

An Investigation of the Predictors of Credit Risk Among Ghanaian Rural and Community Banks

Gana Kırsal ve Topluluk Bankaları Arasındaki Kredi Riskinin Belirleyicilerinin İncelenmesi

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ABSTRACT

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Non-performing loans (NPLs) have attracted a lot of academic attention in recent times due to the devastating effects of credit risk on banks. This study investigated the predictors of credit risk in rural and community banks (RCBs), and the effects of rural banking in the Ashanti Region of Ghana. The study examined the correlation between credit risk as the dependent factor and a set of 8 systemic and nonsystemic factors of credit risk as independent variables. The systemic variables were GDP growth rate, interest rate, inflation rate and unemployment rate. The nonsystemic factors analyzed were branch network, total assets, return on assets and capital adequacy ratio. Secondary data was collected from 15 RCBs which were selected through purposive sampling, stratified random sampling and simple random sampling. The dataset ranged from the year 2008 to 2017. The study found that return on assets, branch network and size (total assets) were the significant unsystemic predictors of credit risk whilst interest rate, inflation and unemployment were the significant systemic predictors of credit risk in RCBs in Ghana. Furthermore, the study revealed that RCBs have had a considerable positive impact on the communities where they operated. Managers of RCBs must consider pursuing a strategy of branch expansion and improving the efficiency of staff because of the moderating effects of these factors on credit risk.

ÖZET

Anahtar Kelimeler:

Kredi Riski,

*Kırsal ve Topluluk
Bankaları,*

Şube Ağı

Jel Kodları:

G21, G33

Son dönemde, kredi riskinin bankalar üzerindeki yıkıcı etkileri nedeniyle, geri ödenmeyen krediler (NPL'ler) akademik ilginin odağı haline gelmiştir. Bu çalışma, Gana'nın Ashanti Bölgesi'ndeki kırsal ve topluluk bankalarında kredi riskinin belirleyicilerini ve kırsal bankacılığın etkilerini incelemiştir. Çalışmada, bağımlı değişken olarak kredi riski ile birlikte 8 sistemik ve sistemik olmayan kredi riski faktörü arasındaki ilişki incelenmiştir. Sistemik değişkenler olarak GSYİH büyüme oranı, faiz oranı, enflasyon oranı ve işsizlik oranı ele alınmıştır. Sistemik olmayan faktörler ise şube ağı, toplam varlıklar, varlık getirisi ve sermaye yeterliliği oranı olarak analiz edilmiştir. 2008-2017 yılları arasında, amaçlı örnekleme, tabakalı rastgele örnekleme ve basit rastgele örnekleme yöntemleriyle seçilen 15 RCB'den ikincil veriler toplanmıştır. Çalışmada, varlık getirisi, şube ağı ve büyüklüğün (toplam varlıklar) kredi riskinin önemli sistemik olmayan belirleyicileri olduğu, faiz oranı, enflasyon ve işsizlik oranının ise Gana'daki RCB'lerde kredi riskinin önemli sistemik belirleyicileri olduğu tespit edilmiştir. Ayrıca, RCB'lerin faaliyet gösterdiği topluluklar üzerinde kayda değer olumlu bir etki yarattığı ortaya konmuştur. RCB yöneticileri, bu faktörlerin kredi riski üzerindeki düzenleyici etkileri nedeniyle şube genişletme stratejisini takip etmeyi ve personelin verimliliğini artırmayı düşünmelidir.

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1. INTRODUCTION

Financial institutions across the world play significant roles in financial intermediation which makes credit available from surplus units to deficit units. One major consequence of financial intermediation is the granting of credit for which reason the most critical risk faced by banks is credit risk (Mukhtarov et al., 2018) which when mismanaged, could lead to insolvency and collapse of banks of all classifications (Mwinlaaru et al., 2016). Credit (Loan) refers to monetary payments which are enshrined in the contractual agreement in which one party- the borrower- agrees to repay the other party-the lender- at some future date, the principal amount and generally with interest (Owusu-Boateng, 2015). The global financial crises including that of Asia for example have largely been blamed on years of bad lending and excessive risk taken (Tangsupvattana, 2022). According to Amuakwa-Mensah and Boakye-Adjei (2015), credit risk-related bad debts of the world's banking industry got aggravated during the global financial crisis from 2007 to 2008. Indeed, most banking crises for the past two decades were a result of ineffective management of credit risk (Mukhtarov et al., 2018). Though banks face several risks including liquidity risk, operational risk and credit risk (Adusei et al., 2014; Afriyie & Akotey, 2013; Wang, 2013), credit risk has received the most scholarly attention. (Arora, 2014; Berrios, 2013; Jovic, 2017; Nikolaidou & Vogiazas, 2017). This heightened interests in credit risk have several reasons. One reason is that credit risk takes 60% of all risks faced by banks (Bekhet & Eletter, 2014; Garr, 2013; Mpofu & Nikolaidou, 2018; Mukhtarov et al., 2018; Mwinlaaru et al., 2016). As expected, different perspectives of bank credit risk have received reasonable academic attention in the financial literature (Arora, 2014; Han, 2015; Jovic, 2017; Nguyen, 2016; Nguyen, 2014; Nikolaidou & Vogiazas, 2017), including those from Africa and Ghana (Adusei et al., 2014; Afriyie & Akotey, 2013; Appiah, 2015; Garr, 2013; Marouf & Guellil, 2017; Mpofu & Nikolaidou, 2018; Mwinlaaru et al., 2016; Nikolaidou & Vogiazas, 2017; Oheneaku, 2017). Other studies have looked at quality market mechanisms, profitability and uncertainties (Berrios, 2013), the default risks associated with credit (Moges et al., 2013), credit risk measurement (Spuchl'akova et al., 2015), credit risk assessment models (Bekhet & Eletter, 2014), credit risk control (Nguyen, 2014) and the management of credit risk (Han & Bin, 2018).

