
Defined Contribution Scheme and Non-Performing Loans in Nigeria

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ORCID: <https://orcid.org/0000-0003-0282-4153>¹ & <https://orcid.org/0000-0003-0863-4529>²Corresponding Author: T. A. Aderibigbe (ta.aderibigbe@acu.edu.ng)**Abstract**

Non-performing loans (NPLs) has been observed to have the capacity to decrease liquidity. However, the defined contribution scheme is replete with liquidity enhancing benefits. In view of this, this study investigated the feasibility of the defined contribution scheme (DCs) to minimizing NPLs and expanding credit supply (proxied by credit to private sector (CPS)) in Nigeria. Using the Autoregression Distributed Lag technique, the study analyzed annual time series spanning 1981 to 2023 from the Central Bank of Nigeria (2024) and the World Development Indicators (2025). The study found that defined DCs positively affect NPLs and negatively affect CPS in Nigeria. Furthermore, the findings indicated that regulatory quality (0.27%) in the previous year, liquidity ratio (0.123%) reduces NPLs in Nigeria. The result reveals that one unit increase in the previous level of control of corruption (0.48%) and regulatory quality (0.027%) will increase the current level of CPS in Nigeria in the long run. In the short run, the control of corruption (0.24%) will increase credit supply in Nigeria. Control of corruption (0.16%) and the previous level of interest rate spread (1.28%) negatively influence NPLs in the short-run. The study concludes that NPLs minimization and credit supply depends significantly on institutions and regulatory policies in Nigeria. The study recommended capacity building in financial policy formulation and implementation and transparency for NPLs minimization and credit supply expansion.

Keywords: Nonperforming Loans, credit supply, contributory pension scheme, efficiency market hypothesis, control of corruption, regulatory quality

JEL classification: E51, E58, G14, G23, G38

1. Introduction

Sequel to the Pension Reform Act of 2004 which changed the standard pension model in Nigeria from defined benefit schemes to defined contribution schemes (Ekpulu & Bingilar, 2016), extant studies such as Ilo *et al.*, (2024) and Asekunowo (2009), have examined and attested to the financial deepening benefit erupting from the defined contribution scheme (funded or pension scheme hereafter). These benefits include long-term investment horizon and predictable cash flows, the large pool of retirement savings translate-able into increased credit and loan supply, increased investment in capital market securities, cost effective management of national debts (Global Financial Stability, 2025; Oyerinde *et al.*, 2025; Ngerebo-A & Dogo, 2025; Odili *et al.*, 2023; Abdul & Jacob, 2023) and consequently increased retirement income (Adetunji & Gumede, 2025) for mitigating old-age poverty.

Following these benefits is the creation of new large pools of funds needing active management (Ekpulu & Bingilar, 2016). For instance, in Nigeria, pension funds grew from N2.9 trillion in 2012 to N14.9 trillion in 2022 (PENCOM, 2022 as cited in Ngerebo-A & Dogo, 2025). However, the scantiness of investment opportunities has rendered the funds idle (Iwegbu, 2020). In the light of the investment limitation facing the pool of funds, there is the need to explore more opportunities to the use of pension funds to prevent idle cash balances. Furtherance to the quest for active use of these funds is the need for risk surveillance, supervision, and transparency measures, due to the fact that the contributory funded scheme in Nigeria has been largely undermined by corrupt practices in terms of delay in the remittance of both employers and employees' contributions, inadequate infrastructure, and limited institutional capacity building, training, and development which are crucial for effective implementation of the contributory funded scheme (Obeta *et al.*, 2024).

Beyond the financial deepening benefits, the search for new investment opportunities, and the consequent need for regulatory mechanisms, lies the need for a thorough appraisal of new opportunities derivable from existing uses. Within the financial deepening benefits framework, the problem of limited investment outlets expressly discourages investment in capital markets as

Iwegbu (2020) noted that the Nigerian pension fund portfolio only cover thirteen (13) investment channels. Additionally, the sustainability of the liquid nature of the pension fund precludes investment in illiquid assets which are sunk in nature. As per the fiscal use of the inactive funds to preventing high interest and foreign loans only national goals are satisfied but at individual level interest and preferences differ with respect to the use of funds. Considering increased credit and loan supply, both the government, firm, and household can independently decide the use of the funds to satisfy differing goals. Hence the active use of the funds to boost credit and loan supply.

Credit and loan supply are the primary sources of generating income for banks. This is due to the fact that the interest earned by banks on loans are by default significantly higher than the interest paid to depositors. In Nigeria for instance, available statistics show that the lending rate exceeded the deposit rate by 6.2% in 2023 and increased to 19% in 2025 (WDI, 2025). Loans are easily supplied than recovered, requiring proficiency in the recovery process. However, when they are not recovered, the impact is often disastrous to the bank as it leads to illiquidity, insolvency, and distress or even outright liquidation (Ughulu & Odion, 2023). Credit and loan supply expose banks to credit risk that usually bring about nonperforming loans (NPLs). For these reasons, banks focus on credit risk management which provokes banks to shift from lending to the private businesses to safer investments like government securities to mitigate NPLs and consequently improve profitability. Within the realm of credit risk management, NPLs serve a key metric for assessing a bank's asset quality and credit risk (Ijuwo, 2024).

The prevalence of NPLs pose several critical challenges and issues that need to be addressed such as financial stability and profitability, capital adequacy, liquidity management, regulatory compliance, customer confidence, economic implications, operational efficiency (Biyanwila & Dissanayake, 2023). NPLs are unrecoverable amounts of loan that do not generate interest income and consequently jeopardize bank's ability to meet depositors' withdrawal needs timely (Eniafe, 2020). When a loan becomes non-performing, it stops generating income for the lender, meaning that any profits generated from lending activity are reduced. This can reduce the amount of capital available to make new loans, which in turn reduces the potential return on assets (ROA).

Additionally, when borrowers fail to repay their loans, lenders must set aside additional money as provisions against losses (Salihu et al., 2023). This additional money set aside refers to LLPs.

NPLs render financial institutions insolvent and ultimately upset the whole economy. These occur in the absence of effective monitoring of NPLs below the 5% threshold (Duruechi, *et al.*, 2022). NPLs impedes access to extendable loans by forcing banks to limit loan granting to businesses or individuals with proven low credit risks. NPLs weakens revenue generating capacity of money lending firms and capacity to efficiently serve her depositors, and increases loan loss provisions (LLPs) of banks which limits funds that ought to be made available for income generating businesses (Adeleke *et al.*, 2022). NPLs force banks to tighten credit supply and raise lending rates to offset credit losses, also pushes credit reliant investors to postpone investment decisions and plans (IMF, 2021). Huge NPLs negatively affect the level of private investment, increase deposit liabilities and constrain the scope of bank credit to the private sector. Also, they can negatively affect private consumption which may lead to economic contraction (Isa & Isa, 2021). To mitigate the adverse effects of NPLs, it salient to research into measures for minimizing NPLs.

