in the study area, to ascertain what the individual country result before comparism;

Test of Hypothesis – Individual Country Output

Table 5: ARDL Regression Result for Nigeria – Model 1

Dependent Variable: DCBS				
Method: ARDL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DCBS(-1)	0.924045	0.130356	7.088636	0.0000
DIR	-30.57307	232.5152	-0.131488	0.8967
IRS	-31.17593	232.6380	-0.134010	0.8947
LIR	30.97261	232.5286	0.133199	0.8954
RIR	0.212201	0.083912	2.528849	0.0200
RPL	0.131902	0.308121	0.428086	0.6732
C	-2.956831	6.898781	-0.428602	0.6728
R-squared	0.722535	Mean dependent var		16.13704
Adjusted R-squared	0.639295	S.D. dependent var		6.536769
S.E. of regression	3.925899	Akaike info criterion		5.791482
Sum squared resid	308.2537	Schwarz criterion		6.127440
Log likelihood	-71.18501	Hannan-Quinn criter.		5.891380
F-statistic	8.680180	Durbin-Watson stat		1.709457
Prob(F-statistic)	0.000100			

Source: Researcher's E-view 10.0 Computation

In table 5, the R^2 and Adjusted R^2 both showed 72.25% and 63.93% respectively. This shows that the chosen regression model best fits the data. Hence, the goodness of fit regression model is 72.25% and implies that chosen explanatory variables explain variations in the dependent variables to the tune of 72.25%. Also, with a high Adjusted R^2 (63.93%) implies that the model can take on more variables conveniently without the R^2 falling beyond 63.93%, which is very commendable. F-statistics of 8.680180 is considered very good being positive and significantly large enough and it shows that there is significant positive relationship between the dependent and explanatory variables. The overall probability (F-statistics) of 0.0000 is rightly signed and very significant and displays a Durbin-Watson of 1.709457 is considered good as it shows absence of autocorrelation on the chosen data.

Hence, from the table 5, the Nigeria LIR, DIR, IRS and RPL have t-statistics value of 0.1331999, -0.131488, -0.1134010 and 0.428086with p-values of 0.8954, 0.8967, 0.8947 and 0.6732 were found to have both positive and negatively insignificant relationship and impact on domestic credit provided by the banking sector (DCBS) and this impact is statistically insignificant at 5% level since its p-value is well above 0.05. while only showing the presence of only one positive and significant relationship in RIR with t-statistics of 2.528849 and p-values of 0.0200.Hence, we accept the null hypothesis that there is no significant relationship between interest rates components and domestic credit provided by the banking sector in Nigeria This shows that the past level of interest rates components in Nigeria insignificantly impact domestic credit provided by the banking sector (DCBS).

Table 6: ARDL Regression Result for South Africa

Dependent Variable: DCBS				
Method: ARDL				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
DCBS(-1)	0.322702	0.139359	2.315613	0.0342
DIR	49.47284	22.61155	2.187946	0.0439
DIR(-1)	35.75971	19.42686	1.840736	0.0843
IRS	46.22422	25.07425	1.843494	0.0839
IRS(-1)	50.60181	23.55414	2.148319	0.0473
LIR	-52.85446	22.14846	-2.386371	0.0297
LIR(-1)	-36.64594	19.79892	-1.850906	0.0827
RIR	2.084179	1.107385	1.882073	0.0781
RPL	9.064531	10.71079	0.846299	0.4099
RPL(-1)	-21.28938	9.470461	-2.247977	0.0390
C	158.8592	32.99867	4.814109	0.0002
R-squared	0.923351	Mean dependent var		163.6000
Adjusted R-squared	0.875445	S.D. dependent var		23.12193
S.E. of regression	8.160268	Akaike info criterion		7.327998
Sum squared resid	1065.440	Schwarz criterion		7.855931
Log likelihood	-87.92797	Hannan-Quinn criter.		7.484980
F-statistic	19.27434	Durbin-Watson stat		2.231576
Prob(F-statistic)	0.000000			

Source: Researcher's E-view 10.0 Computation

The result in table 6 shows R^2 and Adjusted R^2 of 92.34% and 87.54% respectively. This shows that the chosen regression model best fits the data. Hence, the goodness of fit regression model is 92.34% and implies that chosen explanatory variables explain variations in the dependent variables to the tune of 92.349%. Also, with a high Adjusted R^2 (87.54%) implies that the model can take on more variables conveniently without the R^2 falling beyond 92.34%. F-statistics of 19.27 is considered acceptable being positive and it shows that there is significant positive relationship between the dependent and explanatory variables. The overall probability (F-statistics) of 0.00000 is rightly signed and very significant and displays a Durbin-Watson of 2.231576, showing absence of the presence of autocorrelation on the chosen data.

Hence, the ARDL regression from table 6 show the South Africa's interest rates components in DIR, IRS(-1), LIR, RPL(-1) have a t-statistics value of 2.187946, 2.148319, -2.386371and -2.28938 with p-values of 0.0439, 0.0473, 0.0297 and 0.0390respectively were found to have both positive and negative relationship with domestic credit provided by the banking sector (DCBS) and this relationship is statistically significant at 5% level since its p-value is well below 0.05. The lagged period of IRS, LIR and RPL all show both positive and negative relationship with significant impact on domestic credit provided by the banking sector (DCBS). Showing that adjustment in the components of IRS, LIR and RPL by -1 year will still impact on domestic credit provided by the banking sector (DCBS) both positively and negatively respectively. Therefore, we reject the null hypothesis thereby accepting the alternative that interest rates components improve domestic credit provided by the banking sector (DCBS) in South Africa. It shows that past levels of interest rates components have both positive and negative significant relationship with domestic credit provided by the banking sector (DCBS) in South Africa.

Comparative Result, Conclusion and Recommendation

This study examined the relationship between interest rates and DMBs credits, evidence from a comparative in Nigeria and South Africa, selected developing African economies from 1991 to 2018. The study revealed that out of the five interest rates components considered for Nigeria and South Africa, only one interest rate variable in RIR with t-statistics of 2.528849 and p-values of 0.0200 was able to facilitate improved domestic credit provided by the banking sector in Nigeria. While, four (4) interest rates components in DIR, IRS(-1), LIR, RPL(-1) have a t-statistics value of 2.187946, 2.148319, -2.386371and -2.28938 with p-values of 0.0439, 0.0473, 0.0297 and 0.0390 respectively were able to necessitate the change in domestic credit provided by the banking sector in South Africa. This result proves that past level of interest rates components in Nigeria does not influence credit facilitation of banking sector within the economy while the South African past level of interest rates components necessitated the improvement of credit facilitation of banking sector. Hence, the study revealed the efficiency of interest rates components in South Africa while proving that interest rate components in Nigeria is less efficient to improve domestic credit creation by the banking sector within the economy.

This study's results reveal that interest rate components had no long run and short run relationship with DMBs domestic credit facilitation in Nigeria while showing both long run and short run relationship between interest

rates components with DMBs domestic credit facilitation in South Africa. Hence, the study conclude that interest rates components improve the DMBs credit facilitation in South Africa while having unimpressive impact on DMBs credit facilitation in Nigeria within the period under review. Therefore, the study recommend interest rate components should further be used to strengthen the depth of credit capacity of banks as more reduced interest rate components would improve the credit capacity of banks in South Africa while the Nigeria interest rates components should drastically be reduced to exert significant impact and improve credit facilitation of DMBs.

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