Effects of Non-Performing Loans on the Financial Performance of Selected Banks on the Ghana Stock Exchange

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ABSTRACT

The performance of loans plays a significant role in enhancing the financial performance of banks and maximizing shareholders' value. Hence, the study explores the effects of Non-Performing Loans (NPLs) on the Financial Performance of Selected Banks on the Ghana Stock Exchange. To this end, the researcher employed a quantitative research approach with a descriptive research design where the impact of NPLs on financial performance was examined through regression analysis and fixed effect, random effect, as well as Hausman Test with STATA. The panel data were collected from published financial statements of the selected banks from the period of 2012 to 2023. The study revealed that the findings present a nuanced picture that requires immediate attention from stakeholders. While there is strong evidence linking high levels of NPLs with lower efficiency reflected in lower ROA figures, their impact on ROE remains ambiguous based on current data sets. This implies that NPLs have no significant impact on returns from equity, while the high levels of non-performing loans affect the profitability and operational effectiveness of the banks. The study further observed that the interest rate fluctuations do not play any role in the link between NPLs and the returns on assets and equity. Given the results, it is recommended that banks adopt robust risk assessment frameworks specifically focused on closely monitoring non-performing loans. It is also suggested that financial institutions must implement strategies aimed at minimizing defaults through improved credit assessments and borrower support programs. Instead of simply expanding asset bases without strategic oversight, banks should focus on improving operational efficiency along with growth.

Keywords: Non-performing loans, financial performance, selected banks, Ghana Stock Exchange

INTRODUCTION

Throughout the world, the problem of non-performing loans (NPL) has been a pressing concern, particularly following the economic crises that led to greater breaches among borrowers. According to the International Monetary Fund (IMF), high levels of NPL can hinder the ability of banks to lend, which subsequently suffocates economic growth (IMF, 2020). For example, during the Eurozone crisis, countries such as Greece and Italy faced the growing NPL proportions that prevented recovery efforts by restricting credit availability. The investigation reveals that the presence of high levels of NPL is negatively correlated with bank profitability indicators, including asset performance (ROA) and capital yield (ROE) (Beck et al., 2013). Banks loaded with NPLs may need to assign more capital for loan loss provisions instead of making productive investments.

High levels of NPL may have serious consequences for banks. When borrowers fail to comply with their loan terms, banks face greater demands for provisions against potential losses. This not only eats your profits, but also limits your ability to generate income through interest rates. The repercussions extend beyond individual institutions; They ripple throughout the economy.

A study by Agyemang et al. (2020) highlights a strong negative correlation between the NPL and the return on assets (ROA) among African banks. As unrealized losses increase, bank profitability suffers. This relationship underlines a significant challenge that faces financial institutions in these regions. The decrease in profitability resulting from high levels of NPL may have broader economic implications. On the one hand, it reduces the loan capacity of banks, meaning fewer resources are available for both companies and consumers. This can

suffocate economic growth and development as access to credit decreases. Additionally, the decrease in trust in the banking sector can lead to a vicious cycle. As customers' distrust of placing their money in banks with high NPL relationships, liquidity problems may arise. Banks may be unable to meet the demands for retirement or provide new loans due to a lack of funds.

In many African countries, regulatory agencies have been criticized for inappropriate supervision and the application of loan standards (Mugano & Mlambo, 2019). This lack of strict regulations can exacerbate the NPL problem by allowing banks to participate in more risky loan practices without sufficient supervision. The macroeconomic environment has a significant influence on the NPL level within the banks. Economic recessions often lead to greater infractions as borrowers fight with the instability of income (Khan et al., 2021). In many African nations where economies depend largely on exports of basic products, fluctuations in global prices can lead to sudden increases in NPL relationships during periods of economic stress.

Different banking practices in all regions also contribute to variations in NPL levels. For example, some studies suggest that state banks tend to have higher NPL ratios compared to private banks due to political interference and less strict credit evaluation processes (Bokpin & Abo, 2018). On the contrary, private institutions can adopt more rigorous credit evaluation mechanisms that mitigate the risks associated with loan violations.

Cultural attitudes towards debt reimbursement also play a role in the configuration of the NPL dynamics within the banking sector of Africa. In some cultures, there may be less stigma associated with loan defaults compared to others where maintaining credit solvency is essential (Oseiiassibey et al., 2020). This cultural dimension complicates the efforts of financial institutions to administer their portfolios effectively.

Loans with no performance, often referred to as NPLs, are those that are in default or are otherwise delinquent. In general, they are defined as loans that have not received payment for 90 days or more (Monokrou & Gortsos, 2017). The emergence of NPLs is a pressing concern for banks, particularly in Africa's distinctive economic environment. The existence of NPL creates significant obstacles to financial institutions. When these loans accumulate, they lead to a reduction in profitability and force banks to strengthen their reserves against possible losses. This situation finally affects the financial health of the banks involved. Additionally, a high volume of NPLs can endanger the liquidity and overall stability of a bank.

One of the most significant factors contributing to the rise in non-performing loans (NPLs) is macroeconomic instability. When economic conditions fluctuate due to inflation, unemployment peaks, or other disruptions, borrowers often struggle to fulfill their repayment obligations. This instability creates a domino effect that can lead to higher default rates in several sectors.

Another factor that contributes is the ineffective practices of loan collection. Banks and loan institutions can struggle with outdated or inefficient methods for collecting debts. This insufficiency can exacerbate the problem of NPL, since borrowers may feel less pressure to pay their loans when collection efforts are weak or poorly managed. In addition, inappropriate risk assessment frameworks can lead banks to extend credit without thoroughly evaluating borrowers' capacity to repay. When financial institutions rely on outdated models or fail to consider individual borrower circumstances, they inadvertently increase their exposure to potential breaches.

