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Risk Management and Financial Performance of Banks: An Application of CAMEL Framework

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Abstract: Objective: The prime objective of the study is to examine the impact of risk management techniques on the financial performance of banks listed in the stock market. The CAMEL model which is one of the widely used models to access the relationship between the bank risk and bank performance has been used to access the bank performance banks listed in the stock market **Methodology:** Regarding the GMM analysis of the paper, the Arellano-Bond test for the sake of zero autocorrelation was employed, as shown in the table below. The Pearson test was used to determine the cross-sectional dependence for each model. The test findings reveal that the cross-sections are cross-sectionally dependent. We can utilize the Panel Corrected Standard Error (PCSE) and Feasible Generalized Least Squares (FGLS) with balanced panel datasets (PCSE). Due to the unbalanced nature of our panel datasets, we employed the robust clustering option after each model. The data were clustered across banks. **Results:** Based on the current findings, the CAMEL framework significantly affects the EVA model in assessing financial performance. This implies that the management of banks should concentrate not only on the aspects of ROA and ROE which signify banking profit but also on the EVA model which denotes the maximization of shareholder's wealth. **Implications:** The findings of this research illustrated how different risk factors adapted from the CAMEL model of banks determine bank performance. The study will be helpful for policymakers, bankers, and researchers to understand the relationship between bank risk and bank performance. **Novelty:** This study offers a novel relationship between the CAMEL and bank performance.

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1. Introduction

Risk in this context could be delineated as the irregularity in returns with regards to a certain asset (Gutierrez et al., 2019). It can also be delineated as the possibility of two occurrences of a particular event consolidating followed by its after-effects (Culot et al., 2021). Potential risks are identified, measured, controlled, and monitored for any negative effects to the organizational returns in a process called Risk Management. The strategic management of an organization crucially requires proper Risk Management Practices (RMP) (Shammi et al., 2021). RMPs are used for making beneficial contributions to the organization's goals and objectives as well as to the majority of its portfolios. RMPs provide protection and create value for a specific quarter. There is a need for organizations to comprehensively incorporate RMPs in a continuous manner to achieve their set goals. In the context of banks, an overall picture of their capital resources can be achieved by integrating all market, credit, and operational risks into one capital measurement stream; this is deemed as a vital part of the ERM (enterprise risk management) system (Ambira et al., 2011). Such a move enables banks to develop a comprehensive risk profile, thus enabling them to ascertain the amount of risk they are taking on board and determine the degree of diversification achievable by venturing into multiple areas of business. ERM helps define the limit of risks that can be taken based on the firm's capacity towards ensuring the achievement of its objectives and goals (Salam et al., 2018).

Following the 2007-2009 financial crises, the Basel III rulebook was established to provide several measures for reinforcing the resiliency of banks. Liquidity, credit and market risks during ordinary and strained conditions are highly emphasized under the newly developed capital adequacy framework (Adrian et al., 2017). Banks have been obligated to retain a minimum capital level to be able to make up for losses and to carry out operating activities on a going concern basis; otherwise, they would have to bear extreme losses during situations of financial crisis (Mach, 2019). Bank regulations were modified by the Basel Committee to include a couple of new capital requirements i.e., the IRC (incremental risk capital charge) and the VaR (stressed value-at-risk), which increase the capacity of banks to absorb losses (Shammi et al., 2021). While significant price fluctuations during the recent financial crisis was caused by credit risk, the primary cause for the phenomenon was market risk factors including variations in the risk premia (Tugba Degirmencioglu et al., 2019) which pose a more significant impact on bond returns than any other risk factors by default. The Basel Committee established a new capital add-on along with the IRC to enable banks to absorb sharp negative price fluctuations during a crisis, while the VaR is primarily used for assessing price risks under stressed market conditions Ramirez (2017).

(Shaheen et al., 2020) asserted that risk management affects organizational profits via improved risk management practices. Additionally, the risk analysis of a financial statement is claimed to be the primary component of risk management, along with budgeting and strategic planning which affect the profitability of banks (Saeidi et al., 2019).

According to Jayaraman et al. (2021), financial distress in the subsequent year is positively affected by the ratios of year-to-year cost income, equity to total assets, total asset growth, and loan loss reserve to gross loan. However, financial distress is not significantly affected by macroeconomic figures as asserted by Anbar et al. (2011).

