

BANK-SPECIFIC AND MACROECONOMIC DETERMINANTS OF NON-PERFORMING LOANS (NPLS) IN GHANA: THE CASE OF LISTED BANKS ON THE GHANA STOCK EXCHANGE

Daniel Amoah^{1*}, Doris Boakye², Desmond Ofori³, Adwoa Agyeiwaah Ampomah-Britwum⁴

^{1,2}Department of Accounting and Finance, Christian Service University, Ghana

³Department of Business School, Garden City University College, Ghana

⁴Department of Statistics and Actuarial Science, Kwame Nkrumah University of Science and Technology, Ghana

*Corresponding Author:

damoah.stu@outlook.com

Abstract

This study investigates the determinants of NPLs in Ghana's listed banks, addressing critical research gaps on credit risk analysis in emerging markets. Following Ghana's banking sector reforms and the lack of comprehensive frameworks, this study integrates bank-specific and macroeconomic factors to provide a complete understanding of NPL determinants within the banking sector. Using panel data from seven banks listed on the Ghana Stock Exchange (2010-2020), the study employs random effects regression validated through Hausman testing, integrating Financial Intermediation Theory and Moral Hazard Theory. The model demonstrates strong explanatory power ($R^2 = 0.606$), revealing significant negative relationships between NPLs and bank-specific variables: Capital Adequacy Ratio (-0.728), Loan-to-Deposit Ratio (-1.075), Return on Equity (-0.436), and Bank Size (-3.935). Bank Size emerges as the most influential determinant, confirming the presence of economies of scale in risk management. The counterintuitive LDR-NPL relationship suggests that aggressive lending is associated with more stringent credit screening procedures. Macroeconomic analysis confirms credit risk's countercyclical nature, with GDP (-1.773) and Money Supply (-1.821) significantly reducing NPLs. The Lending Rate and Inflation show positive but insignificant effects. Practical evidence from recent bank failures validates findings regarding capital adequacy. The study's contributions include multi-framework integration, robust econometric analysis, and evidence-based recommendations for capital enhancement and risk-based pricing models. Findings highlight the integration of NPL management approaches to address institutional practices and macroeconomic conditions, with implications for banking supervision and monetary policy coordination in emerging economies.

Keywords: Non-Performing Loans, Bank-Specific Factors, Macroeconomic Determinants, Ghanaian Banking Sector

1. Introduction

Banks play a significant role by granting credit to individuals and companies in a country. They face the risk of high loan provisioning, which results in non-performing loans (NPLs). Loans are the most common assets by which banks earn their revenue, but they also pose the biggest risk to them. Banks' NPLs have experienced a considerable surge in their failures in emerging and developed countries (Viswanadham, 2015). Aiyar and Bergthaler (2015) identified two factors that have impacted NPL growth in recent years. External factors include macroeconomic issues such as the unemployment rate,

broad money supply, GDP, and inflation, affecting borrower credibility. Internal factors include loans-to-deposit ratios, capital adequacy ratios, profitability, and bank size.

Jeong and Jung (2013) espoused that banks must identify factors contributing to their NPLs and develop strategies to minimize them. Aiyar and Bergthaler (2015) proposed that to reduce NPLs, policies on credit should be designed and implemented to guide and control the activities and directions for banks when issuing loans to their clients. When this is done, it helps prevent loans that would be highly problematic. A high rate of NPLs in banks reduces investors' confidence, and if its determinants are not rectified, it can result in malaise in the financial sector and drive out investors. According to Barongo (2013), restructuring loan requirements, minimizing loan issuance, digitizing, effective loan monitoring, robust financial statements analysis, and suitable collateral and documentation from the borrower reduce NPLs.