Despite these challenges, recent advances in Fintech offer promising solutions that could significantly mitigate the impact of loans with poor performance. Improved credit score systems and improved loan monitoring tools are at the forefront of these innovations (Afolabi & Ajayi, 2021). By leveraging technology effectively, banks can enhance their ability to assess risk with greater precision. Advanced data analysis enables financial institutions to analyze borrowers' behavior patterns more comprehensively.

The implications for banks that appear in the GSE are profound. High NPL levels can lead to a decline in investor confidence and negatively impact share prices. A study by Osei-Asibey et al. (2019) found a strong inverse relationship between the performance of banking actions and the increase in NPL relations within the Ghanaian context. Investors often receive high levels of NPL as an indication of underlying management problems or an unstable economic environment.

The banking sector in Ghana plays a crucial role in driving economic growth and stability. However, it faces challenges, particularly in relation to unrendered loans (NPL). The regulatory framework that governs these banks plays a crucial role in the effective management of NPL risks. One of the key elements of this framework is the introduction of more strict capital adaptation requirements. These regulations are designed to ensure that banks maintain enough capital reserves to absorb potential losses of uncollectible loans. In addition to capital adaptation requirements, better risk management guidelines have been introduced. As the banking landscape continues to evolve, so must the approaches adopted for managing credit risks associated with loan activities. The implementation of a solid risk management framework enables institutions not only to identify potential violations from the outset but also to equip themselves with the necessary tools to take proactive measures when necessary.

By focusing on strong frameworks, leveraging technology, ensuring compliance, and cultivating a workforce with the necessary knowledge, banks can navigate complexities more effectively, safeguard their interests from the outset, and better serve their customers. However, despite these advances, many banks continue to struggle with the practical implementation. The complexity of risk management practices often leads to gaps in understanding and execution among personnel members at different levels.

Another critical initiative implies improving the exchange of credit information between banks. The effective exchange of credit data can significantly improve loan decision-making processes. When banks have access to integral credit, they can more effectively evaluate the solvency of borrowers and make informed loan decisions. This collaboration between financial institutions could also reduce the instances of future breaches of loan standards. As highlighted by Kwan et al. (2017), effective credit risk management practices are crucial to maintain stability within financial systems.

Research has widely documented the global effects of NPL on banking institutions. A relevant example is the European debt crisis, during which many banks found severe difficulties due to the growing NPL relationship. This situation required regulatory interventions aimed at stabilizing the banking sector (Smith et al., 2020; Johnson & Lee, 2021). The crisis highlighted how high levels of NPL can create systemic risks that extend beyond individual institutions to affect the entire financial panorama.

An increase in NPL inherently increases the credit risk profile of a bank. As a consequence, banks face more strict regulatory scrutiny and can be subjected to sanctions (Lawrence et al., 2024). This greater supervision is not just an inconvenience; It can lead to operational interruptions and additional costs as banks strive to comply with regulations. Additionally, the ineffective management of NPL can significantly erode shareholder trust. The reputation of a bank is essential for attracting both investors and customers. When interested parties perceive poor management or the inability to control bad loans, trust decreases. This loss of trust can erode a bank's competitive advantage in a constantly evolving financial environment.

To safeguard financial stability and encourage growth within this dynamic industry, banks must implement effective strategies to manage low-performance loans. The investigation reveals that high levels of NPLs negatively impact the bank's overall performance by reducing interest income while increasing simultaneous supply costs (Busaada et al., 2023; Phung et al., 2022).

As we delve into the complexities of the Ghana Stock Exchange (GSE), it is essential to examine both macroeconomic influences and the specific challenges faced by Ghana's banking sector. In recent years, Ghana has experienced notable fluctuations in its proportion of non-performing loans (NPLs). These variations have been significantly attributed to economic recessions, monetary depreciation, and changes in regulatory frameworks. Recent data from the Ghana Bank highlight that NPL proportions have intensified at worrying levels, which raises alarms on financial stability within the region. The banking sector in Ghana has not been immune to the problems associated with NPLs. As of April 2025, the NPL ratio had shown a promising decrease to 23.6%, which was below the 25.7% recorded in April 2024 (Banco de Ghana, 2025). This reduction reflects a positive trend, as losses in completely supplied loans decreased from 11.1% to 9.0% during this period. The improvement can be proven mainly by a significant increase in total loans issued by banks and the growth of NPL shares. Specifically, total NPL shares increased by 8.7%, reaching GH¢21.7 billion in April 2025 compared to GH¢20.0 billion the previous year.

A closer examination of these figures reveals an interesting shift in the allocation of public and private sector loans. The proportion of NPL linked to the private sector increased to 93.4%, compared to 91%. On the contrary, the Public Sector NPLs significantly decreased to only 6.6%, falling below the 9%directed threshold. This trend indicates a gradual decrease in the general rates of NPL within the banking sector, a sign that loan performance and risk management practices are improving over time. These developments have positive implications for investors and interested parties alike, suggesting that a more stable economic environment is emerging within Ghana's financial panorama. The research emphasizes that high levels of NPL can negatively affect critical metrics of banking performance, such as assets and return on equity (Kasmir, 2014: p. 204; Ayu et al., 2014).

Banks allocate substantial resources to manage uncollectible debts instead of lending to productive borrowers, which negatively affects their profitability. This decrease can lead to a decline in share prices on the GSE as investors' trust decreases due to concerns about bank solvency and general market stability.

