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Impact of Risk Management on the Performance of Commercial Banks in Ghana: A Panel Regression Approach

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Abstract: The financial sector is an integral part of the economy, playing a vital role in the overall economic development of a nation, but commercial banks in this sector face a myriad of risks. This has made understanding the impact of risk management on bank performance crucial. This study sought to examine the effect of risk management on the performance of commercial banks in Ghana. The study used a quantitative research approach, relying on secondary data from the yearly financial statements of the selected banks. Seven commercial banks were purposively sampled. According to the 2017 Ghana Banking Survey, the seven commercial banks selected represent more than 50 percent of Ghana's financial market by proportion of industrial deposits, which was a criteria for selecting the seven banks. The results of the study showed that of the four types of risks examined vis-à-vis credit risk, operational risk, liquidity risk, and market risk, only operational risk was found to exert a significant influence on bank performance. Operational risk accounted for 99.24% of the variability in bank performance. Furthermore, it was observed that total risk management had a significant impact on bank performance, explaining 74.74% of the variance in bank performance. Since operational risk appears to exert far more influence on bank performance in Ghana than any other risk factor, it is recommended that banks, regulators, and policymakers place more emphasis on curbing operational risks when designing their risk management programmes, as this particular risk, among all the other risk types examined, seems to be the one that exerts the greatest influence on banking performance.

Keywords: financial markets; liquidity risk; panel regression model; risk management

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1. Introduction

Risk management within the banking industry has been at the forefront of global financial discourse, largely owing to the industry's inherent complexity and the immense impact of banking crises on economies (Bank of Ghana 2019; The Editorial Committee—Bank of Ghana 2019). According to Tursoy (2018), the survival of financial institutions hinges on their ability to manage various types of risks, including credit, liquidity, and trading risks, among others. In developing economies such as Ghana, the ability to manage these risks is especially crucial, as their financial ecosystems often face unique challenges (Takang and Ntui 2008; Afriyie and Akotey 2013).

Despite substantial efforts in risk management, banking difficulties remain prevalent worldwide, triggered by factors like insufficient credit standards for borrowers, inadequate portfolio risk management, and economic fluctuations (Basel Committee on Banking Supervision 2000). In developing economies such as Ghana, the banking industry has not been spared. Ghana's recent banking crisis is one such example. According to the Bank of Ghana assessment, the following vulnerabilities were found to be the source of the collapsed financial institutions' problems. This includes a lack of solid corporate governance, a lack of effective risk management,

lackluster credit administration, risky banking activities, the diversion of client funds to non-productive projects, and a general failure to adhere to prudential standards of conduct (The Editorial Committee, Bank of Ghana 2019). The scope of this study shall, however, be limited to risk management as it relates to banks as financial institutions.

For financial institutions, the current global economic climate has heightened the importance of risk management. Given the consistent expansion of the global financial industry and the continuous emergence of new banking entities, the urgency to evaluate the risk profiles of banks and the consequential impact on their performance has surged (Dei Ofosu-Hene and Amoh 2016). Consequently, the purpose of this study is to examine the effects of diverse risk management strategies on the financial performance of banks, focusing specifically on the Ghanaian banking sector. To achieve the goal of the study, the following research questions (RQ) will be addressed:

- What is the effect of credit risk on bank performance?
- What is the effect of operational risk on bank performance?
- In what way does liquidity risk impact bank performance?
- To what extent does market risk have an effect on the performance of a bank?
- What is the impact of total risk management on bank performance?

The rationale for this research is rooted in the distinct features and challenges confronted by banks in developing economies such as Ghana, coupled with the reverberations of the recent banking crisis in the country. Despite the considerable volume of research on risk management in banks, the focus on banks in emerging markets, particularly in light of recent financial crises, remains comparatively sparse. Hence, this study aims to bridge this void by scrutinising the risk management protocols in Ghanaian banks and evaluating their efficacy in fostering financial stability and performance.