Despite extensive regulatory reforms and policy interventions implemented over the past decade, commercial banks in Ghana continue to experience elevated NPL ratios that threaten financial stability and economic growth prospects. This crisis has reached unprecedented levels in Ghana's banking sector history, where sixteen banks collapsed within one accounting period (2019/2020). This catastrophe entails individual institutional failures and systemic risks. These threaten Ghana's economic growth in the financial intermediation process. The Bank of Ghana's interventions, while necessary, have primarily focused on symptom management rather than addressing the fundamental determinants that drive credit risk accumulation. NPL ratios in Ghanaian banks continue to increase, exceeding regional averages and global benchmarks. Due to inadequate understanding of NPL determinants, a critical knowledge gap exists that hinders the development of effective risk management strategies and the formulation of practical policies. Given Ghana's unique economic characteristics, including high inflation volatility, exchange rate fluctuations, and the predominance of SMEs in the lending portfolio, this knowledge gap may influence NPL dynamics differently from other economies. Banking sector distress limits credit availability, weakens monetary policy mechanisms, and erodes public confidence in financial institutions. These effects threaten Ghana's development objectives and Sustainable Development Goals, including poverty reduction, economic growth, and employment creation. The recent banking sector clean-up exercise has highlighted the importance of understanding NPL determinants for the survival and optimal performance of existing banks. These require reliable empirical evidence for investors, depositors, and other stakeholders to make informed decisions and maintain confidence in the banking system.

This study is motivated by several reasons. Theoretically, existing research failed to integrate multiple models on NPL determinants in emerging economies, including Ghana. However, specific mechanisms through which macroeconomic variables influence credit risk in these markets require empirical validation. Also, significant research gaps on NPL determinants persist in the Ghanaian banking context. Existing studies focused on developed economies or employed limited analytical frameworks that fail to capture the complex interactions between bank-specific and macroeconomic factors. Studies in Ghana lack rigorous methodology, including inadequate sample sizes, narrow variable selection, and insufficient use of robust econometric techniques. Furthermore, the recent banking sector reforms and bank consolidations in Ghana necessitate updated empirical evidence that reflects current market conditions. Therefore, this study curbs theoretical, empirical, and policy-driven deficiencies in the literature on NPL determinants in an emerging country like Ghana.

Building on theoretical and empirical deficiencies of NPL determinants in Ghana, this study examines bank-specific and macroeconomic factors within a unified analytical framework, employing econometric techniques. Specifically, it examines how bank-specific factors such as Capital Adequacy Ratio (CAR), Return on Equity (ROE), Loan-to-Deposit Ratio (LDR), and Bank Size (BS) affect NPLs. It evaluates how macroeconomic factors such as Inflation (INF), Lending Rate (LR), Gross Domestic Product (GDP), and Money Supply (M2) affect NPLs in Ghanaian banks.

This study makes several significant contributions to the existing literature on NPL determinants in emerging market banking systems. First, integrating FIT and MHT provides a more comprehensive theoretical framework that previous studies lack. This study employs the Hausman test for model selection and the heteroscedasticity and multicollinearity tests for diagnostics. This addresses the limitations in the literature, thereby enhancing the reliability and validity of findings in this research domain. The study also makes contributions to banking practices and regulatory policies that can be practiced in emerging markets.

2. Theoretical Background

2.1 Financial Intermediation Theory (FIT)

This theory explains how bank-specific factors, including CAR and LDR, influence NPLs through risk management mechanisms. According to Kjosevski et al. (2019), excessive lending relative to deposits can pressure banks to extend credit to less creditworthy borrowers, increasing NPL risk. The theory further elucidates how ROE reflects management efficiency in intermediation activities, such as credit screening capabilities that lower NPL ratios.

Similarly, the theory directs how macroeconomic conditions affect banks' ability to fulfill their intermediate role effectively. During economic expansion, borrowers typically generate sufficient income to service debt obligations, whereas contractionary periods increase default probability. Monetary policy decisions affecting GDP, money supply, and inflation rates influence interest rates, credit availability, and NPL levels by altering the economic environment in which financial intermediation occurs.

2.2 Moral Hazard Theory (MHT)

This theory examines how information asymmetries and incentive structures affect NPL dynamics. MHT suggests that NPLs emerge partly from moral hazard behaviors where borrowers, protected by limited liability, undertake excessive risks, and banks lack perfect information to distinguish between high and low-risk customers (Ghosh, 2017). According to Kumar et al. (2018), inadequate capital (CAR) may incentivize banks to engage in high-risk lending to maximize returns. This framework posits that larger institutions may benefit from economies of scale in monitoring and screening technologies. Conversely, larger banks might assume "too-big-to-fail" status, encouraging excessive risk-taking that increases NPL ratios.

Koju et al. (2018) found that borrowers strategically default on repayment during economic downturns, characterized by low GDP growth and high inflation. Furthermore, periods of expansionary monetary policy (increased money supply) may create excessive liquidity that encourages relaxed lending standards and inadequate screening, nurturing an environment where moral hazard flourishes. These interactions help regulators and bank managers with critical perspectives for developing effective NPL management strategies.