In the complex world of finance, non-performing loan management (NPL) is a critical challenge that can significantly impact the overall performance of an institution. It is believed that some institutions have successfully mitigated their NPL through the implementation of solid strategies for credit management and innovative restructuring solutions. These approaches not only improve the performance of the individual bank but also provide valuable information for others in the industry. Institutions that prioritize this aspect often develop comprehensive frameworks that evaluate the solvency of the borrowers with greater precision.

The successful approaches employed by these institutions contribute to a deeper understanding of how NPLs impact market performance. For example, high levels of NPL can negatively affect investors and share prices. Therefore, interested parties must understand the implications of NPL management in a broader market dynamic. This knowledge becomes particularly relevant in contexts such as Ghana's financial panorama, where resilient banking practices are vital for economic stability. By sharing ideas about effective NPL mitigation strategies, we can encourage other banks to adopt similar practices, ultimately strengthening the financial sector.

Given this context, our study aims to investigate the impact of loans not generated on the performance of the selected banks that appear on the Ghana Stock Exchange (GSE). Focusing specifically on key metrics such as the return on assets (ROA) and the return on equity (ROE), we aim to understand how variations in NPL levels correlate with overall bank performance. The data analysis of the banks quoted in GSE will shed light on trends and patterns related to the management of NPLs within Ghana's unique economic environment. The findings from this research can inform policy recommendations aimed at enhancing financial resilience across the sector.

LITERATURE REVIEW

This section provides an overview of non-performing loans, including their theoretical foundations and an empirical review.

Theoretical foundations

Several theoretical models have been proposed to analyze the dynamics between NPLs and bank performance.

Credit risk theory

This framework emphasizes the evaluation of the deputy solvency and its correlation with non-compliance rates. The growing prevalence of loans not made in European banks highlights significant failures in existing credit risk models, as evidenced by Altman's work (1968) and Kwan & Eisenbeis (1997), which requires a reevaluation of these frameworks. The theory suggests that unrealized loans have a significant impact on financial stability in developing economies, mainly due to inadequate regulatory measures, as evidenced by the findings of Laeven and Valencia (2013) and Beck et al. (2015).

The correlation between macroeconomic factors and increased non-performing loans suggests that credit risk evaluation should incorporate broader economic indicators, as supported by Chen et al. (2012) and Boudriga et al. (2009). The application of automatic learning techniques to predict unrealized loans can enhance credit risk management practices, providing a more effective alternative to traditional statistical methods, as Huang et al. (2020) and Bontemps et al. (2019) have argued. Policy reforms aimed at improving transparency and accountability in loan practices are crucial for mitigating the risks associated with loans without yield, particularly in financial environments following the crisis, as Ghosh (2015) and Morsy & Dabo (2016) point out.

The application of credit risk theory, as articulated by Merton (1974), effectively predicts the probability of non-compliance in corporate bonds due to its dependence on market-driven factors and real-time data analysis. Credit risk theory must incorporate behavioral financial principles, as suggested by Biais and Weber (2009), because investors' emotions significantly influence risk assessments and market stability in financial institutions. The limitations of traditional credit risk theory, as highlighted by Altman (1968), necessitate the integration of automatic learning techniques to enhance predictive precision and response capacity in evaluating a borrower's solvency.

Empirical studies suggest that credit risk theory frameworks can be successfully adapted to emerging markets, as demonstrated by Liu et al. (2018), due to the unique economic indicators that influence credit behavior in these regions. The evolution of credit risk theory underlines the importance of regulatory frameworks, with authors such as the Basel Committee (2010) arguing that the stronger capital requirements are essential to mitigate systemic risks in the banking sector.

Agency Theory

This theory explores conflicts between bank management and interested parties that can lead to bad loan decisions. The agency's theory inadequately addresses the rise of loans that do not yield performance in banking institutions, as evidenced by the lack of alignment between management incentives and shareholder interests (Jensen & Meckling, 1976). The prevalence of loans not made in financial markets can be attributed to the agency theory's failure to account for risk management practices, which leads to disincentivized incentives among executives (Fame, 1980). Empirical studies suggest that the application of agency theory to the governance of financial institutions reveals significant deficiencies in addressing unrealized loans resulting from inadequate supervision mechanisms (Shleifer & Vishny, 1997).

The relationship between agency theory and unrealized loans highlights critical failures in corporate governance structures, as evidenced by the highest breach rates after poor management decision-making (Eisenhardt, 1989). Loans without yield serve as a fire test for the effectiveness of agency theory in financial contexts, demonstrating that misaligned interests can exacerbate credit risk and undermine institutional stability (Admati & Pfleiderer, 2009).

Economic theory

Economic recessions, inflation rates, and unemployment levels are critical factors that influence NPL relationships, as highlighted in several studies. The persistent increase in non-performing loans (NPLs) in the face of further financial crises highlights a deficiency in existing economic theories, which necessitates a reevaluation of risk assessment models, as evidenced by authors such as Altman (2010) and Ghosh (2015). Economic theories that do not adequately incorporate the complexities of borrower behavior contribute significantly to the growing rates of unrealized loans, as illustrated in the works of Duygan-Bump et al. (2013) and Fofack (2005). The relationship between economic recessions and the increase in non-general loans highlights the limitations of traditional economic theories, underscoring the need for innovative approaches, as supported by the investigations of Kwan and Eisenbeis (1997) and Salas & Saurina (2002).

