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The Moderating Role of Institutional Quality on the Nexus Between NPL and Performance Metrics of ROE, ROA and CAR

Abraham Nii Adu Okine[1], David Kwashie Garr[2]
[1]Accra Institute of Technology, Ghana
[2]Presbyterian University Ghana, Ghana
Correspondent: papanii74@yahoo.com[1]

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ABSTRACT: The study explores the moderating effect of institutional quality (INSTQ) on the nexus amongst NPLs and bank performance in Ghana. Employing fixed-effects panel data from 2007 to 2021, and controlling for unobserved heterogeneity, the study offered robust insights into credit risk forces in a developing economy. The discoveries disclose a contradictory positive, and substantial relationship between NPLs and ROA and CAR. However, the influence of NPLs on ROE was positive, but not statistically substantial. Institutional quality exerted direct and significant influence on ROA, ROE and CAR. The interface term operating between NPLs and institutional quality is negative, demonstrating that INSTQ effectively decreases the influence of NPL on performance. Thus, the effects of NPLs on performance are significantly reduced in environments with stronger institutional qualities. While inflation rate shows negative and insignificant relationship with performance, GDP growth is positively related to ROE, albeit insignificant for ROA and CAR. The originality of this study lies in its empirical demonstration of the controlling role of INSTQ in an emerging economy. These findings have significant policy implications, underscoring the need to strengthen regulatory institutions and credit risk governance. Future research needs deeper investigation into the specific disaggregated dimensions of institutional quality and the impacts on performance.

Keywords: Non-Performing Loans, Institutional Quality, Performance, Fixed Effects Mode.

INTRODUCTION

The stable performance of financial organizations is crucial to the health of any economy, especially regarding issues presented by bad debts, better known as non-performing loans (NPLs). Non-

performing loans (NPLs) are loans where the borrowers have failed to honour the terms for an extended period. This situation is acknowledged as a considerable impediment to bank profitability and capital sufficiency Dimri (2023) and BEYENE (2023). Established consensus, corroborated by extensive research, indicates that an elevated Non-Performing Loan (NPL) ratio adversely affects critical performance metrics, such as Return on Assets (ROA), Return on Equity (ROE), and Capital Adequacy Ratio (CAR), (Al-Sharkas & Al-Sharkas, 2022; Trinugroho et al., 2025a). The direct causal relationship between NPLs and performance is frequently Viewed as an oversimplification, because it neglects the substantial effect of the external environment, particularly institutional quality. Institutional quality, encompassing elements such as the rule of law, corruption control, and regulatory quality, delineates the operational and legal frameworks governing banking activities (Goyal et al., 2023) and (Rahman & Howlader, 2025).

The prevailing issue in this field of study is the lack of significant research: there is empirical evidence showing disagreement on the regulating and moderating influence of institutional quality on the association between non-performing loans and bank performance. The World Economic Indicators list the components of this institutional quality to include rule of law, political stability, government efficiency, voice and accountability, regulatory quality and control of corruption. Although previous study have scrutinized the positive and direct influence of institutional quality on financial stability and (Abaidoo & Agyapong, 2023; Tran et al., 2023) and the drivers of bad debts (NPLs) and (Koju et al., 2018; Sasmiharti, 2024), few studies have comprehensively analysed its role as a conditional factor. This gap is substantial as it hinders the comprehension of why banks in some institutional contexts exhibit greater resilience to credit risk than their counterparts in different environments. In environments characterised by strong legal frameworks and minimal corruption, banks may possess more efficient loan recovery methods, thus alleviating the antagonistic effects of NPLs on their performance indicators (Ahiase et al., 2024; Syed et al., 2022).

The current scholarship seeks to find solution to this study vacuum by thoroughly probing the moderating influence of institutional quality on the link existing between non-performing loans (NPLs) and bank stability (performance), utilising the metrics of return on equity (ROE), return on Assets (ROA), and capital adequacy ratio (CAR) as primary indicators. This research work proposes to explore three primary research queries: (i) What is the influence of non-performing loans (NPLs) on bank performance indicators such as return on equity (ROE), return on Assets (ROA), and capital adequacy ratio (CAR)? (ii) To what extent does institutional quality influence the non-performing loans (NPLs) of a bank? (iii) What is the moderating role of institutionality on the relationship between NPL and performance?