The severity of NPL adversities call for the minimization of the menace to reduce and or recover potential and actual loan cum income losses respectively. In Nigeria, the Assets Management Cooperation of Nigeria (AMCON) was established to purchase NPLs from deposit money banks and recapitalize the affected banks (Isa & Isa, 2021). Legal provisions are preventive and not effective for recovery cum minimization of NPLs or loans that have gone bad. The FinTech which offers new opportunities for loan recovery and default reduction underserves the country due to barriers such as inadequate infrastructure, low financial literacy, and regulatory challenges, limited access to stable internet, electricity, and mobile networks (Sewanyina *et al.*, 2025). The CBN recommended quarterly review of loan portfolio of banks yet NPLs still remain prevalent (Adeleke et al., 2022). The CBN make use of monetary policy (Duruechi *et al.*, 2022) such as liquidity ratio, loans to deposit ratio, large exposure and reserve requirements to address issues of NPLs of banks, without paying attention to the varying magnitude or proportion of the NPLs (Atoi, 2018).

From the foregoing, it is salient to note that NPLs has the capacity to decrease liquidity while the contributory funded scheme has the capacity to increase liquidity. In the light of this observation, this study seeks to investigate the extent the liquidity capacity of the funded scheme would: (i) minimize the liquidity problem from NPLs and (ii) expand credit supply in Nigeria. Furthermore, this study seeks to investigate if the liquidity capacity of the funded scheme is feasible for minimizing NPLs and expanding credit supply in Nigeria. Scholarly efforts such as Sewanyina *et al.* (2025), Odebode *et al.* (2024), Ughulu & Odion (2023), Adeleke *et al.* (2022), examined the effect of NPLs on financial performance in Nigeria except Ijuwo (2024) which examined the effect of NPLs on credit risk management measured by loan loss provision, a close substitute for NPLs.

On NPLs minimization, Duruechi *et al.* (2022) examined the nexus between CNB regulatory policies and NPLs in Nigeria using the granger causality. The granger only captures direction of influence and not the magnitude of influence. Isa & Isa (2021) determined the effectiveness of AMCON in mitigating NPLs in Nigeria based on the analyses of trends before, during, and after the establishment of the AMCON. Trend analysis is non-empirical and a-theoretical. From the perspective of determinants of NPLs, Eli-Muade *et al.* (2017) examined the effect of bank specific and macroeconomic factors that is, loan to deposit ratio, bank size, and inflation on NPLs however, these factors are not measures for that can solve the liquidity problem of NPLs. Stemming from the understanding that the funded scheme has the capacity to increase liquidity, studies such as Ilo *et al.* (2024), Abdul & Jacob (2023), Oyedokun *et al.* (2022), Iwegbu (2020), examined the effects of the contributory funded scheme on metrics such as financial access, financial deepening, financial efficiency, economic growth, etc. These studies did not address the benefits of the funded scheme with respect to mitigating the liquidity problem of NPLs in Nigeria.

This study seeks to fill the gap of extending the liquidity benefits of the funded scheme to minimizing the liquidity problem of NPLs in Nigeria. This is churned out of the understanding that the contributory funded scheme offers contributing employees the opportunity to have increased and secured access to bank credit and loans through the use of their retirement savings account as collateral for loan recovery in the event of challenges that adversely affects their capacity to repay

loans, credits, and advances. The downside to the use of pension fund for NPLs recovery is that it may encourage contributing employees to intentional procure loans with the intention of defaulting and allowing banks to use their contribution to offset the loan. But just as the idea of banking risk that not all customers will come and request for all their savings at once then it is assumed that not all contributing employees would develop and indulge in such attitude.

This study is divided into five sections. Section one is the introduction above. Section two covers the analyses of trends of relevant indicators and the review of extant studies with respect to theories, methodology, and findings providing insight to the relation between the liquidity benefit of the funded scheme and the liquidity problem of NPLs in Nigeria. Section three details the theory providing the framework for the study, model specified, and estimation techniques. Section four analyses the empirical results and their implications. Section five concludes with policy recommendations flowing from key findings.

2. Literature Review

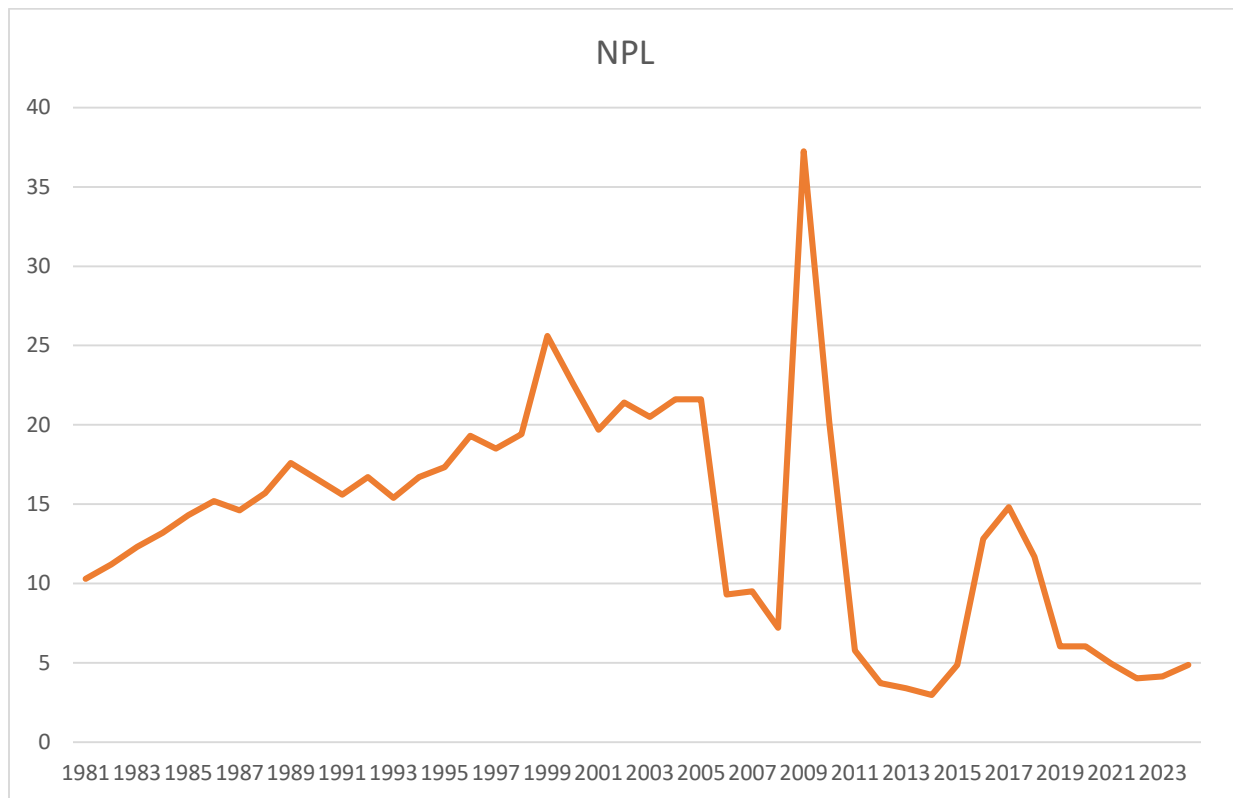
2.1 Stylized Facts

The Bases for Minimizing NPLs in Nigeria

The bases for minimizing NPLs generally stems from the variations in the NPLs proportion which simultaneously reflects the burden of loan loss provisioning, the attendant liquidity problem traceable to the trends in the level of credit and loans supplied to the private sector and the pension funds' assets in Nigeria.