The likelihood that a borrower will probably not honor the terms of payments as agreed in the loan covenant is termed as credit risk (Adusei et al., 2014; Doung & Houng, 2017; Han & Bin, 2018; Nguyen, 2016). Credit risk is also the possibility that the value of some of the assets of banks, with emphasis on loans will deteriorate and eventually become worthless. This includes the possibility that the expected cash flows from loans, advances and securities in the custody of banks have a lingering likelihood that they may either not be settled at all or they may not be settled in full (Castro, 2013; Garr, 2013). Credit risk or default risk can thus be theorized as a potential loss arising from the inability or failure of the borrower to repay the debt in full in accordance with the agreed terms.

The credit and by implication credit risk has many uses and benefits, though it can also pose considerable threats to banks. Mensah (2019) points out that credit contributes about 85% of the income of banks. In the view of Konovalova et al. (2016), credit risk is used to rate borrowers' credit worthiness, know the acceptable and tolerable level of risk a bank can take, assess the maximum amount of loans a bank can give, assess problematic loans, assist in managing the loan portfolio and prevent recurrence of loan delinquencies. Banks can plan the risk they intend to take in the future depending on the understanding of the portfolio of risks confronting them currently (Owusu-Boateng, 2015).

According to Nguyen (2016), credit risk assists in the classification of loans into performing and non-performing loans (NPLs). As noted by Amoako (2015) non-performing loans generate no revenue within a reasonable length of time, usually 90 days past the due date of settlement. Amoako (2015), again assert that NPLs can further be classified as substandard, other loans especially mentioned (OLEM), doubtful and loss. Such classifications are carried out through effective risk management strategies and proper risk assessment techniques (Afriyie & Akotey, 2013). Kagoyire & Shukla (2016) emphasize the relevance of a well-developed credit risk management system which stabilizes the financial condition of banks and helps enhance the assets and profitability of banks. Attah (2017) assert that banks need to manage risks by identifying, measuring, pricing, monitoring and controlling risk. Clients of rural banks are the most susceptible to co-variant risk, market risk and credit risk; for which reason this process of risk management must be strictly adhered to in rural banks (Attah, 2017).

Owusu-Antwi et al. (2016), define rural banks as single banks owned by indigenes and residence of rural communities through the acquisition of stocks and are accredited to do the business of banking in the communities in which they are established. Similar definitions have been offered by other researchers such as Bannerman & Fu (2018) and Kanthimathinathan (2016) with a common focus on rural development. The focus on rural development has made rural banks an integral part of the financial systems of Ghana and other economies lately. Rural credit in Ghana for instance has been sourced from non-institutional sources such as moneylenders, friends

and relatives. These sources were small and unable to bring any radical development and the desired structural changes in the rural economies. Though institutional credit came from mainstream banks such as the Agricultural Development Bank (ADB), they were inadequate and attracted high interest rates, only a few wealthy individuals had access to the credit. To bridge this gap, rural banks have been established in Ghana since 1976 as unit banks (Akorsu et al., 2015).

The primary functions of rural banks are the mobilization of savings and the extension of credit to rural folks (Owusu-Antwi et al., 2016). Rural banks are also set up to provide cheap credit to small and marginal farmers and artisans, save the rural poor from moneylenders who charge high interest, and ensure the development of entrepreneurial skills in rural dwellers (Bannerman & Fu, 2018). In addition, rural banks serve as catalysts for the inculcation of banking habits in rural dwellers, mobilization of surplus financial resources for rural development and identification of viable enterprises in their catchment areas (Akorsu et al., 2015; Amoako, 2015).

In Ghana, credit risk has received considerable scholarly attention (Adusei et al., 2014; Afriyie & Akotey, 2013; Amuakwa-Mensah & Boakye-Adjei, 2015; Garr, 2013; Oheneaku, 2017; Owusu- Boateng, 2015). Rural banking has also been subjected to significant academic research (Akorsu et al., 2015; Boadi et al., 2016; Boakye, 2015; Manu, 2015; Owusu-Antwi et al., 2016; Owusu-Boateng, 2015). Additionally, researchers such as Adusei et al. (2014), and Amuakwa-Mensah & Boakye-Adjei (2015) have undertaken studies on factors that determine credit risk in mainstream commercial banks in Ghana.

However, these studies present some challenges. Whilst those that studied causes of credit risk tended to concentrate on commercial banks, the rest focused mainly on the management of credit risk in rural banks and were deficient in the identification of factors of credit risk in rural banking (Adusei et al., 2014; Amuakwa-Mensah and Boakye-Agyei, 2015; Boadi et al., 2016; Boakye, 2015; Manu, 2015; Owusu-Boateng, 2015; Oheneaku, 2017). A precise prediction of credit risk has become a difficult venture for rural banks (Kanhukamwe, 2015). The identification of factors of credit risk is critical for any subsequent decision relating to credit risk (Marouf & Guellil, 2017). Additionally, most studies on RCBs in Ghana are generally case studies of few banks since large-scale studies such as this are uncommon (Amoako, 2015). To the best knowledge of the researcher, no study has been undertaken on rural banking in Ghana, that analysed the predictors of credit risk including branch network.