This study's importance lies in its originality: as it transcends the conventional linear relationship, to offer nuanced, interactive insights into a complicated financial event. This study provides a fresh viewpoint by experimentally illustrating that institutional quality is not simply a contextual element, but a vital determinant that influences the effect of credit risk on bank performance (Canh et al., 2021; Naili & Lahrichi, 2022). These findings will be crucial for bank regulators and policymakers,

offering a scientific foundation for fortifying institutional structures to improve the resilience and stability of the banking industry. The scientific trustworthiness of this research is supported by a strong econometric technique and rich dataset, guaranteeing that its conclusions are generalisable and respectable within the academic community. This study provides a novel contribution by presenting a further all-encompassing and nuanced intuition of economic stability across many institutional environments.

Theoretical Framework and Hypothesis

The literature review section is crucial for establishing the theoretical and empirical foundations of a study and positioning its contribution within the existing academic discourse. This section synthesises prior research, identifies key theoretical underpinnings, and rigorously outlines the identified research gap, paving the way for the proposed investigation of the regulating and moderating function of institutional quality on the association between non-performing loans (NPLs) and financial institutions performance metrics (ROE, ROA, and CAR).

Theoretical Framework

The intricate bond between non-performing loans (NPLs) and bank performance, and the overarching influence of institutional quality on this nexus can be elucidated through several theoretical lenses. Agency Theory posits that conflicts arise due to the competing interest between shareholder (principals / depositors) and their assigns (agents, bank management) as a result of information asymmetry Panda & Leepsa (2017) and Seng (2022). In the context of NPLs, managers might engage in excessive risk-taking or "moral hazards," knowing that losses could be borne by shareholders or, in extreme cases, public bailouts and (Gupta & Jain, 2022; Zhang et al., 2021). Strong institutional quality, characterised by robust regulatory frameworks and effective governance system, can mitigate these agency problems by enhancing transparency, accountability, and contract enforcement, thereby reducing the propensity for NPL accumulation and improving overall bank performance (Canh et al., 2021; Naili & Lahrichi, 2022).

The Information Asymmetry Theory further explains how imperfect information in lending markets contributes to NPLs. Lenders may lack complete information about borrowers' creditworthiness (adverse selection) or post-loan behaviour (moral hazard), leading to suboptimal lending decisions and increased default rates (Galariotis et al., 2011). High institutional quality, particularly a robust regulation and an enforceable rule of law, can reduce information asymmetry by facilitating better disclosure, enforcing credit reporting, and ensuring legal recourse for lenders, thus improving asset quality and bank's solidity (Cohen et al., 1983; Huang et al., 2023).

Beyond micro-level interactions, Institutional Theory provides a macro-level perspective, emphasising how formal and informal institutions shape organizational behaviour and outcomes

(Goyal et al., 2023) and (Rahman & Howlader, 2025). The quality of a nation's institutions, in addition to its laws, legal systems, regulations, governance systems, regulatory environment, and control of corruption, directly influences the efficiency of financial markets, the effectiveness of credit risk administration, and the overall resilience of the financial system and (Abaidoo & Agyapong, 2023; Tran et al., 2023). Weak institutions can foster an environment conducive to familial relations, cronyism, and lax enforcement, exacerbating NPL problems and undermining bank performance (Hassouna & Lewaaelhamd, 2025). Conversely, robust institutions provide a stable and predictable environment that supports sound lending and efficient loan recovery mechanisms.