A comparative analysis of loans not performed in different banking systems reveals that regulatory frameworks significantly influence NPL levels, challenging conventional economic theories as evidenced by Beck et al. (2013) and Jiang et al. (2018). The existing literature on unrealized loans suggests that

macroeconomic indicators alone are insufficient to predict NPL behavior, emphasizing the need for an integrated theoretical framework that incorporates microeconomic factors, as noted by Panetta et al. (2009) and Figueira et al. (2020).

The growing prevalence of loans not made in developing economies, as evidenced by the works of Laeven and Valencia (2013), suggests a direct correlation with macroeconomic instability resulting from inadequate regulatory frameworks. The investigation reveals that the increase in interest rates has a significant impact on loans with poor performance in European banks, underscoring the urgent need for political leaders to address the implications of monetary policies, as discussed by Bofondi and Rinaldi (2017).

The relationship between economic recessions and loans with poor performance is underscored by the findings of Berglund and Lindqvist (2019), which show that periods of recession exacerbate credit risk among financial institutions. An analysis of unrealized loans in several countries reveals that effective risk management strategies are crucial for mitigating the adverse effects of economic fluctuations, supporting the conclusions drawn by Liu et al. (2020). Literature on unrealized loans, particularly Jarrow and Van de Guchte (2018), illustrates how the vulnerabilities of the banking sector intensify during economic crises, which require comprehensive reforms in financial regulation.

Empirical Review

For policy formulators and banking professionals, it is essential to understand the connection between NPL and ROA. Numerous studies have documented a negative correlation between these two variables. Khemraj and Pasha (2017) identified that high levels of NPL result in higher supply costs for banks. This increase in costs decreases net income, which leads to a decrease in ROA.

Additionally, recent studies highlight the role of regulatory frameworks in mediating this relationship. Basel III regulations introduced stricter capital requirements aimed at enhancing the resilience of banks against financial shocks arising from high levels of NPLs (Zhang & Chen, 2022). By ensuring that banks maintain adequate capital reserves, these measures could mitigate the adverse effects on the ROA by promoting best risk management practices among financial institutions.

However, the relationship between NPL and Roa is not always simple. Some researchers propose alternative views regarding this dynamic. A 2020 study by García et al. It suggests that although high NPL ratios often indicate anguish within individual banks, they could also reflect broader economic conditions, rather than simply indicating poor management practices.

Studies have identified that interest rates tend to correlate with a decrease in ROA in various sectors due to reduced capital investments (Smith et al., 2020; Johnson & Lee, 2021; Patel & Kumar, 2023; Williams, 2024).

Supporting this point of view, Aghion et al. (2018) argue that high relations with NPL can hinder the loan capacity of the banks. When banks face substantial amounts of loans without performance, their ability to extend new credit decreases. This not only limits potential income flows but can also initiate a harmful cycle of economic stagnation.

This perspective encourages us to consider macroeconomic factors, such as unemployment rates and GDP growth, when evaluating NPL levels and bank profitability. In times of economic recession or instability, an increase in unemployment can lead to a greater number of loans that default, thus inflating the number of non-performing loans within banks.

Regulatory frameworks are crucial for maintaining the integrity of banking systems worldwide. Not only do they establish standards for capital adaptation, but they also establish guidelines for risk management and governance practices within banks. In this context, it is clear that intense regulatory supervision can help mitigate the negative impact of NPLs on the ROA.

However, it is also essential to consider geographical differences when evaluating this impact. Muda et al. (2023) highlight how emerging markets may experience more pronounced effects due to less robust regulatory

environments compared to developed economies, where strict supervision is in place. In regions with weaker regulations, banks may face more significant challenges due to high levels of NPLs, as they lack sufficient safeguards against potential losses.

Several studies indicate that an increase in NPLs leads to higher supply costs and lower income from assets, ultimately decreasing the ROE. For example, a study by Akinlo et al. (2020) found that banks with high NPL relationships tend to experience a profitability reduction due to the highest provisions of loan loss, which directly affect their profits and, therefore, their ROE.

Similarly, the investigation carried out by Osei-Asibey et al. (2019) emphasized that banks with higher NPL ratios often face challenges in adapting their capital and operational efficiency, which further limits their ability to generate yields for shareholders. On the contrary, some scholars argue that the impact of NPLs on the ROE may not be uniform across all banking institutions or economic contexts. For example, the research carried out by Ghosh (2021) suggests that well-capitalized banks can handle their risk exposure more effectively and can absorb high levels of NPL without significantly compromising their ROE. This perspective emphasizes the importance of effective risk management practices and capital shock absorbers in mitigating the adverse effects associated with NPL.

The investigation has consistently shown a strong connection between high NPL ratios and reduced capital yield (ROE). When banks experience an increase in breaches, their profitability takes a hit. Boudriga et al. (2018) highlight this relationship, illustrating how economic recessions often result in greater breaches of loans, which then raise the NPL levels within banks. This increase in NPL can negatively impact the bank's overall financial health.

However, it is essential to recognize that external economic conditions also play an important role in this dynamic. While high NPL relationships generally correlate with decreased ROE, several macroeconomic factors can exacerbate or relieve these impacts.

Khemraj and Pasha (2017) further explore the implications of the increase in NPL levels on asset quality and loan capacity. As NPLs increase, banks often need to allocate more resources to cover potential losses through increased supply requirements. This allocation of funds directly affects its ability to increase total assets, since more capital must be reserved for risk management instead of being used for new loan opportunities. This situation creates a cycle in which a decrease in asset quality leads to reduced loan capacity, which can hinder broader economic growth.