The figure (1) below shows that Nigeria has been suffering from NPLs ratio beyond the 5% threshold prescribed by Duruechi et al. (2022) for a period of 36 years that is uninterruptedly from 1981 to 2011 and from 2016 to 2020, except for the periods 2012-2015 and 2021-2023 when NPLs were below 5%. This implies long periods of poor NPLs management in Nigeria. For the period 1981 to 2011, poor NPLs management in Nigeria can be traced to events such as the drastic drop in oil price of 1985, the balance of payment crisis leading to the adoption of the structural adjustment programme, global financial crisis of 2007, while for the period 2016 to 2020 the poor

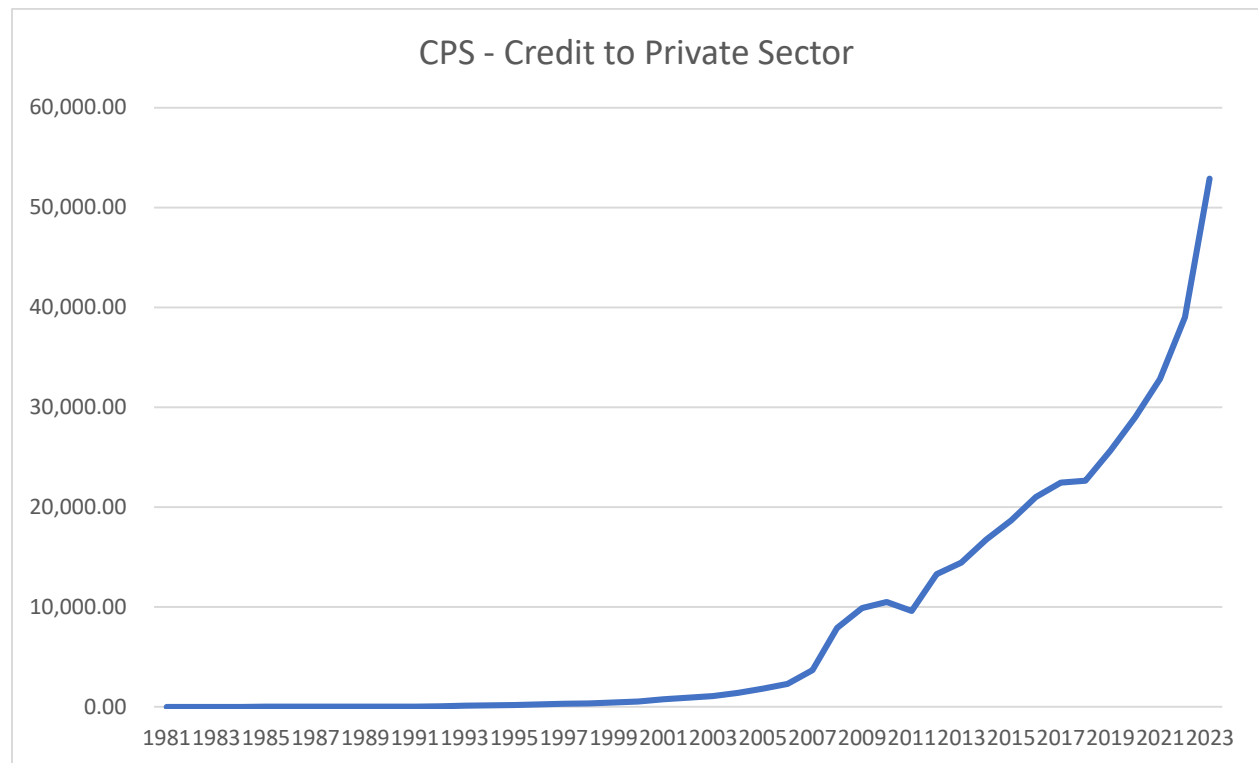
performance can be traced to the crash in global crude oil price between mid-2014 and 2015, and the COVID-19 pandemic shutdown. The periods of these poor loan recovery performances is indicative of the need for NPLs recovery, as the funds are potential loanable funds.



Source: Author's computation using data from WDI (2025)

Figure 1: Trends of Nonperforming Loans in Nigeria from 1981 to 2023

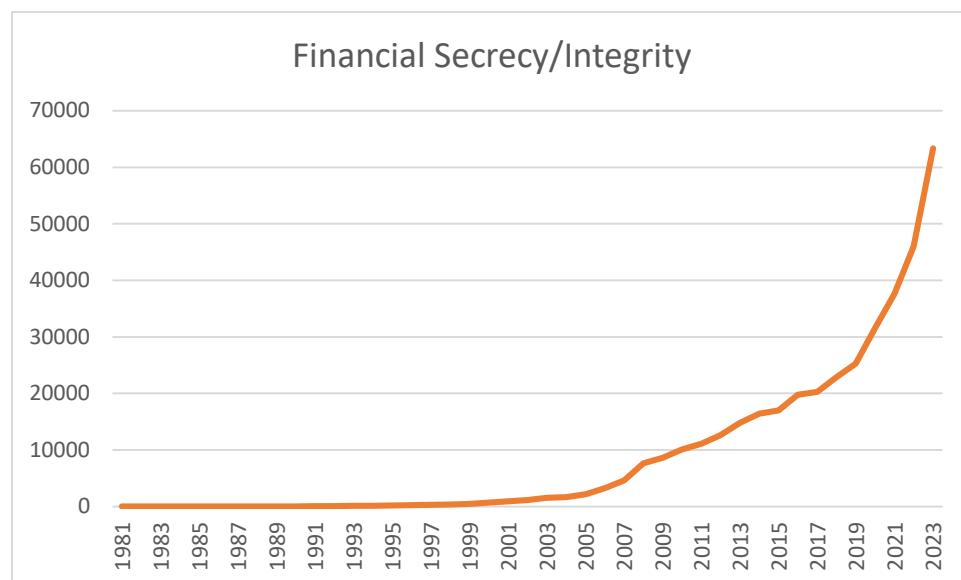
Figure 2 below shows that credit supply to the private sector by commercial bank has been rising at average rate of 24.97% from 1981 to 2023. However, the CBN statistics revealed that the credit supplied to the private sector has been contributing at a critically average low rate of 0.39% (below 1%) to Nigeria's GDP. This implies the need for exploring more opportunities for improving the share of credit supplied to the private sector in the GDP.