2.3 Contextual Evidence of NPLs from Ghana's Banking Sector

In recent years, Ghana's banking sector has undergone several restructurings. In 2017, inadequate capital adequacy ratios and excessive lending relative to deposit bases precipitated the collapse of Capital Bank and UT Bank. According to the BoG report, Capital Bank's CAR reduced below the regulatory threshold of 10 percent, while maintaining an LDR exceeding 80 percent (BoG, 2020). This initiated liquidity constraints on regulatory intervention. In 2018, macroeconomic pressures, including currency depreciation and rising inflation, exacerbated existing weaknesses in bank-specific risk management practices. This propelled BoG to consolidate five banks into Consolidated Bank Ghana.

Despite operating in the same macroeconomic conditions as other banks, GCB has consistently maintained NPL ratios below the industry average. The bank's advanced technology infrastructure, extensive branch network, and sophisticated risk management systems have enabled more effective loan repayment. This illustrates the positive relationship between bank size and NPL management effectiveness.

When Ghana experienced economic challenges and currency depreciation between 2014 and 2016, the banking sector's NPLs increased from 11.4 percent to 17.3 percent. This demonstrates the sensitivity of credit risk to macroeconomic conditions. The pattern suggests that NPLs are countercyclical. It underscores the significance of incorporating macroeconomic forecasting into credit risk management strategies.

2.4 Empirical Review and Research Gap

Extensive studies have examined the determinants of NPLs across various banking contexts. With bank-specific determinants, Kjosevski et al. (2019) used panel data techniques and found a positive correlation between LDR and NPLs in Macedonian banks. This suggests that aggressive lending relative to the deposit base increases credit risk. Conversely, CAR exhibits an inverse relationship with NPLs through loan screening mechanisms (Ozili, 2019). Similarly, Kumar et al. (2018) found a negative correlation between ROE and NPLs using the "bad management" hypothesis. They found that poor financial performance reflects inefficient operations, including suboptimal credit risk assessment. Bank size exhibits varied effects on NPL ratios. Rahman et al. (2018) documented that larger institutions benefit from economies of scale in risk management. Adusei (2018) found the influence of CAR and bank size on NPL ratios, with well-capitalized and larger institutions demonstrating superior loan portfolio quality in Ghanaian banks.

Regarding macroeconomic factors, Koju et al. (2018) found that economic expansion (GDP) reduces default rates by enhancing business revenues and household incomes in Nepal. Badar and Yasmin (2013) also documented that expansionary monetary policy (M2) reduces NPLs through stimulated economic activity in Pakistan. Inflation presents similarly complex patterns, as Kjosevski and Petkovski (2017) found that inflation may reduce real debt burdens. Ghosh (2017) employed threshold models and found that volatile inflation correlates with increased NPLs through interest rate adjustments and purchasing power erosion. Boakye-Adjei and Amuakwa-Mensah (2015) found that the impact of inflation on NPLs proved more pronounced in Ghana than in comparable economies. Vouldis and Louzis (2018) used dynamic panel models to conclude that higher borrowing costs (LR) directly impair debt servicing capacity.

Several research gaps in existing literature justify this study's approach. Most studies focus on bank-specific or macroeconomic factors alone, lacking a comprehensive analytical framework that considers the interaction effects between institutional and systemic risk factors. Furthermore, previous studies on NPL determinants in sub-Saharan Africa have examined individual countries, neglecting Ghana's unique institutional and regulatory framework after its financial sector cleanup period. Methodologically, the absence of econometric validation techniques such as the Hausman test in earlier studies undermines the reliability of findings in this research domain. Again, previous Ghanaian studies limited the scope of profitability measures to ROE, neglecting other critical performance indicators. This study fills these gaps by employing robust econometric techniques to assess bank-specific and macroeconomic determinants of NPLs in Ghanaian banks.