This dearth of scholarly attention has denied the RCBs the opportunity to receive guidance on the factors of credit risk which has resulted in imprudent credit decisions. Consequently, the general capacity to manage credit is impaired resulting in low profitability, low capitalization, low liquidity, poor corporate governance, poor loan recovery, high nonperforming credit portfolios, managerial inefficiencies, decreased staff morale, poor performance, cash flow problems, insolvency, financial distress (Afriyie & Akotey, 2013; Boadi et al., 2016).

As noted by Mukhtarov et al. (2018), NPLs aggravate the liquidity challenges of banks, reduce the net profit of banks, and decrease the image of banks because in the eyes of investors, low profit signifies gross managerial inefficiencies. In 2010, loans and advances in Ghanaian banks grew by 11% from 44.9% in 2008. By the close of 2010, 17.6% of unsettled loans in Ghana were deemed nonperforming and cumulative growth in bad debts reached 77.8% in 2009. The current upsurge in the level of NPLs to 31.1% in April 2018 has led to the collapse of banks and a loss of confidence of the public in the banking sector in Ghana (BOG, 2018).

The Bank of Ghana, (BOG, 2013) indicate that NPLs expressed as a percentage of gross loans for rural banks in Ghana were 11.4%, 18.2%, 16.4% and 13.4% in 2009, 2010, 2011 and 2012 respectively. In April 2017, the share of NPLs in banks was 15.7% (BOG, 2017). Comparing these with the global NPL ratio of 3.2%, Owusu-Boateng, (2015), argues that, the NPL rates associated with rural banking in Ghana are reasonably high and suggestive of ineffective risk management. Collection costs of these bad debts and those related to credit risk management result in high operational costs, making rural banks unprofitable (Boakye, 2015). These costs are usually transferred to clients in the form of high interest rates which make the rural banks unattractive, unprofitable and uncompetitive (Amoako, 2015).

The motivation for this study stems from the critical role that rural and community banks (RCBs) play in promoting financial inclusion and supporting local economies in Ghana. Despite their significance, RCBs often face unique challenges related to credit risk, which can undermine their stability and growth. Understanding the predictors of credit risk specific to RCBs is vital, as it equips these institutions with the knowledge needed to make informed lending decisions, improve risk management practices, and enhance overall financial health. Furthermore, addressing the factors contributing to credit risk can lead to better loan recovery rates, increased profitability, and ultimately, greater confidence among depositors and investors. The study seeks to find out whether an empirical association between branch networks (Branches of Banks) and credit risk in RCBs in Ghana

exists and the extent of this association. Additionally, the study seeks to analyze the applicability of the causes of credit risk in commercial banks to rural banks in Ghana.

The study is structured as follows: after the introduction, we discuss the development of theories and hypotheses. This is followed by sections on research design, methods, data collection and results. The findings from previous research were also reviewed, and concluded with a discussion on the theoretical and practical implications, as well as limitations and directions for future research.

2. THEORETICAL FOUNDATION AND HYPOTHESIS DEVELOPMENT

2.1. The Principal-Agent Theory

The Principal-Agent Theory or the Agency Theory was spearheaded by Stephen Ross and Barry Mitnick in 1960 and 1970 respectively. Whereas Ross originated the economic concept of agency and views the problem as incentive-related, Mitnick concentrated on the institutional theory of agency arguing that the problem emanates from the configuration of institutions, though the underlying assumptions of both studies are similar. The theory analyses the problems that come up in organizations because of the separation of owners from managers (Panda & Leepsa, 2017). According to Appiah, (2015) the theory fundamentally, relies on the theory of information asymmetry and raises the basic problem of self-interested parties in organizations.

The Agency Theory specify that a contract creates a link between principals (owners) and agents (managers) who have competing goals (Mwawurah, 2013). Mwawurah (2013) indicated that agency relation exists between shareholders and managers as well as debt holders and shareholders. In the view of Owusu-Boateng, (2015), credit creates a contractual relationship between lenders (principals) and borrowers (agents) and this relationship is best explained by the Agency Theory. Panda & Leesa, (2017) indicate three ways where the problem exists namely; between Principals or Owners and Agents or Managers, between Majority Owners and Minority Owners, and between Owners and Creditors. Whereas principals expect the maximization of the value of the organization, agents concentrate on self-interest and make decisions detrimental to shareholder expectations. A clash of interests ensues between the goals of shareholders or principals and those of managers or agents (Omwenga & Omar, 2017; Owusu-Boateng, 2015). As noted by Panda and Leesa, (2017) some causes of the agency problem are separation of ownership from control, risk preference, information asymmetry and moral hazard.

As shown by Appiah, (2015), banks are confronted with additional conflicts when screening borrowers for information to detect high-risk borrowers from the onset of the credit application. Some borrowers may provide inadequate information and are likely to conceal relevant information that could aid credit decisions. Banks possess inadequate information and are unable to distinguish between borrowers with differing risk characteristics. Managers may adversely select risky borrowers and pass on the riskiness of borrowers in the form of high lending rates. Adverse selection therefore exposes the bank to reasonable credit risk through high lending rates.