Source: Author's computation using data from CBN (2024)

Figure 2: Trends of Credit to Private Sector in Nigeria from 1981 to 2023

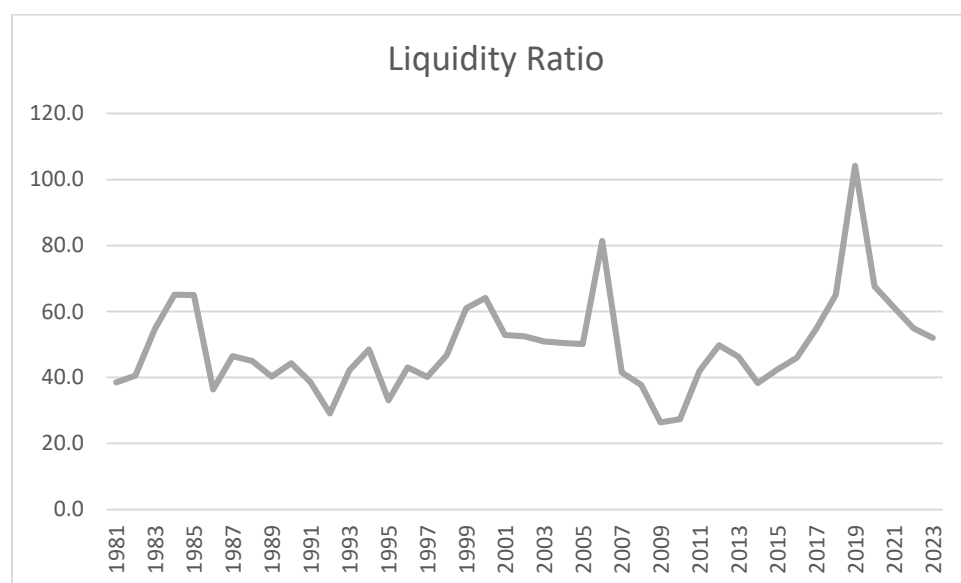
Figure 3 shows the level of financial hoarding or secrecy in Nigeria from 1981 to 2023. It is measured by subtracting the magnitude of currency in circulation from the stock of broad money supplied in Nigeria. It measures the rate at which money supplied move out of circulation unnoticed. The figure shows that the level of financial secrecy in Nigeria is on the upward trend especially from the period 2003 to 2023. Conversely, this implies that the level of financial integrity in Nigeria is drastically dwindling. Furthermore, this alludes to the attribution from Elukpo *et al.* (2017) that bank managers give out unsecured loans against the banking industry specified rules and as a result constrain credit and loan supply (Bernadus & Eswual, 2021) in Nigeria. More so, this is indicative of the effect of NPLs weakening the faith and confidence of their customers as well as their integrity (Salihu *et al.*, 2023).



Source: Author's computation using data from CBN (2024)

Figure 3: Trends of Financial Secrecy/Integrity in Nigeria from 1981 to 2023

Figure 4 shows the liquidity ratio from 1981 to 2023 in Nigeria. It shows that liquidity ratio in Nigeria has been fluctuating and it depicts high level of financial instability destabilizing credit and loan supply in Nigeria. It indicates that the use of monetary policy tools are less reliable for long term financial planning in Nigeria.

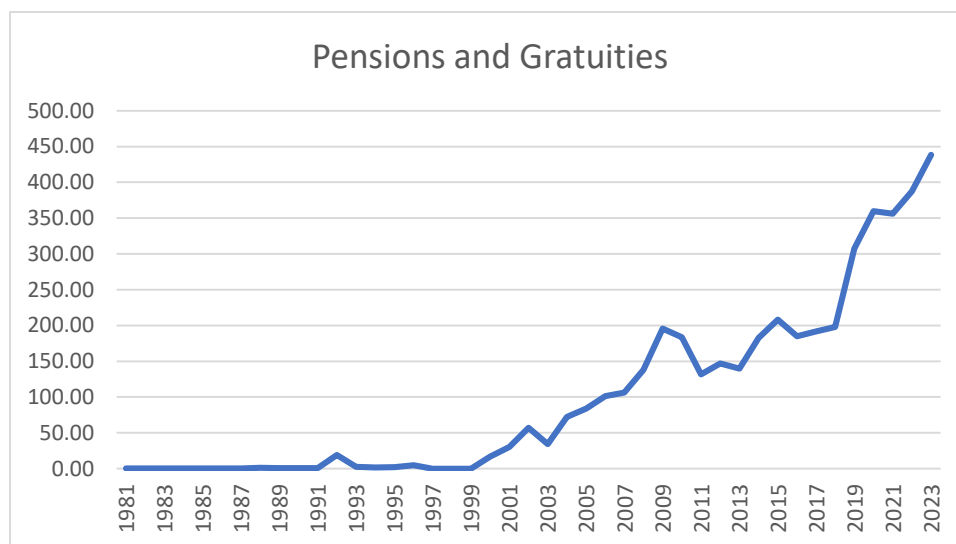


Source: Author's computation using data from CBN (2024)

Figure 4: Trends of Liquidity Ratio in Nigeria from 1981 to 2023

Rationale for the Contributory Funded Scheme

Figure 5 shows that pension contributions in Nigeria has been on the rising trend since 2001 which indicates that the country has been enjoying the creation of large pool of funds a little from the pension scheme that was in operation before the 2004 pension reform. More importantly, the trends attest to the availability of large pool of funds that require active use. This also corroborates claims from Ngerebo-A & Dogo (2025) and Ilo *et al.* (2024).



Source: Author's computation using data from CBN (2024)

Figure 5: Trends of Pensions and Gratuities in Nigeria from 1981 to 2023

2.2 Theoretical Literature Review

The determination of the theory relevant for mitigating the liquidity problem from NPLs with the liquidity benefits from the contributory funded scheme can be done by thorough examination of theories used in extant studies and conceptual analyses of the phenomena. The contributory funded scheme on one hand is simply the amount set aside either by an employer or an employee or both to ensure that at retirement, there is something for employees to fall back on as income. It is different from severance pay because the former is paid in regular instalments while the latter is paid in one lump sum (Abdul & Jacob, 2023). NPLs on the other hand are loans that have not been

serviced according to the terms of their original agreement. They may be delinquent, in arrears, or in default (Salihu et al., 2023). In the banking system in Nigeria, the Non performing loan problems consist of both old debts that are not performing and new loans that may become non-performing (Duruechi et al., 2022). In relation to extant studies, Bernadus & Eswual (2021) noted that NPLs constrains the capacity of banks to sustaining existing or supplying more loans and credit. Conversely, Oyerinde *et al.* (2025) expressed that the contributory funded scheme has the financial deepening benefit of increasing credit and loan supply. Hence the review of the theories employed in these two studies.

Oyerinde et al. (2025) adopted the Efficient Market Hypothesis (EMH) to examine the correlation between returns on investment and the performance of pension funds in Nigeria. The EMH states that for market to be efficient, all asset prices must be unpredictable and must follow a random pattern, based on publicly and privately held information (Uzonwanne, 2012). With respect to NPLs, the financial market is efficient when the magnitude of loan granted is less than that recovered but if the amount of loan recovered is less than the amount granted then there is need for efficiency measures. Based on the innovation behind the use of the contributory pension scheme for offsetting the unrecovered loan, the efficiency in the credit and loan supply market can be restored in a liberalized financial system where the cost of borrowing is determined by the forces of demand and supply. The EMH follows a random walk (Malkiel, 2003) which implies that the level of NPLs in previous years are not connected to that of today. However, the attitude of a debtor under NPLs category today can inform his or her attitude towards loan repayment tomorrow if recovery measures are not taken quickly.