3. Methods

This study employed an explanatory research design with a quantitative research approach. Seven (7) out of 23 listed banks on the Ghana stock exchange were purposively sampled. The study used secondary (panel) data from various banks, including macroeconomic factors from the BoG website and bank-specific factors from audited financial statements, collected between 2010 and 2020. Data was prepared and recorded in Microsoft Excel and imported into IBM SPSS (version 21) software for analysis. The study used the Hausman test to select the best model for the data. The Breusch-Pagan test was used to examine the existence of equal variance that might appear in the disturbance term. The study employed a multicollinearity test to determine the correlation and strength of the association between the variables. The regression model below was adopted:

$$NPL_{it} = \beta_0 + \beta_1(LDR)_{it} + \beta_2(CAR)_{it} + \beta_3(ROE)_{it} + \beta_4(BS)_{it} + \beta_5(GDP)_{it} + \beta_6(M2)_{it} + \beta_7(LR)_{it} + \beta_8(INF)_{it} + \varepsilon_{it}$$

Where:

NPL_{it} = Non-Performing Loans

β_0 = Model Intercept

$\beta_1 - \beta_8$ = LDR, CAR, ROE, M2, GDP, BS, LR, and INF are the independent variables

ε = margin of error

4. Results and Discussion

4.1 Descriptive Statistics

The study conducted a descriptive analysis below.

Table 1. Descriptive Statistics

Variable	Observation	Mean	Standard Deviation
NPLs	77	12.95	11.48
LDR	77	69.36	19.69
CAR	77	12.73	3.33
ROE	77	27.61	11.77
LR	77	13.36	1.41
BS	77	21.69	1.40
GDP	77	53.94	12.34
M2	77	27.27	2.53
INF	77	10.69	4.78

Source: Data processed by IBM SPSS Statistics 21 (2023)

Table 1 presents an average NPL of 12.95%, LDR of 69.36% CAR of 12.73%, ROE of 27.61%, LR of 13.36%, bank size (BS) is 21.69, GDP of \$53.9 billion, money supply (M2) of \$27.27, and inflation (INF) of 10.67%.

4.2 Multicollinearity Test

The study employed the Pearson correlation and Variance Inflation Factor (VIF) to test for multicollinearity. Table 2 shows the correlation among the variables.

Table 2. Correlation Among Variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) LnLDR	1.000							
(2) LnCAR	0.331	1.000						
(3) LnROE	-0.181	-0.380	1.000					
(4) LnLR	-0.348	0.097	0.413	1.000				
(5) LnBS	-0.218	0.263	0.127	0.433	1.000			
(6) LnGDP	-0.354	0.132	0.380	0.715	0.514	1.000		
(7) LnM2	-0.101	-0.113	-0.324	-0.281	-0.101	-0.499	1.000	
(8) LnINF	0.225	0.041	-0.134	-0.135	-0.163	-0.260	0.023	1.00

Source: Data processed by IBM SPSS Statistics 21 (2023)

Table 2 presents that while GDP and LR had a high correlation coefficient of 0.715, all other variables showed moderate and weak correlations. Furthermore, the study employed the VIF test to confirm the multicollinearity.

Table 3. Variance Inflation Factor of the Explanatory Variables

	VIF	1/VIF
LnGDP	3.421	0.292
LnLR	2.367	0.423
LnCAR	1.793	0.558
LnROE	1.769	0.565
LnM2	1.675	0.597
LnLDR	1.654	0.605
LnBS	1.54	0.649
LnINF	1.124	0.89
Mean VIF	1.918	-

Source: Data processed by IBM SPSS Statistics 21 (2023)

Table 3 shows that all variables have a VIF of less than 10. The average VIF value of 1.918 indicates the multicollinearity and low association between explanatory variables.

4.3 Heteroscedasticity Test

The study used the Breusch-Pagan test, and Table 4 presents the findings

Table 4. Heteroskedasticity Test

Chi-Square	3.14
P-value.	0.078

Source: Data processed by IBM SPSS Statistics 21 (2023)

Table 4 presents a p-value of 0.078 (7.8%), which exceeds the 0.05 (5%) threshold. This indicates that the data does not exhibit any issue of heteroscedasticity.

4.4 Determinants of Non-Performing Loans

This is the main study objective. The study employed the Hausmann test to determine the best regression model (random or fixed effect) to be employed. The random effect model is selected when the p-value is greater than 0.05. Conversely, when the p-value is

less than 0.05, the fixed effect model is used. In this study, the test revealed a p-value of 0.729 (see Appendix); hence, the random effect regression model was selected. Findings of NPL determinants are presented in Table 5.