2.2. The Modern Portfolio Theory

The Modern Portfolio Theory (MPT) was developed by Harry Markowitz in 1952. The main thrust of the MPT is that investors attempt to maximize the return to a portfolio of assets and attempt to minimize the risks associated with the portfolio.

The MPT was developed to quantify and measure the trade-off between return-maximization and risk-minimization (Sirucek & Kren, 2015). An investor's focus must thus be on the trade-off between expected return and the risk which is measured by the standard deviation. The MPT used the efficient market frontier to conceptualize this trade-off (Maier-Paape & Zhu, 2018). Sirucek & Kren, (2015) point out that, with a given return to a portfolio of assets, the associated risk could be minimized as long as the blend of assets lies along the efficient market frontier. Any set of assets outside the frontier will not meet the anticipation of the investor and must be eliminated.

A vital factor of the MPT is its ability to assign probabilities to the relation between return and risk under the postulation that, when investors take on higher risk, they must be compensated with higher returns commensurate with the risk taken. Generally, assets with higher risks also have higher returns (Maier-Paape & Zhu, 2018). Markowitz argues that to reduce risk a diversified portfolio should be preferred since this offers an avenue of hedging the total risk of the portfolio. Risk in this instance is the probability of a deviation from the projected return juxtaposed with the realized return. Risk therefore could be conceptualized as a situation where the real

return from an investment could probably be different from an estimated return (Maier-Paape & Zhu, 2018; Mwawurah, 2013; Owusu-Boateng, 2015).

The MPT was later generalized by various researchers between 1964 and 1999 in the Capital Market Theory from which the Capital Asset Pricing Model (CAPM) was developed (Maier-Paape & Zhu, 2018). The CAPM provided an equilibrium view of the trade-off between risk and return in the asset market. The model postulates that, at an equilibrium of investment, the risk of the investment (proxied by the beta coefficient) is directly proportional to the return of the investment. Unlike the MPT, the CAPM adds a risk-free asset (such as Treasury bill) whose rate of return is known to the portfolio so that the combined risk of the portfolio is moderated and reasonably diversified. The total risk of an investment portfolio could thus be segregated into systemic and nonsystemic risk. Systemic risks are non-diversifiable and exhibit substantial responsiveness to the volatilities in asset price movements inherent in the market. Risks that are idiosyncratic to particular assets are unsystemic and are diversifiable (Maier-Paape & Zhu, 2018; Sirucek & Kren, 2015). According to Mwawurah, (2013), in the MPT of investment, the nature of the predictors of credit risk determines whether it could be diversified or not. Whereas determinants of systemic credit risk are non-diversifiable, those of nonsystemic credit risk could be diversified through lending.

2.3. Branch Networks and Credit Risk

Banks with extensive branch networks could spread their loan portfolios across different regions, reducing exposure to local economic downturns or specific industry risks (Han & Bin, 2018). Branch networks could enable banks to gather valuable information on local markets, customer behavior, and economic conditions (Maier-Paape & Zhu, 2018). This data assists in more accurate credit risk assessment, leading to better-informed lending decisions. The relationship between branch networks and credit risk often involves the quality of customer relationships. Several studies suggest that stronger customer relationships built through branches tend to reduce credit risk (Berrios, 2013; Wang, 2013; Mpofu & Nikolaidou, 2018). These relationships facilitate better communication, understanding of customer needs, and early detection of financial distress, thereby aiding risk mitigation. It is therefore hypothesized that;

H₁: There is a relationship between branch networks and credit risk in rural banks.

2.4. Capital and Credit Risk

A well-capitalized bank is better equipped to absorb potential losses arising from loan defaults or credit-related issues. Regulatory frameworks like Basel Accords focus on capital adequacy requirements as a means to ensure banks have enough capital to cover potential credit losses (Wang, 2013). Studies suggest that an optimal capital structure can influence a bank's risk-taking behavior and its ability to manage credit risk effectively (Han & Bin, 2018). The balance between equity and debt financing, as well as the composition of regulatory and economic capital, can impact a bank's risk profile (Amoako, 2015; Appiah, 2015; Castro, 2013). Higher capital buffers in banks could enhance their resilience during economic downturns, reducing the likelihood of systemic crises caused by widespread credit defaults (Badar et al., 2013). The impact of capital regulations, such as risk-based capital standards, on banks' lending behavior, risk assessment, and credit portfolio management is a subject of interest. The market's assessment of a bank's capital adequacy can influence its cost of funding, access to capital markets, and overall financial stability. It is therefore hypothesized that;

H₂: There is a relationship between capital and credit risk in rural banks.

2.5. Total Assets and Credit Risk

While larger banks may have more resources to invest in risk management systems and processes, it doesn't necessarily imply a linear reduction in credit risk as bank size increases. This is because banks have large loan portfolios and are prone to more credit risk. Large banks might employ more sophisticated credit risk models, that have dedicated risk management departments, and utilize advanced technologies for risk assessment compared to smaller banks (Nguyen, 2016). Some studies revealed that larger banks might be more prone to systemic risks due to their interconnectedness with the financial system (Nguyen, 2016; Akorsu et al., 2015). In contrast, smaller banks may struggle to comply with these requirements, potentially exposing them to regulatory scrutiny and financial penalties. Smaller banks may also lack these resources, potentially increasing their vulnerability to credit risk events (Han & Bin, 2018). It is therefore hypothesized that;

H₃: There is a relationship between total assets and credit risk in rural banks.