Despite the generally negative perception of the high levels of NPL, some researchers argue that not all effects are uniformly harmful. Ghosh (2020) presents an interesting perspective, suggesting that during periods of economic recovery, banks can effectively manage their NPLs through proactive strategies, such as restructuring efforts or improved risk evaluation techniques.

According to Bofondi et al. (2021), strict regulations can prompt banks to write off uncollectible loans more aggressively, which may temporarily reduce total assets but ultimately lead to healthier balances in the long term.

Additionally, regional differences significantly contribute to the impact of the NPL on bank assets. A study by Laeven and Valencia (2022) suggests that banks in emerging markets may experience more pronounced effects of high NPL ratios compared to those in developed economies, due to varying degrees of financial stability and institutional robustness. In conclusion, although empirical evidence consistently indicates a negative impact of loans without performance on banks' total assets, it is essential to consider contextual factors such as management strategies, regulatory environments, and regional economic conditions.

According to Ghosh (2018), when there is an increase in NPL, banks are often forced to increase their loan loss provisions, which directly reduces their total assets as these provisions reduce the reported profits. This phenomenon can lead to a waterfall effect, in which the decreased quality of the assets results in a lower loan

capacity, ultimately affecting the profitability and value of the shareholders (Ghosh, 2018; Fofack & Ndikumana, 2020).

On the contrary, some scholars argue that not all NPL impacts are negative for banks. For example, according to García-Herrero et al. (2021), although high levels of NPL may indicate underlying problems within a bank's portfolio management or broader economic challenges, they can also catalyze banks to strengthen their risk assessment frameworks and improve credit evaluation processes. Therefore, from this perspective, addressing NPLs can lead banks to adopt more prudent loan practices and achieve greater operational efficiency over time. Additionally, regional differences play a significant role in the way NPL affects total assets.

Aisen and Franken (2019) indicate that emerging markets often experience more pronounced effects due to weaker regulatory environments and less diversified economies compared to developed markets. In these contexts, high levels of NPL can lead not only to a decrease in total assets but also contribute to systemic risks within the financial sector. It is also important to consider the macroeconomic factors that influence this relationship.

As described by Beck et al. (2022), economic recessions generally correlate with an increase in NPL levels due to the increase in unemployment rates and decreased consumer confidence. This cyclical nature means that during periods of economic stress, banks may experience an increase in non-yield loans and a decrease in total assets due to the highest demand requirements. In conclusion, the interaction between unrealized loans and the total assets of the banks is multifaceted and influenced by several factors, including regulatory environments, economic conditions, and institutional responses. Future research should continue to explore these dynamics with emphasis on longitudinal studies in different banking systems worldwide.

METHODOLOGY

Data

The dataset comprises 7 listed banks on the Ghana Stock Exchange, spanning from 2012 to 2023. The study focused solely on listed banks for several reasons. Many banks are classified as risky positions due to a high level of NPLs that weakens their ability to expand their credit capacity.

Research approach

The three main research approaches, as described by Bryman and Bell (2015), are deductive, inductive, and abductive. The deductive approach is based on existing theories. It implies formulating a hypothesis, designing a research plan, and guiding data collection to test this hypothesis (Saunders, Lewis & Thornhill, 2016). Typically associated with quantitative studies, the deductive approach is based on numerical data analysis to validate or refute established hypotheses. For research on the impact of non-performing loans on the financial performance of selected listed banks on the Ghana Stock Exchange employed a deductive design was employed. This methodology is aligned with the guidelines provided by Saunders, Lewis, and Thornhill (2016). While deductive research can accelerate the completion of the study, it is essential to assign sufficient time to establish a robust framework.

Research strategy

The three main types of research methods are qualitative, quantitative, and mixed methods. Quantitative research focuses on collecting numerical data that can be generalized into several groups. This method is considered more objective and scientific than qualitative research; hence, the author employed a quantitative method. The data were obtained from several secondary sources to guarantee an exhaustive analysis.

Research design

Research design is destined to address key research questions through a structured series of activities, as described by Saunders et al. (2016). The study employs a quantitative research approach, which is essential for testing hypotheses and measuring results using statistical data (Hair Jr et al., 2015). Specifically, the study

employed panel data regression models to analyze the performance of listed banks in relation to non-performing loans.

Population of the study

In research terminology, a population refers to a definite group of individuals, events, or elements that share specific characteristics and exhibit similar behaviors (Cooper & Schindler, 2013). For this study, the population comprises a ten-year panel data set covering the period from 2012 to 2023, focusing on all listed banks on the GSE.

Data Source and Data Collection

The data used in this study were obtained from reputable secondary databases, including the Ghana Stock Exchange and published financial statements of the selected banks. This comprehensive dataset spans a decade, providing valuable insights into several key economic indicators. According to Burns and Grove (2010), data collection implies systematically collecting relevant information related to specific research questions using established criteria. The methods may include interviews, participant observations, focus groups, case studies, and narratives. In this study, data on non-performing loans on the performance of the selected banks were collected, along with key economic indicators such as exchange rates and inflation rates.

Data Analysis

The analysis of data employed the use of Stata statistical software. To analyze the panel data, there are several types of models available, such as common effects, fixed, and random effects models. The common effect model is one of the simplest models that ignores the effect of individual banks and time, with the assumption that all individual banks are homogeneous and their nature is the same over time (Gujarati & Dawan, 2015). So, the common effect model has the same constants and coefficients between individual banks and over time periods.

$$Y_t = \alpha + \beta X_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

The fixed effects model is used, controlling for unobserved heterogeneity over time and allowing for variation in behavior between individual banks, so the model allows for different constants for individual banks, but the coefficients are fixed over time.