Table 5. Random Effect Regression Model

LnNPLs	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]
LnLDR	-1.075	0.235	-4.57	0.000	-1.536	-0.614
LnCAR	-0.728	0.261	-2.79	0.005	-1.238	-0.217
LnROE	-0.436	0.118	-3.68	0.000	-0.668	-0.204
LnLR	0.529	0.502	1.05	0.292	-0.455	1.513
LnBS	-3.935	1.692	-2.33	0.020	-7.250	-0.619
LnGDP	-1.773	0.367	-4.83	0.000	-2.493	-1.053
LnM2	-1.821	0.560	-3.25	0.001	-2.917	-0.724
LnINF	0.077	0.040	1.92	0.055	-0.002	0.157
Constant	70.361	8.281	8.50	0.000	54.130	86.592
Mean dependent var			2.290	SD dependent var		0.705
Overall r-squared			0.606	Number of obs		77.000
Chi-square			213.699	Prob > chi2		0.000
R-squared within			0.775	R-squared between		0.246

*** p<0.01, ** p<0.05, * p<0.1

Source: Data processed by IBM SPSS Statistics 21 (2023)

Table 5 indicates an overall R-squared of 0.606, indicating that the independent variables explain 60.6% of the variation in the NPLs. The Prob > chi2 value of 0.000 implies that the random effect regression model is significant. The study found that CAR, LDR, ROE, BS, GDP, and M2 significantly determine banks' NPLs, with p-values less than 0.05. However, LR and INF showed p-values above 0.05, indicating no significant effects on banks' NPLs. Furthermore, the study developed the regression model below: $LnNPLs = 70.361 - 1.075(LnLDR) - 0.728(LnCAR) - 0.436(LnROE) + 0.529(LnLR) - 3.935(LnBS) - 1.773(LnGDP) - 1.821(LnM2) + 0.077(LnINF) + \varepsilon$

The equation shows that bank-specific factors (LDR, CAR, ROE, and BS) have a significant negative effect on banks' NPLs. This indicates that a 1% increase in each bank-specific factor (LDR, CAR, ROE, and BS) reduces NPLs by nearly 1.08%, 0.73%, 0.44%, and 3.94%, respectively, when other independent variables are held constant. The coefficients of two macroeconomic factors, GDP (-1.773) and M2 (-1.821), indicate that they have negative impacts on the NPLs of Ghanaian banks. Findings demonstrate that, while other independent variables remain constant, a 1% increase in GDP and M2 reduces NPLs by 1.77 and 1.82, respectively. Findings reveal that INF and LR have a significant positive impact on banks' NPLs. The study found that a 1% increase in these factors (INF and LR) leads to a nearly 0.08% and 0.53% increase in NPLs, respectively.

4.5 Discussion of Key Findings

The study's empirical analysis uses econometric methodology to investigate the determinants of NPL in Ghana's banking sector. Findings provide compelling evidence of the intricate role of bank-specific and macroeconomic conditions in determining NPL levels. The study warrants interpreting findings through established theoretical frameworks and comparing them with international empirical evidence to understand their implications for academic theory and practical policy formulation.

CAR's significant negative relationship with NPLs (coefficient = -0.728, $p < 0.01$) strongly supports FIT's predictions on the role of capital buffers in banking stability. Also, this finding aligns with the theoretical view (regulatory capital theory) that well-capitalized banks can manage unexpected losses through effective credit screening and monitoring mechanisms. Findings concur with studies from Ozili (2019) in African banking systems and Kjosevski et al. (2019) in Macedonian banks. These suggest that the CAR-NPL relationship exhibits consistency across diverse emerging market contexts.

This study revealed an unexpected negative relationship between LDR and NPLs (coefficient = -1.075, $p < 0.001$). Traditional banking theory suggests that higher LDR indicates aggressive lending that may compromise credit quality. However, this finding suggests that Ghanaian banks with higher LDR implement more sophisticated risk management systems to compensate for their increased lending exposure. This aligns with modern portfolio theory's emphasis on risk-adjusted returns, where banks pursuing aggressive lending strategies invest more resources in credit risk assessment and monitoring technologies. These findings align with Kristianti and Yovin's (2016) but differ from Swamy's (2012) findings.