2.6. Management Efficiency and Credit Risk

Higher management efficiency, reflected in better governance, effective risk management practices, and prudent decision-making, tends to correlate with lower levels of credit risk (Boakye, 2015). Efficient management practices could lead to improved loan origination standards, better monitoring of borrower behavior, and timely risk identification, thus reducing the probability of loan defaults (Castro, 2013; Garr, 2013). Effective governance structures, including competent and independent boards, transparent decision-making processes, and alignment of management incentives with risk management objectives, are associated with lower credit risk. Sound governance practices contribute to better management efficiency and risk oversight, reducing the likelihood of excessive risk-taking (Castro, 2013). Efficient management could tend to make more prudent decisions regarding loan composition, ensuring a balanced mix of low and high-risk assets (Nguyen, 2016; Iqbal et al., 2023). They could also exhibit a better understanding of risk-return trade-offs and avoid over-exposure to risky borrowers or sectors. Efficiently managed banks are more likely to comply with regulatory requirements and standards. It is therefore hypothesized that;

H₄: There is a relationship between management efficiency and credit risk in rural banks.

2.7. Unemployment and Credit Risk

As individuals lose jobs or face reduced income due to unemployment, they may struggle to meet their financial obligations, leading to higher default rates on loans, including mortgages, personal loans. Unemployment is considered a critical macroeconomic factor influencing credit risk. During periods of high unemployment, overall consumer spending tends to decrease, impacting businesses and individuals' ability to repay debts (Owusu-Boateng, 2015). Incorporating employment status and historical unemployment data could enhance risk assessment algorithms, enabling lenders to more accurately evaluate borrowers' creditworthiness. High unemployment rates could lead to a rise in foreclosures and mortgage delinquencies, particularly impacting the housing market and financial institutions holding mortgage-backed securities (Mensah, 2019). Unemployment could tend to correlate with increased delinquency rates on credit cards. Hence it is hypothesized that;

H₅: There is a relationship between unemployment and credit risk in rural banks.

2.8. Inflation and Credit Risk

Doung & Houg, (2017) indicate that inflation may have either a win-win or win-lose relationship with credit risk. When the inflation rate increases, real income levels in the nation drop and weaken the ability of debtors to pay borrowed funds hence credit risk increases. The opposite is that when the inflation rate decreases, real income levels improve and strengthen the ability of borrowers to settle their loans. This is particularly true in countries with flexible interest rate regimes where lenders adjust rates to reflect the current decreases in inflation rates, hence real income of households improves making debt service easier. The effect of inflation on credit risk in this instance is negative. Contrariwise, when inflation rates increase, this is reflected in the adjustments made as household incomes deteriorate making debt serving difficult. Moreover, increases in inflation rates reduce the real value of borrowed funds hence borrowers have smaller amounts to pay all things being equal, for which reason the burden of debt service reduces. Inflation in this instance has an inverse relationship with credit risk (Gila-Gourgoura & Nikolaidou, 2017; Koju et al., 2018; Bhamra et al., 2023). It is therefore hypothesized that;

H₆: There is a relationship between Inflation and credit risk in rural banks.

2.9. Interest Rate and Credit Risk

Interest rate is a key variable of NPLs since it is the cost of funds given out as loans (Mensah, 2019). Higher interest rates could tend to increase borrowing costs, making it more challenging for borrowers to service their debt obligations (Wang, 2013). This situation could elevate the likelihood of defaults, especially among borrowers with variable-rate loans or those highly sensitive to interest rate fluctuations. Research by Curtis et al. (2020) and subsequent scholars emphasized how changes in interest rates impact the probability of default, suggesting that higher rates increase the potential for financial distress and default among borrowers. The term structure of interest rates, especially the yield curve, influences credit risk assessment. Studies such as Chen et al. (2021) and Burova et al. (2021) have analyzed how different segments of the yield curve affect credit spreads and default probabilities. Higher interest rate volatility could often lead to wider credit spreads, reflecting increased uncertainty and perceived credit risk. It is therefore hypothesized that;

H₇: There is a relationship between interest rate and credit risk in rural banks.

2.10. Gross Domestic Product (GDP) and Credit Risk

During periods of economic expansion (higher GDP growth), credit risk tends to decrease as borrowers' ability to repay loans improves due to increased income and employment opportunities. Conversely, during economic downturns or recessions (lower GDP growth), credit risk tends to rise (Afriyie & Akotey, 2013; Boadi et al., 2016). Projections of GDP growth could influence decisions related to lending practices, risk assessment, and loan provisioning. Understanding the relationship between GDP and credit risk helps banks and financial institutions develop risk models and stress tests that consider various economic scenarios, including different levels of GDP growth. A higher GDP per capita shows improvement in the general purchasing power and the capacity of borrowers to pay back credit. However, when GDP decreases, the capacity for individuals, and businesses to hold additional income for debt services deteriorates. Thus, when GDP increases, credit risk reduces and the opposite holds true (Golitsis et al., 2019). It is therefore hypothesized that;

H₈: There is a relationship between Gross Domestic Product (GDP) and credit risk in rural banks.