The survival of banks can be imperilled by four principal risks: credit risk, market risk, operational risk, and liquidity risk (Puspitasari et al. 2021). These risks, their origins, their management strategies, and their influence on banks' performance will constitute the central focus of this study. Through this research, we strive to provide beneficial insights into effective risk management strategies in the banking sector, thereby guiding future regulatory decisions and aiding banks in their decision-making trajectory. In sum, the role of effective risk management in the banking sector is of paramount importance. As we transition into a phase of escalating financial unpredictability and complexity, it becomes crucial for banks, especially those in developing economies, to implement sturdy risk management frameworks to ensure their sustainability and contribute to overarching financial stability.

Bloom and Milkovich (1998) describe risk as the probability of an undesirable incident occurring and the resulting negative impact on businesses. Meanwhile, Bessis (2011) defines a "risk" as an unknown that may result in decreased profitability or perhaps loss. Both definitions agree on the basic idea that risk has two possible outcomes, but managers are mainly concerned with the negative one. It is important to ensure that risks are accepted with full awareness and information, a clearly defined objective, and an understanding of how to improve measurement and mitigation as part of the effort to manage risk. In contrast to this, it does not ban or discourage risk-taking. To avoid many of the recent global financial crises, financial institutions must manage risk to the best of their abilities.

Managers of financial institutions participate in risk management for at least three reasons (Dei Ofosu-Hene and Amoh 2016): (1) one of the most important is the manager's desire to maintain his or her current status within the company and accumulate more riches for themselves; (2) there are also costs associated with probable financial hardship, such as a major loss of profits that might result in stakeholders losing faith in the firm's business operations; a loss of competitive strategic position within the industry; the withdrawal of a license; and bankruptcy; (3) finally, risk management is necessary because of the capital market's imperfection (Oldfield and Santomero 1997).

Credit risk, market risk, operational risk, and liquidity risk are the four main types of hazards that threaten a bank's viability (Puspitasari et al. 2021). Credit risk stands out

among these because of the larger risk financial institutions face as a result of the nature of their clients and the industry in which they operate (Takang and Ntui 2008; Afriyie and Akotey 2013; Tursoy 2018). Non-performing loans (NPLs) have been extensively studied for their role as a proxy for credit risk, resulting in losses owing to defaults by bank debtors (Fadare et al. 2011; Ghosh 2014). But Laeven et al. (2016) argued otherwise, claiming that non-performing loans do not pose much of a threat to banks' long-term viability.

In the current worldwide economic climate, risk management has become an indispensable tool for financial organisations. While taking risks is essential in banking, precautions must be taken to limit the damage that could be caused (Dei Ofosu-Hene and Amoh 2016; Jaiye 2009). Risk can go either way, according to Bloom and Milkovich (1998) and Bessis (2011). Therefore, acceptance of risks requires knowledge, well-defined goals, and methods to enhance measurement and reduction. The findings of this study are intended to inform future regulatory actions and assist financial institutions in making sound risk management decisions. The unique addition of our study is its emphasis on the Ghanaian setting, post-crisis and within a developing economy. The outline of the paper is as follows: materials and methods are presented in Section 2. The results and discussions are, respectively, presented in Sections 3 and 4, ending with the concluding remarks in Section 5.

2. Materials and Methods

Here, the study's methodology and the strategies used to achieve its goals are explained. Research design, sample strategies, data collection instruments, and analytic methodologies are all covered in this section. As defined by Mack et al. (2005), research methodology encompasses all of the choices made throughout a study within the context of the investigation's particular drivers. The study's research approach is described in detail in this section. This section outlines how the research was conducted and the strategies used to attain the goals. Data processing and analysis are also discussed in this section, as well as sampling strategies.

2.1. Research Design

Research designs are procedures for collecting, evaluating, and reporting data in research investigations (Creswell and Zhang 2009). The research design for the study was a retrospective longitudinal study employing a quantitative research approach. Due to the study's goal of examining how banking performance is impacted by risk management, the researchers decided to apply a quantitative method. According to Creswell and Zhang (2009), statistical and mathematical methodologies may be used to examine the relationships between variables in quantitative research. It is worth noting that the analytical methods used in this study were similar to those commonly used in banking literature, and thus reliable and legitimate answers to the research questions can be expected.