ROE's negative relationship with NPLs (coefficient = -0.436, $p < 0.001$) supports the empirical "good management" hypothesis in banking literature. This theoretical framework posits that management quality is revealed in higher profitability and better credit risk management. Findings suggest that profitable banks in Ghana exhibit enhanced operational efficiency that extends to credit risk assessment and loan monitoring activities. Findings on BS (coefficient = -3.935, $p < 0.05$) illustrate economies of scale in risk management within Ghana's banking sector. This finding supports theoretical arguments that larger institutions benefit from enhanced risk diversification, advanced credit assessment technologies, and high monitoring systems. Findings suggest that scale effects in Ghanaian banking reflect the significant investments in technology and human capital required for effective credit risk management. This aligns with Rahman et al. (2018) findings in Bangladesh but contrasts with studies suggesting the moral hazard effects of "too-big-to-fail" in developed economies.

Regarding macroeconomic factors, the significant negative relationship between GDP and NPLs (coefficient = -1.773, $p < 0.001$) confirms the countercyclical nature of credit risk, aligning with business cycle theory and financial accelerator mechanisms. This finding supports theoretical predictions that economic expansion enhances borrowers' debt servicing capacity through improved income streams and cash flow generation. Findings suggest that Ghana's banking sector exhibits high sensitivity to economic cycles, with NPL levels responding substantially to changes in economic activity. This parallels Koju et al.'s (2018) study in Nepal and Ghosh's (2017) in the United States, indicating that the GDP-NPL relationship exhibits consistency across diverse economic contexts.

Furthermore, M2's significant negative effect on NPLs (coefficient = -1.821, $p < 0.01$) suggests the effectiveness of monetary policy transmission through banking sector credit quality. This finding supports theoretical frameworks suggesting that expansionary monetary policy reduces default rates through multiple channels: increased liquidity, reduced borrowing costs, stimulated economic activity, and improved borrowers' cash flow positions. The substantial coefficient magnitude indicates that Ghana's banking sector responds sensitively to monetary policy adjustments implemented by the Bank of Ghana.

Findings on LR's relationship with NPLs (coefficient = 0.529, $p = 0.292$) suggest that with an increased lending rate, borrowers find it difficult to repay their loans, exposing

banks to a high default rate. However, LR's insignificance may reflect specific institutional factors, including interest rate policies, market concentration effects, or the prevalence of relationship banking in Ghana's banking environment. This finding contrasts with Vouldis and Louzis' (2018) theoretical predictions and empirical studies, suggesting that institutional context significantly influences monetary policies. Findings about the impact of INF on NPLs (coefficient = 0.077, $p = 0.055$) may reflect successful inflation-hedging strategies by Ghanaian banks or the effectiveness of monetary policy interventions. This finding suggests that the INF-NPLs relationship may be moderated by institutional factors and policy effectiveness in emerging market contexts, aligning with findings from Kjosevski and Petkovski (2017) in the Baltic states.

5. Conclusion

This study reveals nuanced relationships between bank-specific features and macroeconomic conditions that significantly influence credit risk dynamics in listed Ghanaian banks. Findings highlight the interplay of institutional factors and economic environments in determining loan portfolio quality. They also contribute to theoretical understanding and feasible banking practices in emerging market contexts. The study supports the Financial Intermediation Theory regarding bank-specific factors in credit risk management. BS-NPL relationship confirms that larger financial institutions enjoy economies of scale in risk management. This enables advanced credit assessment technologies and monitoring systems. This finding highlights the implications of Ghana's banking sector consolidation policies. It suggests that strategic mergers and acquisitions could enhance the overall sector stability by improving risk management abilities.

Findings on LDR's negative relationship with NPLs challenge conventional wisdom and suggest that Ghanaian banks with higher lending ratios implement stringent credit assessment procedures as a compensatory mechanism. This counterintuitive finding suggests that aggressive lending practices and robust risk management frameworks can reduce default rates by improving borrower screening and monitoring. This has implications for regulatory approaches to liquidity management and lending guidelines.

From a macroeconomic perspective, the relationships between GDP growth, money supply, and NPLs highlight Ghana's countercyclical nature to credit risk in the banking sector. These findings underscore the importance of macroeconomic stability for the banking sector. The study advises effective coordination between monetary policy and banking supervision to maintain financial stability. GDP impact on NPLs highlights how banking sector resilience can be enhanced through economic diversification and sustainable growth strategies.