3. METHODOLOGY

3.1. Research Design

The study employed the quantitative research approach based on similar studies on branch networks (Arora, 2014), and predictors of credit risk in commercial banks (Adusei et al., 2014; Garr, 2013; Jovic, 2017; Kanhukamwe, 2015; Mensah, 2019). The study surveyed RCBs utilizing purposive sampling, stratified sampling and simple random sampling from the population of RCBs in the Ashanti Region of Ghana

3.2. Data Collection

The target population comprised all Rural and Community Banks (RCBs) in Ghana that were licensed and reporting to the Bank of Ghana from 2008 to 2017. By the end of 2017, there were 144 rural banks in Ghana (BOG, 2017). Given their widespread distribution across the country, it was practically impossible to cover every bank. Therefore, the accessible population was defined as all RCBs located and operating in the Ashanti Region of Ghana from 2008 to 2017. At the end of 2017, the Ashanti Region had 29 RCBs (BOG, 2017). From these 29 rural banks, the sample excluded any RCBs established after 2008 and those whose accounts had not been published since 2008. This study excludes the post-2017 period due to data accessibility issues, significant policy reforms during the COVID-19 pandemic, and the desire to maintain focus on stable banking conditions. Additionally, RCBs without branches were excluded from the sample. It was anticipated that at least 24 RCBs would be included in the sample frame, from which 15 RCBs, representing approximately 62.5%, would be included in the study as the sample size.

Purposive sampling, simple random sampling and stratified random sampling were used to select 15 RCBs. The stratification of RCBs was based on the size of the branch network of the banks namely wide branches, average branches and low branches. Stratum 1 RCBs constituted those with 10-12 branches and classified as wide branch network (WIDBRAN). Again, stratum 2 RCBs were banks with an average branch network between 7-9 branches and classified as average branch network (AVEBRAN). Finally, stratum 3 banks were classified as those with low branch network (LOWBRAN) whose branch network ranges from 2-6 (Arora, 2014). Subsequently, a simple random sampling will be used to select five RCBs from each stratum to constitute the sample for the study.

The main data source was secondary financial data from rural and community banks as well as macroeconomic data on Ghana for the ten-year period starting from 2008 to 2017. This data source allows researches to quickly gather the necessary information without the time-consuming process of primary data collection and often accessible through libraries, online databases, government publications, and organizational reports, making it convenient for researchers to obtain (Ajayi, 2017). The data was sourced from the Bank of Ghana (BOG), the World Bank, the Ghana Statistical Service (GSS) and published annual reports submitted to shareholders and the Association of Rural Banks (ARB) during annual general meetings. Despite the challenges with this data collection method, several researchers adopted it (Adusei et al., 2014; Agyei, 2016).

Table 1. Percentage Share of RCBs in the Ashanti Region of Ghana from 2008-2017

Year	RCBs in Ghana	RCBs in Ashanti Region	% of RCBs in Ashanti Region
2008	126	24	19.05
2009	130	25	19.23
2010	132	25	18.94
2011	133	25	18.80
2012	134	26	19.40
2013	137	27	19.71
2014	139	27	19.42
2015	141	27	19.15
2016	142	27	19.01
2017	144	29	20.14

Source: Bank of Ghana, (2008-2017)

From Table 1, as at the end of December 2017, there were 25 rural banks in the Ashanti Region of Ghana, with 192 branches and employing 3759 staff. These banks serve 2,440,265 clients and advanced a gross loan of GHS 468.30 million which is the equivalence of about USD97.20 million (ARB, 2018). The Association of Rural Banks (ARB) has a branch in the Ashanti Region headed by a regional manager. The ARB ensures that periodic reports and other prudential requirements from BOG are complied with by its members. The specie needs of the RCBs are undertaken by the ARB Apex Bank which serves as a mini central bank for the RCBs in the region. Notwithstanding the rural development orientation of RCBs, Akorsu et al. (2015) indicate that all rural banks in the region have the majority of their branches in metropolitan and peri-urban areas especially Kumasi. RCBs are shifting focus to urban areas in the region because of the limited opportunities for diversification, liability management and geographic expansion in the rural areas and, vulnerable segments of the urban population also demand similar banking services just like the rural communities.

4. RESULTS

A correction analysis was undertaken using the STATA software application to identify the relationship between the systemic and nonsystemic variables and credit risk. As can be observed from Table 2 at 95% confidence level, there was a relationship between credit risk as the dependent variable and the nonsystemic predictors which were Size, Capital Adequacy Ratio, Return on Assets and Branch Network, with correlation coefficients (r) of -0.7301, -0.0471, -0.5250 and -0.9186 respectively. By virtue of the magnitude of the resultant coefficients, only CAR had a weak relationship with credit risk with the rest exhibiting strong relationships with credit risk. Each of the nonsystemic factors exhibited an inverse relationship with credit risk. A diagonal observation reveals that the issue of multicollinearity does not exist since the correlation between the predictor variables is not statistically significant.

Table 2. Pearson's Correlation Matrix for Unsystemic Variables

Variable	NPL	CAR	ROA	Total Assets	Branch Networks
NPL	1.0000				
CAR	-0.0471	1.0000			
ROA	-0.5250	0.1673**	1.0000		
Total Assets	-0.7301	0.5184**	0.2088**	1.0000	
Branch Networks	-0.9186	0.0241*	0.3322**	0.3393**	1.0000

** ~ Correlation is significant at the 0.01 level (2-tailed); * ~ Correlation is significant at the 0.05 level (2-tailed)

Source: Fieldwork, (2023).