Essentially, risk management practices with a proper risk management policy and of which are integrated into the organizational objectives pose a greater direct impact on financial performance than others (Ebenezer et al., 2017). Hence, despite bypassing other performance determinants, banks can still achieve performance improvement by concentrating on establishing robust risk management policies and making risk management a part of their organizational objectives.

2. Literature Review

2.1 Performance of Banks

ROA and ROE have been widely used in numerous studies for measuring bank performance. Fijałkowska et al. (2018) used profitability to measure financial performance i.e. the ability of a firm to generate earnings that are higher than all its expenditures put together within a given time period. ROA, which assesses a firm's assets, and ROE, which assesses shareholder's equity, are the most widely used profitability ratios.

Galant et al. (2017) described ROA and ROE as measures of accounting which assess an organization's financial and operating performance. ROA refers to the measurement of the efficacy of generating income via assets to boost shareholder value, whilst ROE entails the measurement of the efficacy of generating income via shareholder's equity. In the context of the relationship between corporate governance and firm performance, Saeidi et al. (2019) agreed that performance measurements based on accounting can reveal the outcomes of managerial actions; therefore, they are much more favorable than measurements based on markets. Resultantly, it can be said that a firm demonstrating positive performance via the ROA and ROE is a high performing firm (18). On the contrary, a negative performance denotes a low performing firm.

The broadly utilized accounting-based measurements of ROA and ROE have been demonstrated to be effective in measuring the financial performance of banks i.e., to evaluate whether the banks are actually performing and to establish a yardstick to compare the performances between banks.

The examination of bank performance using ROA and ROE may entail different approaches.

Khan et al. (2019), for instance, employed the independent variables of bank category, industry and macroeconomic factors to determine their effect on ROA and ROE as the dependent variables. Their findings indicate that the dependent variables are significantly affected by expenditure, loan assets, capital ratio, credit jeopardy, inflation and government ownership ratio. Meanwhile, Sufian et al. (2012) measured the performance of banks in China using ROA via the variables of bank-specific factors, macroeconomic factors, and others.

Their findings indicate that although banks with higher capital and more assets are typically more profitable, they are also more exposed to and impacted by external factors like interest rate and inflation (Almaqtari et al., 2019). The study also found that banks with exorbitant operating expenses typically experience negative profitability.

In the context of Islamic banking performance in the Middle East, Anbar et al. (2011) used ROA and ROE as the dependent variables, and bank-specific factors and macroeconomic factors as the independent variables. The findings indicated that there is a positive relationship between capital and loan ratios with profitability. The study also found that the higher the leverage and loans-to-assets ratio, the higher the ROA.

Loans-to-assets ratio refers to the total outstanding loan out of the total assets. A bank is indicated to have high loans and low liquidity when its loan-to-assets ratio is high. Hence, a higher

loan-to-assets ratio leads to greater default risk. Most critically, it also results in higher ROA. The findings affirm that the high assets return generated by Middle Eastern banks also equates to high risks. In the context of South African banks, Kumbirai et al. (2010) measured their performance in terms of profitability, liquidity, and credit quality using financial ratios. In general, it was found that the banks' performance increased at the start of the first and second years but decreased during the 2007 financial crisis as a result of low liquidity and dwindling credit quality. The study took into account the financial crisis period and showed that the financial market downturn had decreased performance.

In the context of commercial banks in Jordan, Bhutto et al. (2021) studied the financial performance of seven banks over the 2005-2009 period. The findings indicate that financial performance is positively affected by all the three aforementioned independent variables. As a conclusion, better profitability is achieved when the total deposit of the bank is higher.

Finally, Adam (2014) used the trend analysis and inter-firm analysis to determine the financial performance of Malaysian banks listed on the stock market over the 2007-2011 period. It was found that the banks' profitability would decrease if their operating expenditure and cost-to-income ratio are high and increase if their assets and operating income are high. The analysis showed that all the banks have been profitable as demonstrated by the positive mean values for all the study variables. In general, the study showed that the joint venture banks in the country have been more profitable with a high capacity for profit generation and loss absorption. On the contrary, the local banks showed a higher capacity to absorb losses and dominate ROA. Limitations wise, Adam (2014) stated that the financial ratio analysis is unable to generalize across business sectors and relies heavily on the dimensions that investors are focusing on. It is also unable to elucidate the key variables that influence value, prone to be affected by mixed management and incapable of integrating the value of money with respect to time which facilitates investors in understanding the complex shareholder value creation process.