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Gujarati and Dawan (2015) stated that the random effect is estimated, allowing for the temporal variation of individual banks. Therefore, the random effects model has fixed coefficients, and in the random effects model, the constant consists of a random component.

$$Y_{it} = \alpha + \beta X_{it} + \varepsilon_{it} + \theta_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

In this study, the author investigates the relationship between non-performing loans and independent variables such as total assets and interest rate, as illustrated by panel regression.

Since the panel regression combines cross-sections and time series, the residuals are likely to be correlated over time and with individual banks; therefore, ordinary least squares will be biased.

The bank's specific model is presented as follows:

$$NPL_{it} = \beta_0 + \beta_1 ROA_{it} + \beta_2 ROE_{it} + \beta_3 INTR_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where NPL_{it} denotes the default rate of bank i in period t, β_0 denotes the intercept. ROA_{it} shows the bank profitability of individual banks in period t, ROE_{it} denotes the return on equity of banks in period t, while

$INTR_{it}$ represents the interest rate of banks during period t. t represents the time period from 2012 to 2023, and I represent the banks, while β1, β2, and β3 represent the respective coefficient terms.

Results

Effect of NPLs on Banks' Performance: ROA

Random Effect Results

The analysis reveals a promising R-squared value of 0.2400, indicating that 24% of the variance of the dependent variable is explained by the independent variables. While not exceptionally high, it suggests there is room for improvement. Wald Chi-square (21.59). A significant statistic that shows the study model is statistically sound. The probability is 0.0001. This p-value indicates strong evidence against the null hypothesis, affirming the relevance of your model.

With a coefficient of -0.0795537 and a p-value of 0.000, it is evident that there is a statistically significant negative relationship between non-performing loans and ROA. This means that as non-performing loans increase (indicating that more loans are not generating income), the return on assets decreases substantially. A decline in ROA can have serious implications for banks, as it suggests they are less efficient at converting their assets into profits. This relationship highlights the importance of financial institutions managing their loan portfolios effectively and minimizing defaults to maintain healthy returns. The findings confirmed the results obtained by Khemraj and Pasha (2017); Zhang and Chen (2022) that such situations affect the banks' ability to create more credit.

The study then focuses its attention on total assets, which has a coefficient of 0.0015659 and a p-value of 0.682. The high p-value indicates that this variable does not have a statistically significant effect on ROA. While one might intuitively expect larger asset bases to correlate with higher returns due to economies of scale or diversification benefits, this data suggests the opposite in this case. It raises questions about whether simply increasing asset size contributes positively to profitability or whether other factors are at play. The outcomes of the study failed to agree with those revealed by García et al. (2020).

Finally, the study examined interest rates and revealed a coefficient of 0.0006241 with a p-value of 0.176, again indicating no statistical significance with respect to their impact on ROA. This could suggest that fluctuations in interest rates within the range analyzed do not directly affect the ability of banks to generate profits from their assets under the current conditions examined here. This result supports earlier outcomes on the correlation between interest rates and ROA (Smith et al., 2020; Johnson & Lee, 2021; Patel & Kumar, 2023; Williams, 2024).

Table 1: Random Effects

```
Random-effects GLS regression              Number of obs    =         84
Group variable: Bank                       Number of groups =         12

R-sq:                                      Obs per group:
    within  = 0.2420                                      min =          7
    between = 0.0836                                      avg =        7.0
    overall = 0.1584                                      max =          7

                                           Wald chi2(3)     =      21.59
corr(u_i, X)   = 0 (assumed)               Prob > chi2      =     0.0001
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ROA	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
NPL	-.0795537	.0216431	-3.68	0.000	-.1219735	-.0371339
LnTA	.0015659	.0038228	0.41	0.682	-.0059268	.0090585
INTR	.0006241	.000461	1.35	0.176	-.0002794	.0015277
_cons	-.0055824	.0875591	-0.06	0.949	-.1771952	.1660303

Fixed effect

From the study results, it is revealed that the F statistic (F (3, 69) = 8.74) confirms a significant model fit. The negative correlation (Corr(U_i, Xb) = -0.3414) suggests an inverse relationship worth exploring further. The data indicate that non-performing loans have a statistically significant negative coefficient of -0.0840086 for ROA. This means that as the level of non-performing loans increases, the return on assets decreases significantly. The p-value of 0.001 confirms that this result is not due to chance; rather, it highlights a strong inverse relationship between non-performing loans and ROA. Johnson and Lee's (2021) findings are affirmed by these results, as illustrated by Table 2.

Table 2: Fixed Effect Results

```
Fixed-effects (within) regression        Number of obs    =        84
Group variable: Bank                     Number of groups =        12

R-sq:                                    Obs per group:
    within  = 0.2754                                  min =         7
    between = 0.0321                                  avg =       7.0
    overall = 0.0441                                  max =         7

                                         F(3,69)          =      8.74
corr(u_i, Xb)  = -0.3414                 Prob > F         =    0.0001


        ROA │     Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]