It is inferred from Table 3 that a positive association exists between GDP and credit risk albeit insignificant with a correlation coefficient of 0.1039. This is in contrast with the expectation of this research since it was the expectation that, GDP will be negatively correlated with credit risk. Though the relationship was insignificant, the positive relationship means increases in GDP will trigger increases in NPLs and vice versa. However, Garr, (2013) found a positive relationship between credit risk and GDP per capita. As GDP per capita increases, credit risk also increases and vice versa. Inflation, interest rate and unemployment were found to have a negative association with credit risk.

Table 3. Pearson's Correlation Matrix for Systemic Variables

Variable	NPL	GDP	Inflation	Interest Rate	Unemployment
NPL	1.0000				
GDP	0.1039	1.0000			
Inflation	-0.2114	-0.1383	1.0000		
Interest Rate	-0.6050	-0.2708	0.2984**	1.0000	
Unemployment	-0.4274	-0.3954	-0.0243	0.1294*	1.0000

** ~ Correlation is significant at the 0.01 level (2-tailed); * ~ Correlation is significant at the 0.05 level (2-tailed)

Source: Fieldwork, (2023)

A Durbin-Watson test was also conducted to ascertain whether the model's residuals were not autocorrelated because if they were it would invalidate the results of the regression. According to Mwaurah (2013) the Durbin-Watson coefficient (d) should be 2 or more to indicate no autocorrelation from Table 4, the Durbin-Watson statistic was 3.278 which implies that the model's residual was not autocorrelated.

A regression analysis was also undertaken using the STATA software application to identify the causal relationship between the dependent and independent variables. Table 4 displays the result.

Table 4. Regression of Variables

NPL	Coef.	Std. Err.	T	P> t
CAR	0.123	0.379	0.33	0.040
ROA	-0.042	2.946	-0.01	0.031
Total Assets	1.548	7.169	0.22	0.005
Branch Networks	2.513	19.001	0.13	0.016
Inflation	-0.324	0.850	-0.38	0.038
Interest Rate	-0.333	0.356	-0.94	0.021
GDP	-0.724	0.898	-0.81	0.046
Unemployment	-2.295	2.273	-1.01	0.017
Cons	1.684	107.597	0.02	0.048
Number of obs	=	10		
F (8, 1)	=	0.420		
Prob > F	=	0.040		
R-squared	=	0.769		
Adj R-squared	=	0.461		
Root MSE	=	3.313		
<i>Durbin Watson Statistic</i>				
Source		SS	df	MS
Model		36.522	8	4.565
Residual		10.975	1	10.975
Total		47.497	9	5.277

Durbin-Watson d-statistic (9, 10) = 3.27

Source: Fieldwork, (2023)

5. DISCUSSION OF RESULTS AND THEORETICAL CONTRIBUTION

According to Afriyie and Akotey, (2014), the overall predictive power of a regression model is strong and ensures consistency when the p-value (Prob > F) is between 0.00 and 0.05. From Table 4, the regression model's predictive power is significant at 95% confidence interval with an overall p-value (Prob > F) of 0.04. The coefficient of determination represented by the R-squared (R^2) measures the percentage variations observed in the dependent factor that is explained by the variations in the predictor variables (Owusu-Antwi et al., 2014). From the evidence, the value of R^2 of 0.7689 shows that the predictor variables jointly explain 76.89% of the variations in credit risk in rural banks meaning the model has a high predictive power. The result therefore depicts high reliability for the model and that the model will exhibit consistency in similar studies elsewhere. The finding implies that 23.11% of the vicissitudes in credit risk is from factors other than the factors used in this research. The Adjusted R^2 corrects for any bias in the R-squared due to any addition to the explanatory variables. The evidence shows that the Adjusted R-squared had a coefficient of 0.4608 and signifies that, 46.08% of the differences in the explanatory variables jointly affect credit risk in RCBs.

Empirically, the model yields the following regression line:

$$Y = 1.68 + 0.12X_1 - 0.04X_2 + 1.54X_3 + 2.51X_4 - 0.32X_5 - 0.33X_6 - 0.72X_7 - 2.29X_8$$

Where:

Y = Credit Risk

X_1 = Capital Adequacy Ratio

X_2 = Return on Assets (Management Efficiency)

X_3 = Total Assets (Size)

X_4 = Branch Network

X_5 = Inflation Rate

X_6 = Interest Rate

X_7 = GDP Growth Rate

X_8 = Unemployment rate

The empirical regression *line* indicates the extent of the variability in credit risk given a change in any of the explanatory variables holding other variables constant (Omwenga & Omar, 2017). The evidence therefore suggests that, holding all predictor variables constant at zero, credit risk in RCBs will be constant at 1.68. This means before RCBs begin to go into operations in their catchment areas, they are already confronted with about 17% credit risk all things being equal. Moreover, as the results indicate when all other terms and variables are held constant at zero, a unit change in CAR, ROA, TA, Branch Network, Inflation rate, Interest rate, GDP growth rate and Unemployment rate, will lead to a change in credit risk of 0.12, 0.04, 1.54, 2.51, 0.32, 0.33, 0.72 and 2.29 respectively.