2.2. Research Population

In research terms, the population of the study refers to the entire group of entities or individuals about which information is desired (Rajasekar et al. 2013). For this study, the research population encompasses all licensed banks operating in Ghana, as our focus lies specifically on these Ghanaian financial institutions.

As of the time this research was conducted, there were twenty-seven (27) universal commercial banks in Ghana, all regulated by the Bank of Ghana. This forms the specific target population for our study.

For readers unfamiliar with Ghana's banking sector, these 23 banks represent a broad spectrum of financial institutions, varying in size, service offerings, customer bases, and operational scope. These banks are universally licensed, meaning they provide a full suite of banking services to both individuals and businesses. The number of banks operating can vary due to factors like new market entries, mergers and acquisitions, or closures.

Therefore, our study, while specific in scope to these 23 banks, seeks to provide insights that could potentially apply across the broader banking sector in Ghana. For a deeper understanding of the banking landscape in Ghana, researchers are recommended to consult the official publications or website of the Bank of Ghana, the country's central banking authority.

2.3. Sampling

Eight banks were purposively sampled out of the twenty-three commercial banks in Ghana based on the criterion that together those eight banks control more than 60% of Ghana's financial market by share of industry deposits according to the 2017 Ghana Banking Survey. Three out of the eight banks selected were local Ghanaian banks, with the remaining being international banks. These banks provide a wide range of financial services such as savings and current accounts, loans, credit cards, forex trading, wealth management, and other business services to individuals, businesses, and organizations.

2.4. Data Collection

Secondary data for this study was obtained from the financial reports of the eight selected banks, serving as the source of the study's quantitative data. These reports were thoroughly analysed for the time period spanning from 2008 to 2018.

The choice of this time frame was informed by a couple of key considerations. Firstly, the aim was to cover a considerable span of years to capture various financial cycles and significant events influencing the banking industry. Secondly, the choice was, to a certain extent, constrained by the availability and accessibility of complete and accurate data for the variables of interest in this study. Extensive efforts were made to cover a broader time period; however, the necessary data was not available or was unreliable for years outside of the 2008–2018 range.

This issue of data availability is not uncommon in financial studies, as evidenced by Sheriff and Amoako (2014), who also faced limitations due to data availability, restricting their study to a 12-year period.

As for data collection, each bank's annual financial report was scrutinized, with key financial and risk management data extracted for the study. These reports are publicly accessible documents, generally available on each bank's official website or upon request. This approach ensures that the study is based on reliable, verifiable data while also offering a level of transparency and reproducibility.

2.5. Measurement of Variables of Research Interest

Credit risk: It is proxied by the ratio of non-performing loans to total loans or advances.

Operational risk: It is proxied by the ratio of operating expenses to total revenue.

Liquidity risk: Liquidity risk was proxied by the ratio of liquid assets to deposits and short-term funding.

Market risk: This is proxied by the interest rate spread or the net interest margin.

Total Risk management: For this study, credit risk, operational risk, liquidity risk, and market risk are conceptualized as components of total risk management. Hence, total risk management is proxied as the sum total of the means of the proxy values for credit risk, operational risk, liquidity risk, and market risk, on the basis that the management of the preceding risk types primarily makes up risk management in a financial institution. Mathematically, this can be expressed as:

$$\text{Total risk management} = \text{mean (credit risk)} + \text{mean (operational risk)} + \text{mean (liquidity risk)} + \text{mean (market risk)}$$

Performance: It is proxied by the return on assets (ROA), which is the ratio of net profit to total assets. The ROA is a measure of the profitability of the banking institution vis-à-vis the performance of the financial institution.