Bernadus & Eswual (2021) used the Agency theory and Credit default theory to analyze the impact of risk management on NPLs. The Agency theory attempts to solve two problems which are monitoring and risks of distribution (Ilnaz & Marakova, 2020). In relation to NPLs, the problem of monitoring is based on the competence of account officers to grant loans to credit worthy customers or the competence of the loan account officers to defend the interest of the employer in the aspect of loan granting and recovery measures and be aiding and abetting customers to

collecting loans that will lead to bad debt. This theory is relevant for designing NPLs preventive measures and not the recovery of loans that have already gone bad. The Credit default theory represents a systematic understanding of the causes which directly lead to the effects which are associated with credit defaults (Sy, 2007). The credit default theory states that credit default with respect to unsecured is caused by delinquency that is evasive moves on the part of the debtor to completely avoid the repayment of loan. With respect to secured loan, credit default does arise as a result of delinquency and insolvency. This implies that weak financial power of debtors is what pushes them to evading or avoiding loan repayment. The credit default theory is only potent for modelling NPLs with respect to causal factors and not recovery measures.

2.3 Empirical Literature Review

On the bases for minimizing NPLs, Bernadus & Eswual (2021) analyzed the impact of risk management on non-performing loans in the Namibia for a five-year period and found that the Namibian banks experienced an increase throughout the period under review both in profits and NPLs and not reduction in NPLs. Ugwu *et al.* (2020) and Ajayi & Ajayi (2017) examined the effects of NPLs and credit risk management on the performance of Deposit Money Banks in Nigeria for a five-year period and found the NPLs have dire consequences for banks' profitability as measured by returns on assets. Saliu *et al.* (2020) analyzed the implications of NPLs on Nigerian deposit money banks. The study also found that an increase in the persistence of non-performing loans resulted in poor performance of Deposit Money Banks in Nigeria, and Non-Performing Loans reduced deposit money banks' return on assets. Adeleke *et al.* (2022) examined the effect of non-performing loans on the financial performance of deposit money banks in Nigeria. the regression estimates results revealed that non-performing loans measured by loans loss provision ratio (LLPR) has a negative and in-significant effect on financial performance to return on asset and equity. Nwosu *et al.* (2020) examined the extent to which non-performing loans affect commercial bank profitability. Results showed that NPLs adversely affects banks' profitability.

In addition to bank profitability metrics, Sewanyina *et al.* (2025) synthesized existing research on the causes, effects, and innovative approaches to managing NPLs in the banking sector by

reviewing 50 studies from various regions. The study revealed that NPLs drowns investor confidence and led to financial instability. Ijuwo (2024) examined the effect of non-performing loan ratio, non-performing loan to deposit ratio, leverage ratio and firm size on credit risk management in listed deposit money banks in Nigeria. Findings revealed that NPL to total deposit ratio has significant negative effect on loan loss provision ratio.

Regarding the rationale for minimizing NPLs problem with the contributory pension scheme, Sewanyina *et al.* (2025) revealed that FinTech solutions such as AI-driven credit scoring and blockchain-based loan monitoring, showed promise in reducing NPLs. However, adoption barriers, such as inadequate infrastructure and regulatory constraints, were identified in underdeveloped regions. Odili et al (2023) revealed that pension fund assets as percentage of GDP adversely influences per capita consumption in Nigeria thus suggesting alternate use for increased credit supply benefit from pension contribution. Oyerinde et al (2025) supported this suggestion that by revealing positively weak association between investment returns and pension fund performance in Nigeria. Adetunji & Gumede (2025) explored the financial stability of healthcare professional's postretirement, in Nigeria. Findings affirm the problem of financial instability necessitating alternative source of income which could have been secured during productive work life through increased access to credit provoked from increased credit supply. Duruechi et al. (2022) showed that CBN regulatory policies although influences non-performing loans by way of long run relationship has an insignificant effect on non-performing loans in Nigerian banks.

With respect to the potency of the contributory pension scheme, Ilo *et al.* (2024) reveal a positive relationship between, FGN securities, pension investments in equities, mutual funds, and financial access. This suggests that increases in these types of pension investments would likely lead to an expansion of financial access in Nigeria. Abubakar & Adekunle (2018) revealed that the pension fund contributions in Nigeria increased greatly and constituted a huge investment fund in the capital and money markets. Abdul & Jacob (2023) showed that pension funds have a significant effect on financial deepening in Nigeria. Oyedokun *et al.*, (2022) showed evidence that pension investment in equities and mutual funds have a positive relationship with financial efficiency.

Iwegbu (2020) examined the indirect effect of pension fund on economic growth in Nigeria through the financial system and found out that pension fund contribution is effective in stimulating growth through investment in portfolios that yield short term returns.

Considering mechanisms that need to be in place for effective use of the contributory pension scheme, Obeta & Edwin (2024) examined the implementation of public sector retirement policies in Nigeria, identifying the gaps and challenges that hinder effective pension administration. The study reveals that a multi-pillar pension system, robust institutional framework, and innovative funding mechanisms are essential for sustainable pension provision. Ekpulu & Bingilar (2016) examined the historical development of pension and pension fund in Nigeria. The study observed that only 89% of the total labour force in Nigeria are excluded from the Defined contribution which is attributable to the non-inclusion of the informal sector in the 2004 pension scheme. This further suggests the need for transparency measures for regulating the adverse effects of informality.

3. Methodology

3.1 Theoretical Framework

This theory is anchored to the Efficiency Market Hypothesis (EMH). Based on the EMH, NPLs is an efficiency gap problem that can be minimized or closed by the pension funds' assets of contributing debtors cum defaulters. However, it is salient to express that the effective use of funds from the pension scheme requires monitoring mechanisms such as the control of corruption and regulatory quality. Furthermore, the question of whether the use of the pension fund would suffice for significant minimization of the NPLs liquidity problem suggests the inclusion of existing measures such as the monetary policy (liquidity ratio for regulating credit supply) and digital tools (use of internet for transparency).

3.2 Model Specification

This study modifies the model specified in Oyerinde et al. (2025) that:

$$NPLs = f(CBN \text{ Monetary Policy tools})$$

1

With the offsetting effect of the Pension funds, the consideration for monitoring or governance mechanisms, and transparency measure, equation 1 is expanded to become:

$$NPLs = f(CBN \text{ Monetary Policy tools}, \text{ Pension Fund Asset}, \text{ Governance Mechanism}, \text{ Transparency}) \quad 2$$

In explicit form equation 2 is specified thus as:

$$NPLs = b_0 + b_1LIR + b_2PFA + b_3CC + b_4RQ + b_5IRS + e \quad 3$$

Given the establishment that NPLs minimizing through the PFA, would lead to increased credit supply, the study estimated the effect of the PFA and other variables in equation 3 on credit supplied to private sector (CPS).

$$CPS = b_0 + b_1LIR + b_2PFA + b_3CC + b_4RQ + b_5IRS + e \quad 4$$

3.3 Data Source, Variable Descriptions and A-priori Expectations

Data were sourced from the Central Bank of Nigeria (2024), and the World Development Indicator (2025)