Bank performance evaluation is also hindered by the need to distinguish and materialize an explicit implementation measure that is consistent with the process of wealth creation. Bank managers, investors and analysts have traditionally concentrated on earnings per share, equity returns, market capitalization and efficiency ratios for assessing bank performance and creating shareholder value.

Such traditional measurements have been shown to be ineffective in offering a direct measure or in assessing the creation of shareholder investment. This is because they are unable to accurately identify the risk and reinforce behaviors including those related to earnings maximization and prevention of returns dilution.

In view of the above, the EVA model was created for the purpose of quantifying the company value by deducting all the capital costs. The model estimates the financial execution that can lead to administrative options different than those that were measured conventionally. Stewart et al. (2013) asserted that the EVA model can measure performance more accurately as it is based on the dollar and has a positive correlation with the maximization of wealth. Hence, the model is used for guiding decisions and performance assessment to achieve wealth maximization for the shareholders. As opposed to the conventional method for measuring bank performance, EVA can identify, enhance, and explicate the performance of a bank whilst the CAMEL framework can evaluate the general performance of the bank. Therefore, this study utilizes the CAMEL framework's variables as the determinants of financial performance, with EVA and the conventional measures as the proxies. These combined measurements offer a better yardstick for determining the financial performance of banks.

In 1989, Stern Stewart & Co. introduced EVA as a means for measuring residual income i.e., the difference between capital cost and capital returns, with a focus on wealth maximization. Fijałkowska et al. (2018) stated that EVA entails the calculation of a firm's profit after tax less the cost in dollar for the employed equity capital.

Marozva (2022) explained that EVA provides a new yardstick for measuring bank performance and is a crucial tool for improving it. As a conclusion, the authors stated that EVA presents a higher percentage for private banks due to the lower invested capital than that of public banks. Meanwhile, the annual value of EVA is higher for public banks as their invested capital generates higher returns and a steadier NOPAT. EVA had been utilized for quantifying the financial performance of banks in Turkey listed on the Istanbul Stock Exchange over the 2006-2010 period (Assist, 2013).

It was found that EVA is superior to either ROA or ROE as a performance indicator. Haddad (2012) used several pool regressions models to determine the link between EVA, ROA, ROE, and capital adequacy and indicated that EVA is positively and significantly related to the stock returns of banks in Jordan. Sahyouni et al. (2015) used EVA to determine the factors affecting the profitability of banks in Ghana over the 1988-2011 period. Based on the findings, EVA is demonstrated as a superior estimation measure than the conventional variety as it captures bank-specific factors more accurately compared to the ROA. It was also revealed that EVA has a positive impact on a bank's cost-to-pay ratio, liquid resources, and aggregate resources for risk management.

Organizational progress is primarily determined by the aspect of risk management. An appropriate risk control system and mechanism is needed for the purpose of risk prevention and mitigation in organizations (Mall et al., 2019). Proper risk management practices can significantly minimize the operational costs in an organization. In a rapidly transforming world where business outcomes are affected, it is critical to have an efficient risk management mechanism in place. To achieve performance objectives, risk management is crucial as demonstrated in the latest global financial crisis (Alim et al., 2021; Pandya & Van Deventer, 2021; Mubeen, Hye, Shahid & Rehan, 2022; Obeid. 2022). Businesses today not only have to enhance and maintain their performance, but also adopt carefully thought-out risk management practices towards achieving their set strategic objectives (Hoogsteen et al., 2022; Butola, Dube & Jain, 2022; Karakostas, 2022; Karama , 2022; Kasana, Chauhan & Sahoo, 2022). The financial services sector needs to consider all these the most as it was badly affected by the latest financial crisis. Financial institutions primarily face strategic, operational, credit and market risks. Owners and managers adopt risk management approaches based on whether risk management is incorporated into the objectives of the organization, whether a risk management framework or policy is documented, the manner in which the risks are identified, the process of analyzing the risks, the assessment and management of the risks, the monitoring and review of the risks, and finally the availability of a proper risk management mechanism (Heinze et al., 2021).