2.6. Estimation Methods

Panel data approaches were utilised to ascertain the effect of risk management on financial institution performance. For this study, panel data regression analysis was chosen as the most suitable method to ascertain the effect of risk management on financial institution performance. This decision was made based on a few key considerations:

(1) Methodological foundation: Panel data regression allows for the analysis of multiple observations over time, which is advantageous for this study as it investigates the influence of risk management on bank performance over a period from 2008 to 2018. This technique accommodates the temporal dynamics of risk management and bank performance, offering a more comprehensive perspective than cross-sectional or time series methods alone.
(2) Organizational foundation: The banking industry, which forms the focus of this study, is characterized by complex relationships between variables that evolve over time. Panel data regression can model these relationships more effectively than other techniques.
(3) Restrictions: Panel data regression analysis requires large datasets with observations at multiple time points for each entity. This necessitates a substantial amount of data, which may not be readily available. The technique also assumes no perfect multicollinearity, which means that the independent variables must not be perfectly correlated.
(4) Selection criteria for the method: Panel data regression was chosen for its ability to control for variables that change over time but not between entities, to mitigate potential bias and increase the accuracy of the estimates.
(5) Criteria for selecting the research population: The research population was selected based on the focus of the study, which is the performance of commercial banks in Ghana. Thus, all licensed commercial banks operating in Ghana during the study period formed the research population. This ensured that the study results would be reflective and representative of the entire banking sector in Ghana.

The panel data of eight chosen banks was analysed from 2008 to 2018. Panel data analysis may be defined as the application of conventional regression models to a set of data point, which can be expressed as follows:

$$y_{it} = a + bx_{it} + \varepsilon_{it}; \quad i = 1, \ldots, N \tag{1}$$

where y is the dependent variable, x is the independent variable, a and b are the coefficients, i is the index for individuals, t is the time index, and ε is the error term.

The error term, ε_{it}, plays a very vital role in determining which specific method to use for the panel data analysis. The error term captures confounding factors, i.e., all other factors that might impact on the interest rate spread but are excluded from the model (Rusuhuzwa et al. 2016).

It is critical to consider the error term, ε_{it}, while selecting a strategy for analysing panel data. Other variables that may affect banking performance but are not included in the model are captured by the error term. Fixed effects regression and random effects regression are two of the most common models used in panel data analysis, although each has its own assumptions. By examining the error term, we may determine which strategies are appropriate for application.

There are three assumptions that underpin the classical regression model's foundation: first, that all variables are exogenous; second, that all errors are uncorrelated; and third, that the error variance for each variable around the line of best fit is the same for each observation. Random effects regression models may be used if these assumptions are broken, but fixed effects regression models can be used if they are not.

2.6.1. Fixed Effects Model

The fixed effects regression model (FERM) is used to examine the impact of factors that change over time, according to Torres-Reyna (2007). In FERM, all potential biassing effects

of the factors on the independent and dependent variables are taken into account. This is why FERM assumes uncorrelated errors. For the sake of determining the net impact of the predictors on the dependent variable, it is assumed in FERM that features of variables that do not change over time are eliminated. Due to the fact that each object (or entity) is unique, there should be no correlation between its error term and the constant (which represents its variable features).

The equation for the fixed effects model is given by

$$Z_{jt} = \delta_0 + \delta_1 Y_{1,it} + \cdots + \delta_k Y_{k,it} + \theta_2 E_2 + \cdots + \theta_n E_n + \lambda_2 T_2 + \cdots + \lambda_t T_t + \varepsilon_{jt} \quad (2)$$

where, Z_{jt} is the response variable for the j-th entity at time t, $Y_{k,it}$ is the set of explanatory variables for the i-th entity at time t, δ_k is the coefficient for the explanatory variables, E_n is the entity n, θ_n is the coefficient for the binary regressors (entities), T_t is the time as a binary variable, λ_t is the coefficient for the binary time regressors, and ε_{jt} is the error component.