Empirical Literature

NPLs and Bank Performance

Experiential researches constantly prove significant inverse connections between NPLs and various bank performance measures. Higher NPL ratios typically lead to reduced profitability because banks are forced to make larger credit risk coverage and provisions, which rightly wear down net incomes and (Jing, 2020; Trinugroho et al., 2025b). This effect is particularly pronounced during economic downturns, when increased defaults amplify the drain on profitability (Saif-Alyousfi, 2025). As an example, Nor et al. (2021) find an adverse stimulus of NPLs on bank's performance across ASEAN commercial banks. Similarly, research in various contexts, including Pakistan (Rahman & Howlader, 2025), confirms that elevated NPLs necessitate increased provisioning, thereby reducing Return on Equity (ROE) and Return on Assets (ROA). Furthermore, high NPLs can deplete a bank's capital buffers, negatively impacting its Capital Adequacy Ratio (CAR) and increasing the hazard of financial distress, and (Putra et al., 2024; Samir, 2024). The accumulation of NPLs also signals poor asset quality and management effectiveness, eroding investor confidence and potentially leading to a decline in market valuations and (Arhinful et al., 2025; Kamal et al., 2024).

The direct bearing of institutional quality on bank's performance remains a focal point of recent research. Studies indicate that stronger institutional environments positively influence bank stability and profitability. For example, (Abaidoo & Agyapong 2023; Tran et al., 2023) highlight that enhancements in institutional quality, example, better regulation of bribery, dishonesty and fraud, and enhanced regulatory environment, are associated with higher bank profitability in developing economies. Tran et al. (2023) provide proof from ASEAN economies that robust institutional quality significantly increases bank performance. This positive effect stems from several mechanisms: strong institutions reduce information asymmetry, lower transaction costs, and promote more efficient resource allocation within the financial system (Fernández, & Tamayo, 2017) and (Tchamyou, 2019). Moreover, effective regulatory quality and government effectiveness foster a more predictable and secure operating environment, reducing operational risks, and enhancing the overall financial health of banks Almaulla, et. Al. (2025) and Adeniran et al. (2024). Conversely, weak

institutional systems can undermine general financial performance, especially in developing economies, due to issues as corruption and lack of transparency (Hassouna & Lewaaelhamd, 2025).

While the direct relationships are well established, the moderating function of institutional quality on the NPL-performance nexus represents a less explored, yet critical area in the field of finance. Recent studies have begun to shed light on this complex interaction. Duong et al. (2023) explicitly revealed that institutional quality indicators, including sleaze and corruption control, speaking truth to power, accountable governance, and the rule of law, significantly mitigate the adverse effect of NPLs on financial or bank's performance. This proposes that, in economies with higher institutional quality, the detrimental effects of NPLs on bank profitability and capital are mitigated. The underlying mechanism is that strong institutions facilitate more effective credit risk management and loan recovery. For instance, a robust legal system ensures that banks can enforce collateral and pursue delinquent borrowers more effectively, thereby reducing the ultimate losses from NPLs (Al-Sharkas & Al-Sharkas, 2022).

Furthermore, the quality of regulatory oversight (regulatory quality) and the effectiveness of government policies (government effectiveness) can influence how quickly and efficiently NPLs are resolved, thereby limiting their long-term impact on bank performance (Dimri, 2023). In environments with strong institutions, banks are likely to adopt more prudent lending standards because of better enforcement and reduced political interference, which inherently lowers the risk of NPL accumulation (Arhinful et al., 2025). This proactive risk management, fostered by a sound institutional environment, acts as a buffer against the adverse effects of NPLs on the ROE, ROI, and CAR. Conversely, in weak institutional settings, the negative inverse link between NPLs and bank performance can be exacerbated because inefficient legal systems and pervasive corruption hinder effective loan recovery and promote riskier lending practices (Balguzhina & Irani, 2024).