Variable	definition	Measures	a-priori expectation
NPLs (dependent)	Nonperforming loans is the amount of loan considered difficult to be recovered.	measured as the percentage of bad loans to total loans	-
CPS (dependent)	Credit to Private Sector is the total amount of credit granted to private individuals and firms for personal uses	Measured as the share of credit to private sector in	-
LIR (Independent)	Liquidity ratio is the amount of deposit not given as loan to customers	Measured as the share of deposit reserved to total deposit. Functioning as regulatory policies	Negatively (-) signed with NPLs Positively (+) signed with CPS
PFA (Independent)	Pension Fund Asset is the sum of periodic (annual) contributions	Measured as the share of yearly pension contributions to GDP	Negatively (-) signed with NPLs Positively (+) signed with CPS

	of employees having pension account.		
CC (Independent)	Control of corruption is the extent to which the authorities in the country have curbed corruption.	Measured as the perception of the public on the extent to which corruption is tackled.	Negatively (-) signed with NPLs Positively (+) signed with CPS
RQ (Independent)	Regulatory quality is the ability of government to formulate and implement sound policies	Measured as perception of public on policies and regulations that promote private sector development.	Negatively (-) signed with NPLs Positively (+) signed with CPS
IRS (Independent)	Interest rate spread captures the difference between lending rate and deposit rate	Measures the preference for interest income on credit supply over other sources of income. Functioning as regulatory policies	Negatively (-) signed with NPLs Positively (+) signed with CPS

Author's Initiative, 2026

3.4 Estimation Techniques

The study conducted the descriptive statistics to provide simple summaries about the variables specified in the model. It involves using a single indicator like mean, median, mode, standard deviation, skewness, variance, etc. to describe a large set of observations. Following the descriptive statistics, the correlation between the variables were analyzed using the correlation matrix to determine the degree of association. A correlation is a single number that describes the degree of relationship between two variables. It is used to carry out ordinal regressions. The correlation coefficient is used to determine the strength and type of relationship between two variables which observations may be ordinal or time series. The study carried out the unit roots test using the augmented dickey fuller tests to determine the level (level, first difference, or second difference) at which the variables are stationary. In order to obtain credible and robust results for any conventional regression analysis, the data to be analyzed must be stationary. This is because estimating regressions using non-stationary variables based on ordinary least square lead to spurious and inconsistent results. After the stationary test, the study proceeded to the regression analyses using the Autoregressive Distributed Lag (ARDL) estimation technique. The auto-

regressive distributed lag model (ARDL) is a dynamic single-equation regression model. The ARDL model is an ordinary least square based model, which is applicable for both non-stationary time series, times series with mixed order of integration.

4. Analyses of Empirical Findings

4.1 Descriptive Statistics

Table 1: Descriptive Statistics

	CPS	NPL	LIR	PFA	CC	RQ	IRS
Mean	11.91	14.33	48.16	10.44	6.48	10.75	6.27
Median	8.11	15.20	46.23	0.20	4.93	12.97	6.78
Maximum	22.75	37.25	104.20	438.55	18.93	27.01	11.06
Minimum	5.81	2.96	4.14	0.00	0.00	0.00	0.19
Std. Dev.	5.77	7.08	15.90	66.84	6.49	10.02	2.83
Skewness	0.57	0.48	0.73	6.33	0.25	0.09	-0.67
Kurtosis	1.58	3.88	6.11	41.02	1.47	1.45	2.68
Jarque-Bera	5.98	3.02	21.06	2876.98	4.64	4.37	3.41
Probability	0.05	0.22	0.00	0.00	0.098	0.11	0.18

Source: Author's Computation Using E-views 12, 2026

The mean from the summary statistics shows the average value for each of the variables of interest to this study. The median tells the middle value for each of the variables. The minimum and the maximum values show the lowest and the highest values of the variables in this study respectively. The standard deviation measures the deviation of each of the sample means from the original observations of the variables. With respect to skewness, when the value is zero, there is normal skewness. Regarding the Kurtosis, when the value is lower than 3, then the variable is platykurtic and if equal or greater than 3, then it is mesokurtic. Platykurtic means that the variable or series

will have values lower than the sample mean and vice versa if mesokurtic. Jarque-Bera measures the skewness and kurtosis of the series with those from the normal distribution.

The average values for the series CPS, NPL, LIR, PFA, CC, RQ, and IRS are approximately 11.91, 14.33, 48.16, 10.44, 6.48, 10.75, and 6.27 respectively. The middle values for CPS, NPL, LIR, PFA, CC, RQ, and IRS are approximately 8.11, 15.2, 46.23, 0.2, 4.93, 12.97, and 6.78 respectively. The maximum and minimum values for each of the series include 22.75 and 5.81 for CPS, 37.25 and 2.96 for NPL, 104.2 and 4.14 for LIR, 438.55 and 0 for PFA, 18.93 and 0 for CC, 27.01 and 0 for RQ, and 11.06 and 0.19 for IRS. The standard deviations for CPS, NPL, LIR, PFA, CC, RQ, and IRS are greater than 1, which indicates that the mean of each of the variables are over-dispersed and demonstrates nominal instability. This shows that their average values are weak representations of the original series of each of the variables.

The skewness's for CPS, NPL, LIR, CC, and RQ are positive and less than one except for PFA which is positive greater than one. The skewness reveals that CPS, NPL, LIR, CC, and RQ have a long-right tail and are leptokurtic. The kurtosis for NPL, LIR, and PFA are greater than three (>3) and are mesokurtic while that of CPS, CC, RQ, and IRS are less than three (<3) and platykurtic. The probability values for the Jarque-Bera statistics for the series show that NPL, CC, RQ, and IRS are greater than 0.05 while that of CPS, LIR, and PFA are greater than 0.05. This indicates that NPL, CC, RQ, and IRS follow normal distribution and the null hypothesis of a normal distribution is accepted and vice versa for CPS, LIR, and PFA.

4.2: Relationship between Contributory Funded Scheme and Nonperforming Loan and Credit Supply in Nigeria

Table 2: Correlation Analysis

	CPS	NPL	LIR	PFA	CC	RQ	IRS
CPS	1						
NPL	-0.34	1					
LIR	-0.08	-0.28	1				
PFA	0.29	0.10	-0.43	1			

CC	0.83	-0.25	-0.01	0.25	1		
RQ	0.69	-0.22	-0.01	0.09	0.86	1	
IRS	0.23	-0.01	0.14	-0.34	0.28	0.46	1

Source: Author's Computation Using E-views, 2026

The correlation results show that LIR and NPL have negative and weak relationships with CPS. The correlation indicates that about 11.56% and 0.64% variations in CPS are explainable by variations in LIR and NPL respectively in Nigeria. This further implies that persistent NPLs and the use of liquidity ratio to prevent NPL will impede credit supply in Nigeria. The results revealed that DCs, CC, RQ, and IRS have positive relationships with CPS but that of CC is strong while those of PFA, RQ, and IRS is weak. The results further indicate that about 8.41%, 68.89%, 47.61%, and 5.29% variations in CPS are accountable for by variations in PFA, CC, RQ, and IRS respectively in Nigeria. Regarding NPL, LIR, CC, RQ, and IRS, are negatively correlated with NPL in Nigeria. Implying that increase in liquidity ratio, control of corruption, regulatory quality, and, interest rate spread would mitigate the prevalence of NPLs in Nigeria. However, the correlation result reveal that the increases in the DCs is associated with increases in the NPLs. Implying that as credit supply is increased through DCs, there is the tendency to accumulate NPL in Nigeria.