According to Torres-Reyna (2007), the fixed effects regression model (FERM) is utilised when the focus is on analysing the influence of variables that fluctuate over time. Under FERM, any influence that the variables may have, thereby biassing the independent or dependent variables, is adjusted for. This is the reason why uncorrelated errors are assumed for FERM. Again, under FERM, it is assumed that characteristics of variables that do not vary with time are nullified to allow for an assessment of the net effect of the predictors on the dependent variable. Each entity is different; therefore, the entity's error term and the constant (which captures variable characteristics) should not be correlated with the others (Torres-Reyna 2007).

2.6.2. Random Effects Model

Being that each item is unique, there should be no correlation between its error term and the constant (which represents its specific qualities). Because inferences may not be true if the error components are correlated, a fixed effect model is not appropriate. In such an instance, random effects may be more appropriate.

The random effects model is given by:

$$Z_{jt} = \delta_j + \theta Y_{jt} + \varepsilon_{jt} + v_{jt} \quad (3)$$

where, Z_{jt} is the response variable for the j-th entity at time t, δ_j ($j = 1, \ldots, n$) is the unknown intercept for each entity, Y_{jt} is the explanatory variable for the i-th entity at time t, θ is the coefficient for the explanatory variable, v_{jt} is the between entity error, and ε_{jt} is the within entity error.

2.7. Limitations of Study

Data Collection: the scope of the study could be extended both backwards and forwards in time, depending on data availability. The current study is limited to data from 2008 to 2018. If more historical or recent data becomes available, it would be beneficial to incorporate that information to refine the analysis.

Sample Size: While this study used data from eight selected banks, future studies could seek to include data from more banks if possible. A larger sample size could offer more robust and generalized findings.

3. Results

3.1. Effects of Credit Risk on Banking Performance

This section addresses the research question, "What is the effect of credit risk on bank performance?" To answer this research question, regression analysis was conducted using bank performance as the dependent variable (proxied by return on assets) and credit risk as the independent variable. The results of the regression analysis are presented in Table 1.

Table 1. Regression Analysis between Credit Risk and Bank Performance.

Analysis of Variance				Number of Obs	=	8
Source	**SS**	**Df**	**MS**	F (1, 6)	=	0.07
Model	0.0030003	1	0.0030003	Prob > F	=	0.7990
Residual	0.253969644	6	0.042328274	R-squared	=	0.0117
Total	0.256969944	7	0.036709992	Adj R-squared	=	−0.153

Model Summary						
Bank Perf	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Credit Risk	2.534662	9.520352	0.27	0.799	−20.7608	25.83012
__cons	0.0244408	0.3226509	0.08	0.942	−0.7650577	0.8139392

The results in Table 1 reveal that the coefficient of determination, R-squared, was 0.0117 and the computed t-value was 0.27 at a *p*-value of 0.799. The fact that the *p*-value is greater than 0.05 suggests that credit risk had no significant effect on bank performance. The coefficient of regression was 2.5347. Based on the results in Table 1, the following linear regression model was produced:

$$\text{Bank performance} = 0.0244 + 2.535\ (\text{Credit risk}) \tag{4}$$

Equation (4) suggests that a unit percentage rise in credit risk management will trigger an increment of 2.56% in bank performance, but this increment was observed to be statistically insignificant ($p = 0.799$; t = 0.27).

3.2. Effects of Operational Risk on Bank Performance

This section addresses the research question, "What is the effect of operational risk on bank performance?" Regression analysis was used to solve this research question, utilising bank performance (proxied by return on assets) as the dependent variable and operational risk as the independent variable. The results of the regression analysis are presented in Table 2. The results in Table 2 reveal that the coefficient of determination, R-squared, was 0.9924 and the computed t-value was 28.04 at a *p*-value of 0.00. The fact that the *p*-value is less than 0.05 suggests that operational risk had a significant effect on bank performance. The coefficient of regression was 0.9087. Based on the results in Table 2, the following linear regression model was produced:

$$\text{Bank performance} = -0.01929 + 0.90871\ (\text{Operational risk}) \tag{5}$$

Equation (5) suggests that a unit percentage rise in operational risk management will trigger an increment of 0.8894% in bank performance, and this increment was found to be significant ($p = 0.000$; t = 28.04).