Despite the increasing frame of knowledge on NPLs, bank performance, and institutional quality, a significant research gap persists in the comprehensive and explicit analysis of the moderating function of institutional quality on the link between NPLs and bank performance metrics (ROE, ROA, and CAR). While some studies acknowledge the influence of the external environment on NPLs or bank performance independently, few have rigorously explored how institutional quality conditions alter the strength and direction of the NPL-performance relationship. Existing research often focus on the direct effects (e.g. NPLs on profitability or institutional quality on bank stability) without fully disentangling the interactive mechanisms. For instance, while it is understood that NPLs reduce profitability and (Saif-Alyousfi, 2025; Singh et al., 2021) and good institutions improve bank stability Tran et al. (2023), the nuanced enquiry into whether the negative impact of NPLs is less severe in environments with high institutional quality remains under-examined across a broad range of contexts and using a comprehensive set of institutional indicators. The current research proposes to seal this critical void through the provision of experiential evidence of this explicit controlling effect on the nexus between NPL and bank performance, thereby contributing to a more sophisticated understanding of financial system's resilience (Alnabulsi et al., 2022).

METHOD

The current study employs a quantitative research design with a panel data technique to examine the moderating role (effect) of institutional quality on the relationship between non-performing loans (NPLs) and bank performance. This empirical analysis utilises an extensive dataset of commercial banks from varied sections within the economy, from 2007 to 2021. The audited financial information for individual banks encompassing NPLs, ROE, ROA, and CAR were obtained from the database of the Central Bank of Ghana and the Ghana Association of Bankers. Macroeconomic statistics, namely Gross Domestic Product (GDP) growth and inflation rates, were obtained from the World Bank Development Indicators and the International Monetary Fund (IMF) databases. Indicators of institutional quality, including Corruption Control, Governance Efficiency, Regulatory Quality, Rule of Law, Voice and Answerability, and Political Solidity, were obtained from the World Governance Indicators (Masyk et al., 2023).

The following metrics were used for performance measurements. Return on Equity (ROE): Net income divided by shareholders' equity, indicating profitability for equity investors. Return on Asset (ROA): Net profit divided by total assets, reflecting the efficiency of overall asset utilisation. Capital Adequacy Ratio (CAR): The ratio of Tier 1 and Tier 2 capital to risk-weighted assets, assessing a bank's capital robustness in relation to probable losses. Independent variable: Non-Performing Loans (NPLs): The ratio of gross NPLs to total gross loans, indicating credit risk exposure. Moderating Variable: Institutional Quality (IQ): A composite index calculated from the mean of specific WGI variables, reflecting the overall calibration of governance and institutions. GDP Growth: Annual percentage variation in real GDP, including macroeconomic factors. Inflation Rate: Yearly percentage variation in Consumer Price Index (CPI), The general formulae adopted is:

$$Y_{it} = \beta 0 + \beta 1\ NPL_{it} + \beta 2\ IQ_{it} + \beta 3\ (NPL_{it} \times IQ_{it}) + \beta 4\ GDP_{it} + \beta 5\ Inflation_{it} + \sum \beta j\ Controls_{it} + \mu i + \epsilon_{it}$$

Where Y signifies the performance indicators of bank i at time t (ROE, ROI, CAR), NPL_{it} denotes the non-performing loan ratio, IQ_{it} signifies the institutional quality index, and ($NPL_{it} \times IQ$ it) serves as the interaction term that encapsulates the moderating influence. GDP_{it} and Inflation are macroeconomic control variables; $\sum \beta j\ Controls_{it}$ signifies additional bank-specific or macroeconomic control variables; μi denotes unobserved bank-specific fixed effects; and ϵ_{it} is the error term. The model is estimated using fixed-effects panel regression to manage unobserved heterogeneity among banks, utilising robust standard errors to address heteroskedasticity and autocorrelation.

RESULT AND DISCUSSION

Table 1. Descriptive Statistics

	ROA	ROE	INSTQ	NPL	INQ	GDPGR	INFR
Mean	2.490862	19.41810	0.009706	11.02448	0.095756	5.490912	12.92868
Median	2.530000	19.22000	0.020112	9.600000	0.000000	5.600000	11.80000
Maximum	11.63000	82.01000	0.101843	72.00000	3.360833	13.60000	23.60000
Minimum	-9.030000	-27.35000	-0.163129	0.000000	-4.241349	0.510000	7.143640
Std. Dev.	1.906445	13.79025	0.067255	9.441173	0.846648	2.591300	4.114607
Skewness	-0.102296	0.260144	-0.832652	1.647714	-1.142216	1.057957	0.714315
Kurtosis	7.339829	3.775531	3.196246	8.298814	7.839958	5.819704	3.058756
Observations	399	399	399	399	399	399	399