Table 3: Augmented Dickey Fuller Test Result

Variable	Test Statistics	Critical Value @ 5%	Prob. Value	Integration Rank
CPS	-4.032	-2.937	0.0000	I(1)
NPL	-3.076	-2.933	0.0362	I(0)
CC	-11.62	-2.941	0.0000	I(1)
DCs	-6.123	-2.933	0.0000	I(0)
RQ	-16.18	-2.941	0.0000	I(1)
LIR	-3.694	-2.933	0.0077	I(0)
IRS	-5.516	-2.937	0.0000	I(1)

Source: Author's Computation Using E-views 12, 2026

Table 3 shows the results of the unit roots test using the augmented dickey fuller technique. The result show that CPS, CC, RQ, and IRS, are stationary at first difference, while NPL, DCs, and LIR are stationary at level. This interpretation was arrived at the level where both the test statistics

are greater than the respective critical values and the probability values are less than 0.05 level of significance.

4.3 Regression Analyses

Table 4: Auto regressive Distributed Lag (ARDL) Bound Tests

	NPL		CPS	
Test Statistic	Value	K	Value	K
F-statistic	3.38	3	7.79	3
Critical Value Bounds				
Significance	I(0) Bound	I(1) Bound	I(0) Bound	I(1) Bound
10%	2.37	3.2	2.37	3.2
5%	3.79	3.67	3.79	3.67
2.5%	3.15	4.08	3.15	4.08
1%	3.65	4.66	3.65	4.66

Source: Author's Computation Using E-views 12, 2026

Bound test is used to test for the existence of long-run relationship and this implies that if the F-statistic is greater than the critical value there is long-run relationship among the variables. From the table 4 above, the F-statistics is greater than the critical value which represents the absence of long-run relationship at both 5% and 10% levels of significance for the CPS model and 10% for the NPL model.

Table 5: ARDL Regression Results (long-run)

NPL			CPS		
Variable	Coefficient	Prob. Value	Variable	Coefficient	Prob. Value
C	12.01	0.0048	C	6.546431	0.0000
NPL(-1)*	-0.43	0.0049	CPS(-1)*	-0.536347	0.0000
CC(-1)	0.11	0.7328	CC(-1)	0.484443	0.0003
IRS(-1)	0.36	0.4052	IRS**	-0.182280	0.0931
RQ(-1)	-0.27	0.1914	RQ(-1)	0.027246	0.6529
LIR	-0.123	0.0398	LIR	-0.037343	0.0340
PFA	0.011	0.5050	PFA	-0.000680	0.8773

Source: Author's Computation Using E-views 12, 2026

Table 5 above shows the long run ARDL results for the NPL and CPS models. The result reveals that NPL(-1) and RQ(-1) in the previous year, and liquidity ratio (LIR) in the current year negatively influences nonperforming loans (NPL), while CC(-1) and IRS(-1) in the previous year,

and the defined contribution scheme (DCs), positively influences NPL in the current year in Nigeria in the long-run. Based on the coefficients of the significant predictors, the result reveals that one unit increase in previous level of nonperforming loans, regulatory quality, and current level of liquidity ratio in Nigeria will reduce the current level of NPLs in Nigeria by 0.43%, 0.27%, and 0.123% respectively. Furthermore, a unit increase in the previous level of control of corruption and interest rate spread, the current level of pension fund assets will increase the current level of NPLs in Nigeria by 0.11%, 0.36%, and 0.011% respectively.

In relation to the CPS model, the result reveals that CPS(-1) in the previous year, current interest rate spread, LIR, and DCs negatively influences credit to private sector (CPS), while CC(-1) and RQ(-1) in the previous year positively influences CPS in the current year in Nigeria in the long-run. Based on the coefficients of the significant predictors, the result reveals that one unit increase in previous levels of credit to private sector, current level of interest rate spread and pension fund asset in Nigeria will reduce the current level of CPS in Nigeria by 0.54%, 0.037%, and 0.0007% respectively. More so, a unit increase in the previous level of control of corruption and regulatory quality will increase the current level of CPS in Nigeria by 0.48% and 0.027% respectively.

Table 6: Auto regressive Distributed Lag (ARDL) Short-run Results

NPL			CPS		
Variable	Coefficient	Prob. Value	Variable	Coefficient	Prob. Value
D(CC)	-0.157736	0.6307	D(CPS(-1))	0.263388	0.0216
D(CC(-1))	0.788212	0.0100	D(CPS(-2))	-0.338200	0.0024
D(IRS)	0.242709	0.5876	D(CC)	0.236676	0.0173
D(IRS(-1))	-1.284213	0.0059	D(CC(-1))	-0.228498	0.0425
D(RQ)	0.265179	0.1363	D(RQ)	-0.204090	0.0014
			D(RQ(-1))	-0.253160	0.0029
			D(RQ(-2))	-0.190602	0.0018
CointEq(-1)*	-0.427399	0.0001	CointEq(-1)*	-0.536347	0.0000
R-squared	Adjusted	Durbin-	R-squared	Adjusted	Durbin-
0.65	R-squared	Watson	0.76	R-squared	Watson
	0.58	stat. 2.12		0.69	stat. 2.59

Source: Author's Computation Using E-views 12, 2026

Table 6 shows that current level of control of corruption D(CC) and the previous level of interest rate spread D(IRS(-1)) negatively influence NPL in the short-run but only is significant at D(IRS(-

1)) 5% level of significance. The previous level of control of corruption, the current level of interest rate spread and regulatory quality positively influence NPL in the short-run but only the previous level of corruption control is significant at 5% level of significance. The results show that a unit increase in D(CC) and D(IRS(-1)) will reduce NPL in the short-run by 0.16% and 1.28% respectively while a unit increase in previous CC, current level of IRS and RQ will increase NPL in Nigeria by 0.79%, 0.59%, and 0.14% respectively. The second lag values of credit to private sector D(CPS(-2)) and D(RQ(-2)), previous year values of corruption control D(CC(-1)) and regulatory quality D(RQ(-1)), and current level of regulatory quality D(RQ) negatively influence CPS in the short-run and all are significant at 5% level of significance. The previous level of CPS and the current level of corruption control CC positively influence CPS in the short-run and both are significant at 5% level of significance. The results show that a unit increase in D(CPS(-2)), D(RQ(-2)), D(CC(-1)), D(RQ(-1)), and D(RQ) will reduce CPS in the short-run by 0.34%, 0.19%, 0.24%, 0.25%, and 0.20% respectively while a unit increase in D(CPS(-1)) and D(CC) in the short run will increase CPS by 0.26% and 0.24% respectively.

The Durbin-Watson Statistics 2.12 for the NPL model and 2.59 for the CPS model are greater than the R^2 for each model. It shows that there is no false regression result. The R-Squared values which 0.58 and 0.69 shows that about 58% and 69% of the variations in NPL and CPS are accounted for by the respective predictors in each model in the short-run. The error correcting terms which are -0.43 and -0.54 are negative and less than -1, and significant at 1% level of significance. It implies that short-run deviations will converge to long-run path by 43% (NPL) and 54% (CPS) yearly.