Table 2. Regression Analysis between Operational Risk and Bank Performance.

Analysis of Variance				Number of Obs	=	8
Source	**SS**	**Df**	**MS**	F (1, 6)	=	786.40
Model	0.255024	1	0.255024	Prob > F	=	0.0000
Residual	0.0019458	6	0.000324	R-squared	=	0.9924
Total	0.2569699	7	0.036710	Adj R-squared	=	0.9912

Model Summary						
Bank Perf	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Opera Risk	0.908712	0.032404	28.04	0.000	0.8294221	0.9880036
__cons	−0.01929	0.007822	−2.47	0.049	−0.0384344	−0.0001548

3.3. Effects of Liquidity Risk on Bank Performance

This section addresses the research question, "In what way does liquidity risk impact bank performance?" To answer this research question, regression analysis was conducted

using bank performance as the dependent variable (proxied by return on assets) and liquidity risk as the independent variable. The output of the regression analysis is presented in Table 3. The results in Table 3 show that the coefficient of determination, R-squared, was 0.0407 and the computed t-value was 0.50 at a *p*-value of 0.632. The fact that the *p*-value is greater than 0.05 suggests that liquidity risk had no significant impact on bank performance. The coefficient of regression was 0.28426. Based on the results in Table 3, the following linear regression model was produced:

$$\text{Bank performance} = 0.01687 + 0.28426\ (\text{Liquidity risk}) \tag{6}$$

Equation (6) suggests that a unit percentage rise in liquidity risk management will trigger an increment of 0.30% in bank performance but this increment was found to be statistically insignificant ($p = 0.632$; t = 0.50).

Table 3. Regression analysis between liquidity risk and bank performance.

Analysis of Variance				Number of Obs	=	8
Source	**SS**	**df**	**MS**	F (1, 6)	=	0.25
Model	0.010462105	1	0.010462105	Prob > F	=	0.6318
Residual	0.246507839	6	0.04108464	R-squared	=	0.0407
Total	0.256969944	7	0.036709992	Adj R-squared	=	−0.119

Model Summary						
Bank Perf	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Liq. Risk	0.2842594	0.5633068	0.50	0.632	−1.094103	1.662621
__cons	0.0168747	0.1945205	0.09	0.934	−0.4590999	0.4928493

3.4. Effects of Market Risk on Bank Performance

This section addresses the research question, "To what extent does market risk have an effect on the performance of a bank?" To answer this research question, regression analysis was utilized, using bank performance (as measured by return on assets) as the dependent variable and market risk as the independent variable. The output of the regression analysis is presented in Table 4. The results in Table 4 reveal that the coefficient of determination, R-squared, was 0.1134 and the computed t-value was 0.88 at a *p*-value of 0.414. The fact that the *p*-value is greater than 0.05 suggests that market risk had no significant effect on bank performance. The coefficient of regression was 3.506. Based on the results in Table 4, the following linear regression model was produced:

$$\text{Bank performance} = -0.01929 + 3.506\ (\text{Market risk}) \tag{7}$$

Equation (7) suggests that a unit percentage rise in market risk management will trigger an increment of 3.49% in bank performance, and this increment was found to be statistically insignificant ($p = 0.414$; t = 28.04).

Table 4. Regression Analysis between Market Risk and Bank Performance.