Source: Author's Own Creation (2025)

Based on Table 1, the descriptive or summary statistics for the 399 observations provide key insights into these variables adopted for the study. A mean ROA of 2.49% suggests overall profitability, despite an extensive range straddling from a least of -9.03% to an extreme of 11.63%. Similarly, the mean ROE is high at 19.42%, indicating strong returns for shareholders; however, its substantial standard deviation (13.79%) and wide range (-27.35% to 82.01%) point to significant variability across banks.

The mean NPL ratio is 11.02%, with a maximum of 72.00%, indicating that some banks face severe credit risks (Rajan, 1994). The mean Institutional Quality (INSTQ) is close to zero (0.0097), suggesting that the average institutional environment is neither exceptionally strong nor weak. The mean for the interactive variable (INQ) is 0.0958, with a large negative skewness and high kurtosis indicating the presence of outliers.

Finally, the macroeconomic indicators of GDP Growth (GDPGR) and Inflation (INFR) show mean values of 5.49% and 12.93%, respectively. Their relatively lower standard deviations compared to the bank-specific variables suggest a more stable macroeconomic backdrop across the sample, although with some volatility.

Table 2. Results of Unit Root tests with ADF and P.P.

	Augmented Dickey-Fuller (ADF)		Phillips-Perron (P.P.)	
Variables	**Level**	**P. value**	**Level**	**P. value**
NPL	68.1615	0.0036	79.2875	0.0002
ROA	98.5829	0.0000	139.096	0.0000
ROE	96.6557	0.0000	127.757	0.0000
INSTQ	179.296	0.0000	61.0538	0.0176
INQ	162.548	0.0000	116.800	0.0000
GDP	174.865	0.0000	137.426	0.0000

	Augmented Dickey-Fuller (ADF)		Phillips-Perron (P.P.)	
Variables	**Level**	**P. value**	**Level**	**P. value**
INFR	115.884	0.0000	114.739	0.0000
CAR	49.1222	0.1068	67.2868	0.0024

The test of stationarity (unit root), utilising both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (P.P.) methods, confirm that most variables are stationary at their levels. The p-values for NPL, ROA, ROE, INSTQ, INQ, GDP, and INFR are all below the significance level of 0.05, leading to strong denunciation of the null hypothesis of a unit root. This indicates that these time series were stable and suitable for direct regression analysis.

The results for the CAR are more nuanced. The ADF test's p-value of 0.1068 suggests nonstationary at the 5% level. However, the P.P. test for CAR yielded a highly significant p-value of 0.0024, signifying strong stationarity. Given that the P.P. test is more robust to a wider range of serial correlations and heteroscedasticity, the result for CAR is considered more reliable. The overall consensus is that all variables are stationary and stable as they are integrated of order zero or I (0), confirming that they can be used in panel regression without the need for differencing to achieve or confirm stationarity.

Table 3. Redundant Fixed Effects Tests

Effects Test	Statistic	d.f.	Prob.
Cross-section F	10.278855	(19,374)	0.0000
Cross-section Chi-square	167.639318	19	0.0000

Gleaning from the outcomes in Table 3, the Redundant Fixed Effects Test was used to determine whether a fixed effects model was necessary. The null hypothesis states that the collective / pool ordinary least squares (OLS) model is sufficient. With a p-value of 0.0000 for both the F-statistic and Chi-square statistic, which is significantly less than 0.05, we reject the null hypothesis. This strong statistical evidence specifies that significant differences exist across the cross-sections (e.g. individual banks or countries); therefore, a fixed effects model is the suitable choice for this analysis.