4.4: Discussion of Findings

The minimization of NPLs is critical to the financial stability of the financial sector of any economy as well as the opportunities for credit supply expansion. The correlation results that LIR and NPL are negatively correlated with credit supply indirectly aligns with Bernadus & Eswual (2021), Ugwu *et al.* (2020), Ajayi & Ajayi (2017), Saliu *et al.* (2020), Adeleke *et al.* (2022), and Nwosu *et al.* (2020) on the basis for minimizing NPL which is the fact that banks' profit result majorly from credit and loan supply and that NPL adversely affects banks' profitability.

The ARDL result that DCs negatively influences credit supply contradicts Ilo *et al.* (2024) that pension funds improve financial access which results among others from increased credit supply. It also contradicts findings from Oyedokun *et al.* (2022) that pension funds enhance financial efficiency considering the long run ARDL result that DCs negatively influences credit supply and positively influences NPL. Considering mechanisms for increasing credit supply, the findings that regulatory quality increases credit supply which is a financial deepening benefit from active use of pension funds, agree with Obeta & Edwin (2024) that robust institutional framework are essential for sustainable pension funds.

4.5 Diagnostics Tests

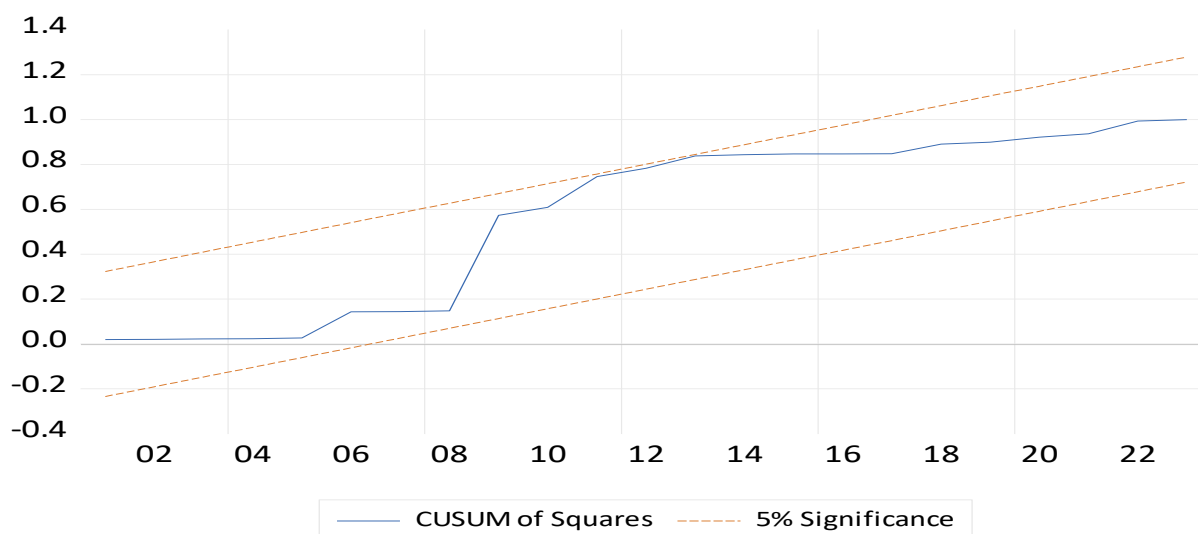
Breusch-Godfrey Serial Correlation LM Tests

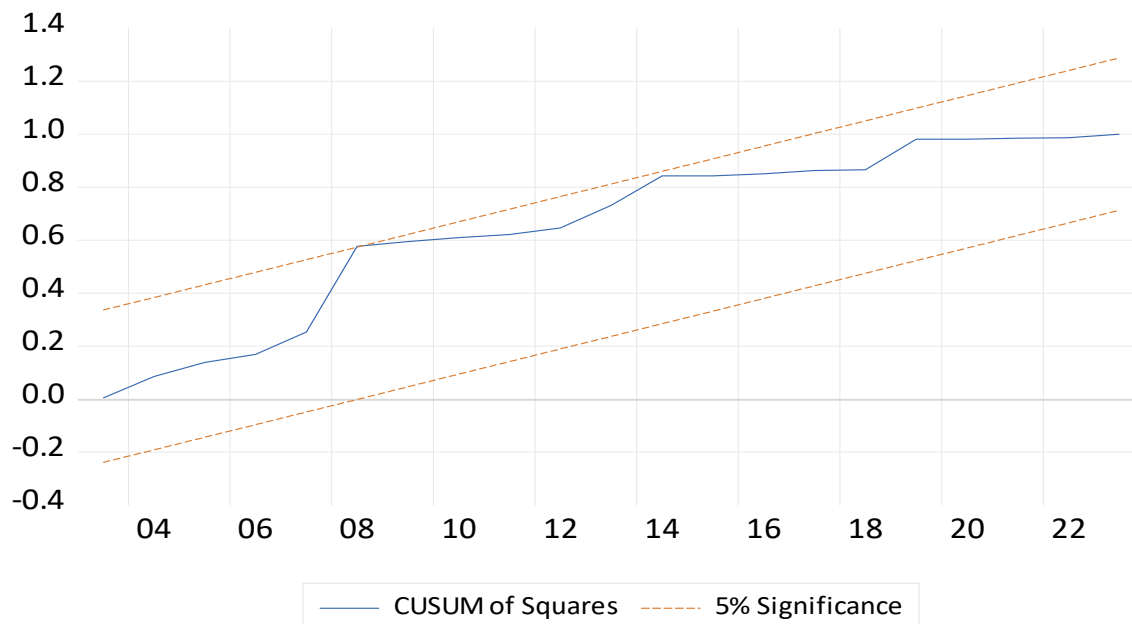
NPL		CPS	
F-statistic	Prob. Value	F-statistic	Prob. Value
0.1136	0.8930	6.1452	0.0070

The Breusch-Godfrey test reveal that autocorrelation is absent in the NPL model at prob. value (0.8930) greater than 0.05 and in the CPS model, autocorrelation is present at prob value (0.0070) less than 0.05.

CUSUM od Squares Tests

NPL Model



CPS Model

The Cumulative sum of squares test for both the NPL and CPS models shows absence of structural break or instability as the plotted lines lie between the red critical boundaries. It also implies the absence of sudden changes in the parameter estimates and thus the models are considered stable.

5.1 Conclusion and Recommendations

The study investigated the feasibility of the liquidity benefits of the contributory pension/funded scheme to minimize NPLs and expand credit supply in Nigeria using the ARDL technique. Based on the EMH, the study estimated two models for Nonperforming loans and Credit to private sector as a function of Liquidity ratio, Pension Fund Asset, Control of corruption, Regulatory quality, Interest rate spread. The design for the study is a descriptive and analytical type in which the various characteristics of the time series data in terms of stationary or order of integration and long run relationships were examined using relevant test methods.

From the ARDL results, the study concludes that institutional factors such as regulatory quality, control of corruption, CBN monetary policy with respect to liquidity ration and interest rate spread are the relevant tools for minimizing NPLs and this implies that NPL is not an efficiency matter

but a delinquency one as predicted by the agency and credit default theories requiring the effectiveness of institutions and monetary policy. The study concludes further that NPL minimization and credit supply expansion is not appropriate option for the active use of pension funds in Nigeria. Following the conclusions, the study recommends capacity building and training in financial policy formulation and implementation, financial transparency, and credit restrictions in Nigeria for NPL minimization, credit risk management and credit supply expansion.

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