Analysis of Variance				Number of Obs	=	8
Source	**SS**	**df**	**MS**	F (1, 6)	=	0.77
Model	0.029271	1	0.029271	Prob > F	=	0.4136
Residual	0.227698	6	0.037950	R-squared	=	0.1134
Total	0.2569699	7	0.03671	Adj R-squared	=	−0.034

Model Summary						
Bank Perf	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
Mark. Risk	3.506199	3.992259	0.88	0.414	−6.2625	13.2749
__cons	−0.19095	0.347434	−0.55	0.602	−1.0410	0.6591931

3.5. Impact of Total Risk Management on Bank Performance

This section addresses the research question, "What is the impact of total risk management on bank performance?" To answer this research question, regression analysis was conducted using bank performance as the dependent variable (proxied by return on assets) and total risk management as the independent variable. The result of the regression analysis is presented in Table 5. The results in Table 5 show that the coefficient of determination, R-squared, was 0.7474 and the computed t-value was 4.21 at a *p*-value of 0.006. The fact that the *p*-value is less than 0.05 implies that total risk management had no significant impact on bank performance. The coefficient of regression was 0.587371. Based on the results in Table 5, the following linear regression model was produced:

$$\text{Bank performance} = -0.23229 + 0.587371\ (\text{Total risk management}) \quad (8)$$

Equation (8) suggests that a unit percentage rise in total risk management will lead to an increment of 0.355% in bank performance, which was found to be statistically significant ($p = 0.006$; t = 4.21).

Table 5. Regression Analysis between Total Risk Management and Bank Performance.

Analysis of Variance				Number of Obs	=	8
Source	**SS**	**df**	**MS**	F (1, 6)	=	17.75
Model	0.192058756	1	0.192058756	Prob > F	=	0.0056
Residual	0.064911188	6	0.010818531	R-squared	=	0.7474
Total	0.256969944	7	0.036709992	Adj R-squared	=	0.7053

Model Summary						
Bank Perf	**Coef.**	**Std. Err.**	**t**	**P > |t|**	**[95% Conf. Interval]**	
TRM	0.587371	0.1394054	4.21	0.006	0.2462583	0.9284837
__cons	−0.23229	0.088771	−2.62	0.040	−0.4495095	−0.01508

4. Discussion

The present study sought to examine the effect of risk management on the performance of commercial banks in Ghana. To achieve this goal, five objectives were set, namely, to ascertain the effect of credit risk on bank performance; determine the effect of operational risk on bank performance; determine the impact of liquidity risk on bank performance; and determine the impact of total risk management on bank performance. The first objective of the study was to ascertain the effect of credit risk on bank performance. The results of the study showed that credit risk had no significant effect on bank performance. That finding contradicts findings from Ekinci (2016), who observed that credit risk exerted a significant effect on banking performance in Turkey, and Mwangi (2012), who found that credit risk had a relatively significant effect on the performance of banks in Kenya. However, the finding is consistent with Madugu et al. (2019), who reported that credit risk exhibited a significant effect on bank performance. Moreover, the coefficient of determination between credit risk and bank performance was found to be 0.0117, suggesting that credit risk, and by extension, credit risk management, accounts for only 1.17 percent of the variance in bank performance.

The second objective determined the effect of operational risk on bank performance. The results of the study revealed that operational risk has a significant effect on bank performance in Ghana. The above finding is consistent with Gadzo et al. (2019) observation that operational risk influences the performance of commercial banks in Ghana. In another study, the above finding was found to agree with Hussain et al. (2016), who found that operational risk was a key influencer of bank performance in Pakistan. Additionally, the coefficient of determination between operational risk and bank performance was found to be 0.99244, suggesting operational risk and, by extension, operational risk management account for 99.24% of the variability in bank performance. This further suggests that operational risk has far more influence on bank performance in Ghana than any other risk.

The third objective sought to determine the impact of liquidity risk on bank performance. The study results showed that liquidity risk had no significant impact on bank performance, as the computed p-value was greater than 0.05. The above study result contradicts the findings of Arif and Anees (2012), who reported that liquidity risk exerts a significant influence on bank performance. Arif and Anees (2012) study was conducted in Pakistan. Furthermore, the coefficient of determination between liquidity risk and bank performance was found to be 0.0407, suggesting liquidity risk and, by extension, liquidity risk management account for 4.07% of the variability in bank performance.