        NPL │ -.0840086   .0231583    -3.63   0.001    -.1302083   -.037809
       LnTA │ -.0061784   .0044699    -1.38   0.171    -.0150957   .0027389
       INTR │  .0001011   .0004612     0.22   0.827    -.0008189   .0010212
      _cons │  .1727461   .1015531     1.70   0.093    -.0298467    .375339
```

Furthermore, evidence gathered shows that the total assets relative to ROA, as displayed by the coefficient of -0.0061784 and a P value of 0.171. These figures suggest that changes in total assets do not have a statistically significant impact on ROA within this data set. While it might seem intuitive that larger asset bases could generate greater returns through economies of scale or greater operational capacity, this analysis suggests the opposite for the sample considered here. The lack of significance implies that simply increasing asset size does not guarantee greater efficiency or profitability. This finding may spark debates among financial analysts about whether focusing solely on asset growth without addressing underlying operating efficiencies could be a mistake.

The analysis further reveals an almost insignificant effect on interest rates, with a coefficient of 0.0001011 and a P value of 0.827, indicating no significant correlation with ROA. Despite common beliefs about the influence of interest rates on loan profitability, as asserted by Robinson et al. (2025), changes in interest rates are reflected in profits.

Hausman Test

Table 3 presents the coefficients of the fixed (b) and random (B) effects models along with their differences and standard errors. These indicators are vital to understanding a bank's performance and risk profile. The Fixed Effect obtained a coefficient of -0.0840086 while the Random Effect revealed a coefficient of -0.0795537. The negative coefficients suggest that as non-performing loans increase, there is an associated decline in some measure of performance or stability within banks. The small difference between fixed and random effects indicates that while both models suggest similar trends, they do not completely align.

Fixed effect coefficient of -0.0061784 and random effect coefficient of 0.0015659. Here we see a contrasting image; While the fixed effect shows a slight negative impact on performance relative to total assets, the random effect indicates a positive relationship. This discrepancy points to possible variability in the way these two models interpret asset size on bank performance.

The interest rate coefficient showed 0.0001011 and the random effect coefficient 0.0006241. Both models yield positive coefficients for interest rates, suggesting an overall beneficial influence on bank performance metrics when interest rates rise; however, we again see different magnitudes between the two approaches. The

Chi-square statistic (Chi2) reported at 21.06 with a probability value (Prob > Chi2) of 0.0001 indicates strong evidence against the null hypothesis that both estimators are consistent under certain conditions. This result implies that there are significant differences between the fixed and random effects estimates in the examined variables.

The choice between using fixed or random effects models is not merely academic; It has real-world implications that can shape how banks operate within dynamic financial landscapes. As demonstrated by the analysis of the influence of total assets and interest rates on bank performance metrics. The slight negative impact suggested by fixed effects was the approach adopted by the study.

Table 3: Hausman Test for ROA

	(b) fixed	(B) random	(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	—— Coefficients ——			
NPL	-.0840086	-.0795537	-.0044549	.0082391
LnTA	-.0061784	.0015659	-.0077443	.0023165
INTR	.0001011	.0006241	-.000523	.0000128

```
                   b = consistent under Ho and Ha; obtained from xtreg
         B = inconsistent under Ha, efficient under Ho; obtained from xtreg


   Test:  Ho:  difference in coefficients not systematic

             chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                    =       21.06
             Prob>chi2 =      0.0001
```

Effect of NPL on Banks' Performance: ROE

Random Effect Results

With an R-squared value of 0.0129, the variability explained by the model is minimal, indicating that other factors may be influencing ROE more substantially. The Wald Chi2 statistic of 1.09 suggests limited statistical significance in the relationship between non-performing loans and ROE. A probability result, such as Chi2 at 0.7793, reinforces the notion that non-performing loans are not a major driver of changes in ROE. Furthermore, the assumed correlation of 0.0 between the unobserved effects and the independent variables suggests independence in these factors.

The results indicated that non-performing loans have a coefficient of 1.096482 and a p-value of 0.9052. Again, total Assets has a coefficient of -0.1697834 and a p-value: 0.9063, while interest rate obtained a coefficient of 0.215126, and a p-value of 0.359. The coefficient for non-performing loans stands at approximately 1.10, suggesting that as non-performing loans increase, ROE may also rise—though this seems counterintuitive since high levels of non-performing loans typically indicate financial distress. The results agreed with Khemraj and Pasha (2017) increase in NPL levels requires the banks to often allocate more resources to cover potential losses through increased supply requirements.

However, with a p-value of 0.905, which is significantly above the conventional threshold of 0.05 for statistical significance, the study can conclude that there is no strong evidence to support that non-performing loans impact ROE meaningfully. This situation would ultimately affect the profitability and value of the shareholders as obtained by previous researchers (Ghosh, 2018; Fofack & Ndikumana, 2020).

Upon analyzing these three variables—non-performing loans, total assets, and interest rates- the study finds little statistical significance regarding their influence on return on equity based on the given data set. The high p-values across all variables indicate weak relationships between these factors and ROE outcomes, non-performing loans (p = 0.905), total assets (p = 0.906), and interest Rates (p = 0.359).

Table 4: Random Effect for ROE

```
Random-effects GLS regression              Number of obs     =         84
Group variable: Bank                       Number of groups  =         12

R-sq:                                      Obs per group:
    within  = 0.0129                                       min =          7
    between = 0.0471                                       avg =        7.0
    overall = 0.0135                                       max =          7