2.2 CAMEL

Other ratios employed for measuring bank performance include the profit expense, cost-to-income, , and return on capital (Saiful et al., 2019). A number of researchers from various countries had used the CAMEL model analysis to assess bank performance (Karri et al., 2015; Ledhem et al., 2020). The model was developed and implemented by regulatory agencies in America in the 1980s for rating on-site bank assessments.

Bank managements had adopted the CAMEL bank rating as a means for measuring bank performance and financial status.

The performance of banking institutions around the world has been measured using the CAMEL model including the World Bank, the African Development Bank, the Asian Development Bank, the US Federal Reserve Bank, and other regularity bodies. This model originally had five components before the component of market risk was added to it by the end of the 1990s (Brülle et al., 2019). The extended model was later named as the CAMELS model, which incorporates the main performance evaluation parameters of capital, asset quality, management, earnings, liquidity, and sensitivity. The parameters are measured based on a scale from 1 to 5, whereby 1 denotes the highest rating whilst 5 denotes the lowest. These parameter ratings are used to measure the financial soundness of the banks under study. In the CAMELS analysis, banking performance and soundness are measured using various financial ratios including those on asset quality, capital adequacy, management efficiency, earnings and profitability, liquidity, and market risk sensitivity.

There are several limitations to using the financial ratio analysis. For one, only a single banking activity aspect can be explained by each ratio, thus adding to the existing complexity in studying the matter. There will be difficulties in interpreting large numbers of ratios because of the many financial indicators involved, thus leading to inconsistent results and inaccurate methods for measuring performance as a whole. Such limitations can be overcome by carrying put efficiency analyses to measure bank performance (Akhtar, 2010). According to Daraio et al. (2018), performance measurement analysis would benefit significantly from additional approaches like the parametric and non-parametric methods.

Aigner et al. (1977) developed the parametric technique of which most popular approach is the SFA (Stochastic Frontier Analysis) (Machmud et al., 2018). In this approach, banking efficiency is measured via the aspects of cost efficiency, profit efficiency, and alternative profit efficiency. (Prakash et al., 2021) defined cost efficiency as the estimation of how the actual banking cost approximates the best-practice (benchmarked) banking cost in producing similar outputs under the same setting. Profit efficiency refers to the estimation of how near a firm is to creating maximum profits within a certain level of input and output prices. As opposed to cost efficiency, profit efficiency takes into account revenues which can be generated via input and output changes.

Finally, alternative profit efficiency refers to the estimation of how near a firm is to generating maximum profit in line with its output level rather than its output cost. Charnes et al. (1978) developed the DEA (Data Envelopment Analysis) which is a non-parametric program for measuring bank performance (Førsund et al., 2002). As opposed to the SFA, the DEA is more favorable according to several scholars. The wide-ranging DEA has been broadly used for measuring organizational performance via analogous services utilizing the same range of services. According to Kohl et al. (2019), the DEA beneficially provides new insight regarding activities and entities that have been previously measured using different methods. The DEA estimates banking efficiency using the output weighted sum to input weighted sum ratio.

2.3 Capital Adequacy (CA)

This refers to the adequacy of available equity to absorb probable shocks. Banks possess a highly regulated capital structure as capital significantly reduces the prevalence of banking failure and losses. Tesfai (2015) asserted that capital adequacy is a primary component in measuring and evaluating bank performance, along with the other five CAMEL factors as acknowledged and implemented by the Basel system for the Bank for International Settlement (BIS). In 1990, the Nigerian banking system adopted the capital adequacy ratio as a performance measurement. It entails the ratio between the bank's capital (Tier 1 and Tier 2) to its weighted assets. In the context of Nigeria, banks are required to fulfill the minimum requirements as set by the supervising and monitoring authority namely the Central Bank of Nigeria (CBN). Despite broad consensus regarding the necessity of having statutory capital requirements for reducing moral hazards, Adrian et al. (2017) argued that high capitals result in low profits. This is because high capital ratios cause banks to become risk-averse, leading them to ignore potentially risky investment prospects. Consequently, investors would opt for lower risks and settle for lower capital returns.