The fourth objective of the study assessed the effect of market risk on bank performance. The study's findings showed that market risk had no significant effect on bank performance. That result is inconsistent with Ekinci (2016), who observed that market risk has a significant effect on banking performance. Moreover, the coefficient of determination between market risk and bank performance was found to be 0.1134, suggesting market risk and, by extension, market risk management account for 11.34% of the variability in bank performance.

The fifth objective looked at determining the impact of total risk management on bank performance. From the data analysis conducted, it was found that the impact of total risk management on bank performance was statistically significant. This finding agrees with findings by Hussain et al. (2016) that a better risk management system leads to improved bank performance. Furthermore, the results obtained for objective five appear to be in consonance with the findings made by Mohammed and Knapkova (2016). Mohammed and Knapkova (2016) observed that there is a positive relationship between firm performance and total risk management. Additionally, the coefficient of determination between total risk management and bank performance was found to be 0.7474, suggesting total risk management accounted for 74.74% of the variability in bank performance—a finding that further lends credence to assertions by Hussain et al. (2016) that a better risk management system leads to improved bank performance.

5. Conclusions

The statistical analyses suggest that different types of risk have varying degrees of impact on the performance of banks in Ghana. Operational risk management is the most influential, accounting for approximately 99.24% of the variability in bank performance. This indicates that operational risks, if not managed properly, could significantly hinder a bank's performance. Therefore, in practical terms, it is imperative that Ghanaian banks and regulators intensify efforts towards curbing operational risks in order to improve banking performance.

In contrast, credit risk, liquidity risk, and market risk management were found to account for a much smaller proportion of the variance in bank performance, at 1.17%, 4.07%, and 11.34%, respectively. The implications of this analysis originate from the acknowledgement that although risks are inherent in the daily operations of the banking sector, their impact on overall performance is significantly less noticeable than that of operational risk. Conclusively, the inclusive strategy for risk management, which takes into account all types of risks, is responsible for 74.74% of the fluctuations in banking performance. This accentuates the importance of a comprehensive risk management approach in attaining improved outcomes.

Ultimately, while it is necessary to consider all forms of risk in risk management strategies, the emphasis should be placed on operational risks due to their substantial influence on bank performance. These conclusions are integral for banks, regulatory bodies, and policymakers in crafting risk management strategies that efficaciously address the unique risk landscape of the Ghanaian banking sector. Particularly, the findings are of great value in designing policies that can effectively mitigate operational risks in the banking industry, with a significant impact on the performance of banking institutions.

5.1. Policy Implications of Findings

Operational Risk Management: given that operational risk management accounts for about 99.24% of the variability in bank performance, regulatory authorities in Ghana should prioritize policies that encourage banks to mitigate operational risks. This could include the development of comprehensive risk assessment frameworks and mandatory reporting standards that ensure banks adequately identify, measure, and manage operational risks.

Risk Training: Policies could be implemented to ensure ongoing training and capacity building in risk management, particularly focusing on operational risks. This would equip personnel in the banking sector with the necessary skills and knowledge to manage such risks effectively.

Technology Integration: As operational risks can also include system failures and cyber threats, policies encouraging the adoption of advanced technologies for improved system resilience, data protection and cyber security could be beneficial. Regulatory incentives could be considered to support such tech upgrades.

Risk Diversification: Although operational risk has the highest impact, the other types of risks—credit risk, liquidity risk, and market risk—also contribute to the overall bank performance. Therefore, policies should encourage risk diversification and the implementation of comprehensive risk management strategies that address all risk types.

5.2. Suggestions for Future Research

Consideration of External Factors: the study could be expanded to consider the influence of external factors such as macroeconomic indicators, political instability, changes in regulations, and technological advancements, among others, on the risk management and performance of banks.

Comparative Studies: comparative studies across different countries or regions could also be considered. This could shed light on how regional or country-specific factors affect risk management and bank performance.

Qualitative Analysis: incorporating qualitative data, perhaps through interviews or surveys with banking professionals and regulators, could add another layer of depth to the research, providing context and real-world insights that quantitative data alone may not capture.

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