6. PRACTICAL IMPLICATION

Since branch network had a negative relationship with credit risk, it is recommended to the Board of Directors (BOD) and Managers of RCBs to consider pursuing a strategy of vigorously expanding the branch network of rural banks because of the moderating effect on credit risk. Rural banks with low branch networks are relatively exposed to the damaging effect of credit risk. Such banks especially are to consider the pursuit of a serious branch expansion. The study also showed that management efficiency is a key predictor of credit risk in RCBs. It is therefore recommended to the BOD of RCBs to initiate additional training programs aimed at developing the knowledge, skills and abilities of management and staff of RCBs since this will improve efficient resource utilization and enhance the abilities of management to detect potential delinquent borrowers from the onset of the loan application process. In theory, RCBs in Ghana are unit banks but in practice, all RCBs operate branches.

The study recommends that the Bank of Ghana should reconsider, de-emphasize and officially revoke the original conceptualization of RCBs as unit banks and rather institute a policy that encourages continuous branch expansion in RCBs since this will make institutional credit available to rural communities and also reduce credit delinquencies in RCBs. It is further recommended that the Ministry of Finance and the Bank of Ghana who are policy makers and regulators of the economy should adopt strategies that will enhance the general management of inflation, interest rate and unemployment since these have been proven to exert a considerable impact on the NPLs of RCBs. Managers of the Ghanaian economy should target the implementation of growth-related policies since these could lead to considerable benefits in the rural banking sector such as reducing loan defaults. The Bank of Ghana should not relent in the pursuit of the monetary policy targeting inflation and the general stability of the economy since this will eventually affect the NPL levels in RCBs in Ghana.

The collaboration between the management of rural banks, regulators and policymakers is a continuum. Whereas managers of RCBs handle nonsystemic variables which are idiosyncratic to the RCBs at one end of the continuum, the regulators and policymakers manage systemic factors at the other end. When one end of the continuum is poorly handled, the positive developments at the other end could be eroded. This is because if these key stakeholders act in isolation of each other, the positive effect of managing nonsystemic factors that improve loan repayments could be eroded by poor supervision and poor management of the systemic variables. It is recommended that the predictor variables that were found to be significant should be the target of managers, policymakers and regulators in a collaborative manner. It is further suggested that the BOD, ARB Apex Bank and the Bank of Ghana as well as the managers of the macroeconomic landscape of Ghana should team-up to deal with both systemic and unsystemic variables in order to enhance the efficient management of credit risk in RCBs.

7. CONCLUSION

This study empirically investigated the predictors of credit risk in rural and community banks (RCBs) in the Ashanti Region of Ghana. Specifically, the study investigated the correlation between credit risk as the dependent variable which was proxied by the NPL ratio and a set of 4 systemic factors and 4 unsystemic factors of credit risk as independent variables from 2008 to 2017. The systemic variables used were GDP growth rate, interest rate, inflation rate and unemployment rate. The unsystemic factors analyzed were branch network, total assets (size), return on assets (management efficiency) and capital (capital adequacy ratio).

The study adopted the quantitative research method using secondary data. The secondary data were extracted from the annual reports of RCBs as well as periodic prudential reports submitted to the Association of Rural Bank, Ashanti Regional Branch. The RCBs were selected through purposive sampling, stratified random sampling and simple random sampling. The data collected were analyzed with the help of Microsoft Excel and STATA and presented with tables and percentages. Three sets of analyses namely, descriptive statistical analysis correlation analysis and regression analysis were undertaken. The framework of the analyses was aimed at answering and testing 8 hypotheses.

The study concludes that return on assets, branch network and size are the significant unsystemic predictors of credit risk whilst interest rate, inflation and unemployment and GDP are the significant systemic predictors of credit risk in RCBs in Ghana. This means that predictors of credit risk in commercial banks in Ghana are generally applicable to the rural banking sector as well. These findings lead to the conclusion that any deterioration in the macroeconomic landscape of Ghana and poor management of RCBs could lead to increasing levels of NPLs in the rural banking sector in Ghana. Since the paper is a pioneer study on the causes of credit risk in RCBs in Ghana, it has provided fresh insights on credit risk in rural banking and contributed to the literature on credit risk especially the relevance of branch network as a predictor of credit risk in rural banking.

8. LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The capacity of the research to generalize the results of the study was limited because it concentrated on a specific population in a specific region and did not take into consideration the local dynamics of rural banking from the other regions of Ghana. Studying all RCBs in Ghana would have been ideal for effective generalization. Hence the study was limited by small scope, small sample size, small constructs and scope of analyses. The study revealed that the predictor variables only explain about 76% of the variations in credit risk. Further studies need to be conducted to ascertain the additional determinants of credit risk in rural banking. Factors such as board size and the exchange rate could be modeled alongside other variables. The study showed that capital and GDP were significant predictors of credit risk in rural banking which runs contrary to most literature. Additional research needs to be conducted to find out why this is so in rural banking. Again, further studies need to be conducted on the relevance of branch network in the era of dynamic technological advancements and to determine the impact of technology on the banking habits of rural dwellers. Since this is the only study that has analyzed branch network as a predictor of credit risk in rural banking, it is recommended that this study is extended to mainstream commercial banks and ascertain the relevance of branch network as a predictor of credit risk in commercial banks in Ghana.

AUTHORS' DECLARATION:

This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support.

AUTHORS' CONTRIBUTIONS:

The entire research is written by the author.

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