Capital adequacy leads all the components in the CAMEL framework. Capital is needed by banks to protect them against financial losses and risks (Mach, 2019; Qehaja, Gashi & Hoti, 2022; Reichel, 2022; Suhendra, et.al. 2022). The regulatory authorities of banks are responsible for establishing a minimum requirement for the capital-asset ratio which adheres to the standards of the Basel Accord. Capital adequacy is measured by dividing the bank capital into two tiers. Tier, one entails equity capital and free reserves, whilst tier two entails subordinated debts. According to Ramirez (2017) capital adequacy ratio is positively and significantly related to bank performance, which is consistent with the findings of Saeidi et al. (2019). Based on the aforementioned finding, a rise in capital would aid the bank in settling unsecured debts, improving future prospects, and ultimately increasing bank profits. On the contrary, Anbar et al. (2011) found a significantly negative relationship between capital adequacy and bank performance in the context of China following the 2008 financial crisis. According to the authors, the economy's post-crisis recovery had led to increased funding costs for the banks, highlighting that increased capital leads to decreased profits (Ebenezer et al., 2017).

2.4 Credit Risk

Next in line in the CAMEL framework is asset quality which refers to the quality of the loan, reflecting banking earnings. Fijałkowska et al. (2018) stated that measuring benefit quality is crucial in understanding the hazards presented to the account holders. Galant et al. (2017) asserted that asset quality is primarily affected by the factors of asset diversification, loan size and duration, loan portfolio growth, and the prevailing credit policy. Khan et al. (2019) both measured loan quality utilizing the ratio of non-performing loans (NPL) to total loan, and both found that NPL significantly affects bank performance. Past studies also found the indirect effect of asset quality on bank performance i. e. via loan quality. In the context of Islamic countries, Almaqtari et al. (2019) indicated a positive link between asset quality and bank performance as evaluated utilizing the loan loss and net interest margin ratio. According to the authors, the positive link is contributed by the fact that a higher credit risk would result in a higher interest margin to address 16 possible risks; therefore, the interest rate increases with high-risk loans and indirectly boosts the bank's interest income. Meanwhile, Sufian et al. (2012) indicated the significant and negative effect of NPL on bank profits, and summed up that a high NPL in the loan portfolio leads to low loan quality. The authors explained that since NPL causes default loan payments, interest income is therefore reduced.

2.5 Management (MGMT)

This is the third CAMEL component. (20) stated that the management significantly affects bank performance by ensuring the bank's soundness and growth. In the aforementioned study, bank efficiency was measured via

expenditure, specifically operational cost. It was proposed for bank managers to practice high levels of integrity and professionalism in controlling and monitoring their banks' operational expenditure. Anbar et al. (2011) investigated bank management efficiency via the ratio of operating profit to net income. They found an insignificant result, therefore indicating the probable role of a different ratio for testing and measuring bank management efficiency. Such studies were undertaken by other researchers such as (Kumbirai et al., 2010) who used the variable of expenditure control. The authors highlighted that although higher expenses would lead to higher operational costs, it would not affect the profitability of the bank. This positive relationship was explained by the authors as the being the result of a higher number of banking activities which in turn leads to the generation of higher revenues. Kiptui (2017) found similar results i.e., higher expenditures lead to higher lending rates so as to cover for the high operational costs. As demonstrated by the two studies above which found a positive effect of bank management on bank performance, the result may be driven by the bank employees' operational management experience and expertise which aids the bank in saving cost and preventing losses due to fraud. Ultimately, the bank's ability to save cost and prevent loss contribute to its overall performance. On the contrary, Stewart et al. (2013) found a negative relationship between the variables i.e. a higher operational efficiency leads to higher operational cost and ultimately lesser profits for the bank. This is contributed by the higher overhead expenditure incurred which reduces the bank's profitability.

2.6 Earnings (EA)

This is the fourth CAMEL component. It measures profitability in the form of return on equity. It entails the capability of the bank for expanding its business. Shammi et al. (2021) highlighted the significance of earning in measuring bank profitability. The study also indicated the substantial differences in the aspects of management, earning and liquidity between banks in Malaysia and Indonesia. Shammi et al. (2021) showed that capital can be increased via retained earnings i.e., via the adoption of advanced technology to boost operational efficiency. Earning is also a measure of the bank's capacity in the aspects of loss absorption, financing expansion, and capital development (Abbas et al., 2021; Chen et al., 2021). The authors revealed the significant and positive relationship between earning and profit, as was unveiled from the journal review. A bank's earnings may be generated from the numerous products and services it offers including loans assets for generating interest income (Molyneux et al., 2021), late charges for generating non-interest income, service charges for payment transactions, and so on. Apart from banking activities, earnings are also generated from the available capital.