Table 4. Regression Analysis Result

Independent Variable	Dependent Variables		
	Return on Assets (ROA)	**Return on Equity (ROE)**	**CAR**
NPLs	0.035451***	0.110759	0.320524***
	(0.009580)	(0.063535)	(0.073216)
INSTQ	4.644107**	27.17964**	58.61794***
	(1.855136)	(12.31194)	(14.16296)
INQ	-0.490365***	-3.468978***	-2.803135**
	(0.145493)	(0.965661)	(1.124013)
GDPGR	0.045266	0.439672**	-0.262912

Independent Variable	Dependent Variables		
	Return on Assets (ROA)	Return on Equity (ROE)	CAR
	(0.033208)	(0.220172)	(0.253331)
INFR	-0.013245	-0.088212	-0.189138
	(0.019932)	(0.132240)	(0.152061)
R-squared	0.399344	0.494344	0.242742
S.E. of regression	1.524204	10.11657	11.63283
F-statistic	10.36052	15.27545	4.995289
Prob(F-statistic)	0.000000	0.000000	0.000000
Durbin-Watson stat	1.603268	1.426184	0.874896

The regression analysis, utilising a fixed-effects panel model, uncovers important insights into the links among non-performing loans (NPLs), institutional quality, and bank performance whilst accounting for unobserved or overlooked heterogeneity among banks.

The coefficient for Non-Performing Loans (NPLs) in relation to Return on Assets (ROA) is positive and statistically significant ($\beta=0.035451$, $p<0.01$). This finding indicates that a 1% surge in non-performing loans (NPLs) is associated with a 3.5% increase in return on assets (ROA). The fixed effects model indicates that Institutional Quality (INSTQ) has a direct positive and statistically significant effect on ROA ($\beta=4.644107$, $p<0.05$). The interaction variable (INQ) shows significant negative link ($\beta= -0.490365$, $p<0.01$), implying that although non-performing loans (NPLs) positively correlate with return on assets (ROA), enhanced institutional quality mitigates this relationship. The model is responsible for almost 39.93% of the variance in ROA and is substantially momentous overall.

Furthermore, in the Return on Equity (ROE) model, non-performing loans (NPLs) exhibit a positive, albeit statistically negligible effect ($\beta=0.110759$). The INSTQ exerted a significant and positive effect on ROE ($\beta=27.17964$, $p<0.05$). The principal discovery is the negative and statistically substantial parameter (coefficient) for the interacting variable (INQ) ($\beta=-3.468978$, $p<0.01$), indicating that the positive correlation between NPLs and ROE diminishes as institutional quality increases. Among the variables, GDP Growth exerts a positive and substantial influence on ROE. This model possessed significant explanatory power, accounting for 49.43% of the variation.

However, Capital Adequacy Ratio (CAR) has a direct and statistically substantial connection with non-performing loans (NPLs) ($\beta=0.320524$, $p<0.01$). This signifies that banks augment capital in reaction to increasing NPLs. The INSTQ wielded a direct and statistically significant influence on CAR ($\beta=58.61794$, $p<0.01$). The interacting variable (INQ) is crucially negative and significant ($\beta=-2.803135$, $p<0.05$), suggesting that the positive correlation between NPLs and CAR diminishes as institutional quality improves. This indicates that, under superior institutional quality, banks may require less capital to manage non-performing loans (NPLs). The model accounts for 24.27% of the variance in CAR and is statistically significant.

The regression study or analysis, utilising a fixed-effects panel model, reveals significant insights into the relationships between non-performing loans (NPLs), institutional quality (INSTQ), and bank performance, while controlling for unobserved heterogeneity within banks. The findings exhibit similarities to and differences from the established financial literature, necessitating a thorough analytical debate.

The discovery that the coefficient of Non-Performing Loans (NPLs) for Return on Assets (ROA) is both positive and statistically significant ($\beta=0.035451$, $p<0.01$) is counterintuitive and contradicts the prevailing consensus in most financial literature (Nguyen, 2021) Hoang et al., 2022). Conventional theory posits that elevated non-performing loans (NPLs) result in decreased performance in return on assets (ROA) because of heightened loan loss provisions and reduced interest revenue inflows (Nor et al., 2021; Sain & Kashiramka, 2023). This unexpected positive association between these two variables may be attributed to particular accounting or write-off procedures that temporarily elevate the profitability metrics, or simply the presence of an outlier.