The study recommended that bank managers prioritize improving capital adequacy and developing integrated risk management practices, as well as macroeconomic forecasting capabilities. Banks should implement organic growth or strategic consolidation mechanisms to enhance their institutional scale and improve operational capabilities and credit monitoring systems. In designing supervisory models and methodologies for challenging banks, regulators should consider the dynamic relationships between bank-specific and macroeconomic conditions. Furthermore, policymakers should recognize the interconnected nature of macroeconomic policy and banking sector stability by considering the impact of fiscal and monetary policies on credit risk formation. Findings demonstrate that integrating Financial Intermediation Theory and Moral Hazard Theory within emerging market contexts provides a more comprehensive understanding of credit risk formation. Therefore, this study suggests that

future research should continue to explore multi-theoretical approaches to analyze the banking sector. Due to a few limitations, future research should consider expanding the sample size and incorporating governance variables that may influence NPL.

References

- Adusei, C. (2018). Determinants of non-performing loans in the banking sector of Ghana between 1998 and 2013. *Asian Development Policy Review*, 6(3), 142-154.
- Aiyar, S., & Bergthaler, W. (2015). A strategy for resolving Europe's Problem Loans (IMF Staff Discussion Note SDN/15/19).
- Badar M., & Yasmin A. (2013). Impact of macroeconomic forces on nonperforming loans: An empirical study of commercial banks in Pakistan. *Journal of Transactions on Business and Economics*, 1, (10).
- Bank of Ghana (BoG) Report (2020). Banking Act. [Online]. Available at: www.bog.gov.gh (Accessed on 7th June 2023).
- Barongo, W. M. (2013). Factors contributing to nonperforming loans in non-banking institutions in Tanzania: A case of National Social Security Fund. Unpublished master's thesis, Open University of Tanzania
- Boakye-Adjei, A. & Amuakwa-Mensah, F. (2015). Determinants of non-performing loans in the Ghana banking industry. *International Journal of Computational Economics and Econometrics*, 5(1), 35-54.
- Ghosh, A. (2017). Sector-specific analysis of non-performing loans in the US banking system and their macroeconomic impact. *Journal of Banking & Finance*, 81, 155-169.
- Jeong, S., & Jung, H. (2013). Bank wholesale funding and credit procyclicality: Evidence from Korea. *Panoeconomicus*, 60(5), 615–631.
- Kjosevski, J., & Petkovski, M. (2017). Non-performing loans in Baltic States: determinants and macroeconomic effects. *Baltic Journal of Economics*, 17(1), 25-44.
- Kjosevski, J., Petkovski, M., & Naumovska, E. (2019). Bank-specific and macroeconomic determinants of NPLs in the Republic of Macedonia: Comparative analysis of enterprise and household NPLs. *Economic Research-Ekonomska Istraživanja*, 32(1), 1185-1203.
- Koju, L., Koju, R., & Wang, S. (2018). Macroeconomic and bank-specific determinants of non-performing loans: Evidence from the Nepalese banking system. *Journal of Central Banking Theory and Practice*, 7(3), 111-138.
- Kristianti, R. A., & Yovin, F. (2016). Factors affecting bank performance: Cases of top 10 biggest government and private banks in Indonesia in 2004 - 2013, *Review of Integrative Business Economics Research*, 5(4), 371-378.
- Kumar, M., Eichengreen, B., & Gambacorta, L. (2018). The determinants of bank profitability in the Chinese banking industry. *Pacific Economic Review*, 23(3), 267-287.
- Ozili, P. K. (2019). Non-performing loans and financial development: New evidence. *The Journal of Risk Finance*, 20(1), 59-81.
- Rahman, M. M., Zheng, C., & Ashraf, B. N. (2018). Bank size, risk-taking, and capital regulation in Bangladesh. *Eurasian Journal of Business and Economics*, 11(21), 43-64.
- Swamy, V. (2012). Impact of macroeconomic and endogenous factors on non-performing bank assets, *The International Journal of Banking and Finance*, 9, (1), 27-47.

- Viswanadham, N. (2015). Determinants of non-performing loans in commercial banks: A study of NBC bank, Dodoma, Tanzania. *International Journal of Finance and Banking Studies*. 4(1), 2147-4486
- Vouldis, A. T., & Louzis, D. P. (2018). Leading indicators of non-performing loans in Greece: the information content of macro-, micro-, and bank-specific variables. *Empirical Economics*, 54(3), 1187-1214.