Earnings quality denotes the quality of the profit made by a bank, measured by the degree of its reliability and relevancy (Alyaarubi et al., 2021; Benkraiem et al., 2021). The difference between revenue and expenditure denotes the profit obtained. Banks mainly attain their income from interest gained on loans as well as revenues from various banking activities. Meanwhile, expenditure entails the payments of salaries, wages, rents, administrative overheads, taxes, and so on. Profit is the surplus available after deducting all the expenditure. A prosperous bank can generate modest profits regularly and maintain a state of robustness for itself and its investors (Parrott et al., 2021). A bank's earnings quality and profitability are crucial in ensuring the health of its current and future operations.

2.7 Liquidity Risk (LI)

Liquidity management is another crucial concern for the managers of commercial banks. Liquidity refers to the ability of banks to cash their assets or their fair value during times of need (Alim et al., 2021). The ability of a bank to respond to financial situations that require an expedient injection of cash lies in the quality of its assets (Ahmed Maude, 2021). Liquidity is crucial to enable a bank to meet its financial obligations without having to use its cash reserves (Pring et al., 2021). Banks that are highly liquid typically forego certain investments that may be highly profitable. Such a trade-off between liquidity and return can be seen when there are shifts from short-term securities to long-term ones, or when a loan increases the returns of the bank along with its liquidity risks and vice versa. Hence, a bank which is highly liquid is also less profitable and less risky (Bibow, 2020; Olowookere, 2021; Pring et al., 2021).

This final CAMEL component is proxied via short-term deposits which are a stable source of funding for managing liabilities and net borrowings of short-term nature. Saiful et al. (2019) highlighted the importance of liquidity management towards attaining efficiency in bank management via the trade-off between profit and liquidity. Liquidity and profitability have been indicated to be both positively and negatively related. Among the studies that found a positive relationship between the two variables is Marozva (2022), who investigated the performance of banks in 12 countries across North America, Australia and Europe. The study asserted that the liquid assets of banks can offer funding for other banking services in short term, leading to the generation of revenues that would boost the banks' profits. Likewise, Marozva (2022) found that liquidity is significantly and positively related to ROA via the liquid assets to short-term funding ratio. Similar findings were derived in another related study by Mall et al. (2019) on the performance of Greek banks utilizing an unbalanced pooled time series data. The study found that banks with low liquid assets are likely to possess low ROA. On the contrary, Hoogsteen et al. (2022) found a negative relationship between liquidity and profitability in the context of banks that are required by the authority (e.g., central bank) to have liquid assets in place. These banks are only required to hold the liquid assets but are not authorized to use them. As such, the banks' cash flow is also indirectly withheld hence lessening their profit, leading to a negative relationship.

Meanwhile, liquidity risk is defined as the unanticipated and rapid increase in depositors' withdrawals i.e., quick liquidation of customers' assets. The State Bank of Pakistan 2003 defined liquidity risk as possible losses due to the bank's incapability to fulfill its obligations. Several factors drive the occurrence of this risk namely the sudden and rapid withdrawal by depositors, and market interference or insufficient market depth (Al-Daamee, 2021; Al Janabi, 2021; Alsyahrin et al., 2018; Basheer, 2021). According to Ledhem et al. (2020) low liquidity can lead to cash shortage of which recovery would be very costly thus decreasing the ability of the bank to make profits. The authors added that low liquidity can cause a bank to become liquidity insolvent without becoming capital insolvent. In sum, liquidity risk occurs when banks fail to fulfill their projected and contingent cash requirements and therefore have to acquire additional borrowings (Acharya et al., 2020). Moreover, liquidity risk can also prompt other financial risks including market, interest rate, credit, and strategic risks. Interest rate risk, for instance, can be prompted by indefinite future funding and investment rates.