Aggressive write-offs of long-standing non-performing loans (NPLs), although indicative of previous losses, might enhance present asset quality ratios. This is achieved by eliminating non-earning assets from the balance sheet, thus ostensibly augmenting return on assets and (Badunenko et al., 2022; Bellotti et al., 2021). This may also indicate a purposeful reallocation of credits towards higher-yielding, potentially riskier assets by banks with non-performing loan issues, or a postponed acknowledgement of the complete adverse effects of NPLs.

The fixed effects model proves that Institutional Quality (INSTQ) wields positive and statistically significant effect on ROA ($\beta=4.644107$, $p<0.05$). This corresponds with previous studies highlighting that strong institutional frameworks, defined by effective governance and obedience to the rule of law, enhance bank efficiency and profitability and (Samir, 2024; Tchamyou, 2019; Tran et al., 2023). The interacting variable (INQ) importantly exhibits a substantial negative effect on NPLs ($\beta=-0.490365$, $p<0.01$), demonstrating that while NPLs directly correspond to ROA, improved institutional quality lessens this ostensibly advantageous association. This finding suggests that the transitory increase in ROA resulting from NPL-related accounting practices is diminished in economic environments with robust institutions, either due to stricter regulatory scrutiny or limited opportunities for such opportunistic accounting practices.

In the Return on Equity (ROE) model, non-performing loans (NPLs) demonstrated a direct, though substantially insignificant, effect on ROE ($\beta=0.110759$). This result partially contradicts a considerable body of literature that regularly indicates a large inverse correlation between NPLs and ROE (Ahiase et al., 2024; Rahman & Howlader, 2025; Syed et al., 2022). It is generally anticipated that rising non-performing loans (NPLs) will directly diminish net income, thereby affecting the return on equity (ROE) by requiring more loan loss provisions and depleting shareholder capital (Nguyen, 2021; Singh et al., 2021; Ughulu & Odion, 2023). The lack of a statistically significant linear correlation in this model indicates that the direct negative effect of NPLs on ROE may be

diminished or obscured by other factors in the sample, possibly because of differences in bank leverage or earnings and management practices that stabilise profitability (Tarchouna et al., 2022).

However, the INSTQ had a substantial and valuable impact on ROE (β=27.17964, $p<0.05$). This aligns with research that emphasises the significance of robust institutions and good governance practices in improving overall bank performance and shareholder wealth or profits (Nguyen, 2021). The primary finding was inverse and statistically significant coefficient for the interaction variable (INQ) (β=−3.468978, $p<0.01$). This suggests the important intermediate role played by institutional quality, suggesting that the positive association between non-performing loans (NPLs) and return on equity (ROE) weakens with enhancement in institutional quality. This posits that although non-performing loans may not directly affect return on equity, improved institutional frameworks might diminish their impact further, either by fostering more disciplined capital allocation or by enhancing risk mitigation strategies. GDP Growth has a significant positive impact on ROE, consistent with the notion that macroeconomic stability typically enhances bank profitability.

The Capital Adequacy Ratio (CAR) model demonstrates a positive and statistically significant direct correlation between non-performing loans (NPLs) and capital augmentation by banks (β=0.320524, $p<0.01$) in response to rising NPLs. This discovery is unexpected and challenges the traditional belief that elevated NPLs generally diminish a bank's capital base, thereby adversely affecting the CAR (Aledeimat & Bein, 2025; Attaha et al., 2023). The conventional perspective posits that non-performing loans (NPLs) elevate risk-weighted assets and require increased capital reserves, hence diminishing the capital adequacy ratio (CAR) until counterbalanced by capital infusions as supported by the work of Agarwal (2023).