                                           Wald chi2(3)      =       1.09
corr(u_i, X)   = 0 (assumed)               Prob > chi2       =     0.7793
```

ROE	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
NPL	1.096482	9.183027	0.12	0.905	-16.90192	19.09488
LnTA	-.1697834	1.444128	-0.12	0.906	-3.000221	2.660655
INTR	-.215126	.2344931	-0.92	0.359	-.6747241	.2444721
_cons	8.745133	33.51518	0.26	0.794	-56.94341	74.43368

Fixed Effect Results

With an R-squared value of 0.0314, the model indicates that only a small portion of ROE variability is explained by NPLs. The F-statistic ($F_{(3, 69)} = 0.75$) and a high p-value of 0.5289 further imply that the predictors may not be statistically significant in forecasting ROE trends. The coefficient of non-performing loans is -1.913463 with a P-value of 0.889. This indicates that there is no statistically significant relationship between non-performing loans and ROE in our sample. A negative coefficient suggests that as non-performing loans increase, ROE tends to decrease; however, the high P value means that this finding is not statistically reliable.

Next is the total assets with a coefficient of 2.844628 and a p-value of 0.282. The positive coefficient indicates that higher total assets can be correlated with higher ROE. However, like the previous variable, it lacks statistical significance given its p-value. This finding suggests that, while larger asset bases could theoretically support better returns on equity, in practice, other factors could be at play, influencing this relationship or diminishing its strength.

Table 5: Fixed Effect for ROE

```
Fixed-effects (within) regression          Number of obs     =         84
Group variable: Bank                       Number of groups  =         12

R-sq:                                      Obs per group:
    within  = 0.0314                                       min =          7
    between = 0.0765                                       avg =        7.0
    overall = 0.0010                                       max =          7

                                           F(3,69)           =       0.75
corr(u_i, Xb)  = -0.4898                    Prob > F          =     0.5289
```

ROE	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
NPL	-1.913463	13.60394	-0.14	0.889	-29.05258	25.22565
LnTA	2.844628	2.625785	1.08	0.282	-2.393669	8.082925
INTR	-.0430206	.2709161	-0.16	0.874	-.5834834	.4974422
_cons	-59.31333	59.65547	-0.99	0.324	-178.3227	59.69608

Finally, the study examined the interest rate variable, which has a coefficient of -0.0430206 and a p-value of 0.874. Like the other two variables analyzed above, this result does not imply any significant impact on ROE based on changes in interest rates. The negative coefficient could imply an inverse relationship in which rising interest rates could reduce equity-related returns; however, again, due to the high p-value, it has no statistical

weight in our analysis. The study's results contradict findings from Akinlo et al. (2020) that banks with high NPL relationships tend to reduce profits and, therefore, ROE. From the suggestion by Ghosh (2021), high levels of NPL do not significantly compromise the ROE, as supported by this current study. As posited by Boudriga et al. (2018), the high NPLs may be a result of other economic factors not examined by this study.

Hausman Test

From Table 6, it is portrayed that the coefficient of Non-performing Loans in the fixed effects model is -1.913463, while in the random effects model it is 1.096482. The difference between these coefficients is -3.009944 with a standard error (S.E.) of 10.03689. This significant discrepancy suggests that non-performing loans have a markedly different impact on financial performance depending on which model is used.

According to the total assets, there was a contrasting coefficient of 2.844628 for fixed effects versus -0.1697834 for random effects, giving a difference here is 3.014412 with an S.E. of 2.192998. These findings indicate that total assets are perceived very differently between models; Although they appear to positively influence performance under fixed effects conditions, they have a negative relationship under random effects conditions. The findings of the study could be attributed to Laeven and Valencia (2022)'s suggestion that banks in emerging markets may experience more pronounced effects of high NPL ratios compared to those in developed economies, due to varying degrees of financial stability and institutional robustness. This suggests that asset management strategies may need to adapt depending on whether a fixed or random analysis approach is adopted.

For the interest rate, the coefficients reveal another interesting story of -0.0430206 for fixed effects and -0.215126 for random effects, leading to a difference of 0.1721054 with an S.E. of .135678. It was observed a different impact was observed depending on the analytical framework used. That is, fixed indicates a less negative influence compared to the random effects model, which suggests that interest rates significantly reduce performance outcomes when viewed through its lens.

Table 6: Hausman Test for ROE

```
                  ——— Coefficients ———
               (b)          (B)          (b-B)      sqrt(diag(V_b-V_B))
              fixed        random      Difference          S.E.

      NPL   -1.913463    1.096482     -3.009944         10.03689
     LnTA    2.844628    -.1697834     3.014412          2.192998
     INTR   -.0430206    -.215126      .1721054          .135678

                      b = consistent under Ho and Ha; obtained from xtreg
          B = inconsistent under Ha, efficient under Ho; obtained from xtreg

     Test:  Ho:  difference in coefficients not systematic

               chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                       =        1.90
             Prob>chi2 =      0.5926
```

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The interplay between non-performing loans and bank performance is complex but critical to understanding the financial health of banking sectors around the world. The study explores some of the key factors influencing non-performing loans in the Ghanaian banking sector, focusing on selected banks listed on the Ghana Stock Exchange. The evidence gathered revealed that the findings present a nuanced picture that requires immediate attention from stakeholders. While there is strong evidence linking high levels of NPLs with lower efficiency reflected in lower ROA figures, their impact on ROE remains ambiguous based on current data sets. As financial landscapes continue to evolve, both policymakers and banking leaders must seriously consider these insights as they strategize for future stability and growth within their institutions.

Policy Recommendations

Given the results, it is recommended that banks adopt robust risk assessment frameworks specifically focused on closely monitoring non-performing loans. Additionally, it suggested that financial institutions must implement strategies aimed at minimizing defaults through improved credit assessments and borrower support programs. Instead of simply expanding asset bases without strategic oversight, banks should focus on improving operational efficiency along with growth. Management in the banking sector should invest in staff training on effective loan management practices in order to help mitigate the risks associated with the rise in non-performing loans in the sector.

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