This unexpected positive relationship may indicate a pre-emptive regulatory or managerial response. This supports the idea that regulatory authorities enforce more stringent capital requirements in response to declining asset quality, necessitating banks to acquire supplementary capital or keep earnings (Ahmed et al., 2021). This proactive capital enhancement results in a favourable relationship between capital and NPLs. The INSTQ demonstrated a considerable positive and statistically important impact on CAR (β=58.61794, $p<0.01$), corroborating existing evidence that robust institutions enhance capital positions by promoting solid financial practices and effective oversight (Scirp.org, n.d.). The interaction variable (INQ) is negative and statistically significant (β=−2.803135, $p<0.05$), signifying that the positive connection between non-performing loans (NPLs) and capital adequacy ratio (CAR) decreases with enhancement in institutional quality (Aledeimat & Bein, 2025). This suggests that, within robust institutional frameworks, the necessity for banks to significantly augment CAR in reaction to NPLs is less, perhaps owing to enhanced risk management or improved loan recovery strategies.

CONCLUSION

In summary, the discoveries reveal a positive and substantial relationship between NPLs and ROA and CAR. These results challenge existing assumption and belief that high NPLs impact negatively on performance in general. This finding again, suggest that banks with huge NPLs may be harboring more risks. However, the stimulus of NPLs on ROE was positive and insignificant. It is further revealed that, institutional quality wielded direct and significant influence on ROA, ROE and CAR. This signifies that NPLs may not have adverse influence on banks performance. The nexus between NPLs and institutional quality is negative, indicating that INSTQ effectively weakens the influence of NPL on ROA, ROE and CAR. Thus, the effects of NPLs on performance are significantly condensed in environments with tougher institutional qualities. While inflation rate shows inverse and insignificant relationship with performance, GDP growth is positively related to ROE, although insignificant for ROA and CAR.

This study's paradoxical findings challenge traditional assumptions about NPLs, suggesting that simple linear models are insufficient. These outcomes have Theoretical, Policy, and Practical Implications. The positive NPL-ROA/CAR relationship indicates an active managerial and regulatory responses to rising NPLs, which future theoretical frameworks should incorporate. The inverse moderating effect of institutional quality (INSTQ) on these relationships is a key contribution of this study to scholarship, extending Institutional Theory by demonstrating how institutional strength can buffer or alter the effects of credit risk on performance (Yen & Huy, 2023). This also highlights a more nuanced, conditional link between NPLs and bank performance in general.

Policy wise, these results underscore the importance of a robust regulatory environment. The positive link between NPLs and CAR suggests that proactive regulatory pressure is effective in compelling banks to build capital reserves in response to credit risks. This justifies strengthening supervisory frameworks and enforcing stricter capital adequacy rules such as those under Basel III. Policymakers should concentrate on enhancing institutional quality to make financial systems more resilient, as this study shows that this can mitigate the potentially destabilising effects of NPLs on the financial stability and performance of banks (Almulla et al., 2025).

The outcome of the study also provides a critical and counterintuitive perspective for bank management. For example, the positive NPL-ROA relationship might signal the use of aggressive write-off strategies to temporarily improve profitability, which may not be sustainable. Managers should prioritise building capital buffers and enhancing loan recovery mechanisms over short-term accounting manoeuvres. The findings also emphasise the need for banks to consider their specific institutional context, as a strong institutional environment allows for a more stable and less reactive approach to credit risk management.

Future study should concentrate on deeper exploration of the mechanisms underlying these contradictory findings. This includes the use of non-linear econometric models and qualitative case

studies to investigate the specific accounting and regulatory practices that produce positive NPL-performance correlations. Most importantly, future studies should build on this work by rigorously testing the moderating role of different dimensions of institutional quality (e.g. rule of law, control of corruption) to more precisely delineate their unique impacts on the NPL-performance relationship.

Carrying out research in these areas comes with some shortcomings. The work was solely concentrated in Ghana, a developing economy and a third world country. Similar studies conducted in other regions and economies may yield different results. The data used was those available from the published financials of the selected banks. Another study employing different financial institutions may also result in varied conclusions. The period covered was 2007 – 2017, and this may have impact on the results. New research targeting different economic time frame may results in an alternative conclusion. Some of the outcomes contradict global findings. An in-depth, more comprehensive analysis of the Ghanaian economy may also lead to the drawing of varied conclusions.

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