2.8 Regression Models

This paper examines the effects of the CAMEL components namely the capital adequacy ratio, liquidity risk, credit risk, management efficiency, and earning quality (Aksoy et al., 2022; Altay, 2021; Amer, 2021; Faozi et al., 2022; Jawarneh, 2021) on the three measures of firm performance namely the return on assets, return on equity, and economic value added .The model 2 to 4 represent the linear model, representing the impact of CAMEL components namely the capital adequacy

ratio, liquidity risk, credit risk, management efficiency, and earning quality on the three measures of firm performance namely the return on assets, return on equity, and economic value added

$$\boldsymbol{Y_{it} = \alpha_0 + \alpha_1 X1_{it} + \alpha_2 X2_{it}} \quad \textbf{(1)}$$

Model 2-4: Impact of FLR on the BR

$$ROA_{it} = \alpha_0 + \alpha_1 CAD_{it} + \alpha_2 LIQ_{it} + \alpha_3 AQ_{it} + \alpha_4 MGTE_{it} + \alpha_5 ERNQ_{it} + \varepsilon_{it} \quad (2)$$

$$ROE_{it} = \alpha_0 + \alpha_1 CAD_{it} + \alpha_2 LIQ_{it} + \alpha_3 AQ_{it} + \alpha_4 MGTE_{it} + \alpha_5 ERNQ_{it} + \varepsilon_{it} \quad (3)$$

$$EVA_{it} = \alpha_0 + \alpha_1 CAD_{it} + \alpha_2 LIQ_{it} + \alpha_3 AQ_{it} + \alpha_4 MGTE_{it} + \alpha_5 ERNQ_{it} + \varepsilon_{it} \quad (4)$$

3. Data and Data Sources

The study used secondary sources of data. The secondary data bank-specific factors are collected from the annual report of the banks whereas the data of regulatory and economic factors is collected from the database of Bureau of Statistics and State Bank of country. The study period covers from 2005 to 2021. The descriptive statistics are shown in the table 1 below.

Table 1. Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
ROA	303	0.3013211	0.2059242	0.0212307	2.7432210
ROE	303	0.0623439	0.0432303	0.0223461	0.6195135
EVA	303	0.0315633	0.0202319	0.0012878	0.2091753
CAD	303	21.533617	2.4323162	14.5032153	28.673211
LIQ	303	16.373401	7.242540	1.6128190	39.860000
AQ	303	0.6787213	2.5837100	0.0002611	24.352130
$MGTE$	303	0.0411101	0.0611248	0.0123114	0.7463214
$ERNQ$	303	0.5422157	0.1521445	0.0226129	0.9454320

We began our analysis by determining whether our variables were stationary. We used the panel Fisher type unit root test with the Philipps perron method on all of our variables to ensure that they were stationary and to rule out any erroneous regressions. The findings show that the variables are stationary at all levels (Choi, 2001). We employed the Fisher-type unit root test, which runs the Augmented Ducky Fuller (ADF) test to each cross-section and reports integrated p-values from the unit-root tests for panel data incorporating four of the approaches of Choi (2001). Among the techniques, three employ the inverse-normal, inverse x2, or inverse-logit transformations to transform p-values, whereas the remaining is a variant of the inverse x2 transformation that is typically incorporated when N approaches to infinity. Test's null hypothesis is that all of the panels have a unit root. The findings suggest that the null hypothesis is not supported and that the variables are stationary at all levels. Thus, the null hypothesis of the test is; all panels have a unit root. In the test specification, we try several lag lengths, but the significant results remain the same.

Table 2. Pearson correlation coefficients

Variables		1	2	3	4	5	6	7	8
ROA	**1**	1							
ROE	**2**	0.1271	1.00						
EVA	**3**	0.1119	0.3118	1.00					
CAD	**4**	0.1239	0.0224	0.4113	1.00				
LIQ	**5**	0.0329	0.2097	0.2005	0.1294	1.00			
AQ	**6**	0.0715	0.2894	-0.0121	0.0372	0.1217	1.00		
$MGTE$	**7**	0.1213	0.4714	0.8110	0.3521	0.2543	-0.1191	1.00	
$ERNQ$	**8**	0.1228	0.2265	0.1663	0.1817	0.4281	-0.1009	0.2714	1.00

Table 2 shows the Pearson correlation coefficients used in this study to assess the strength of correlations among the independent variables. No correlation coefficients among the independent variables show value greater than 0.80, as shown in Table 2. According to Gujarati et al. (2009), a benchmark of 0.8 level of correlation is adopted to detect the presence of multicollinearity. Several diagnostic tests were done to determine the most appropriate estimations (see Table 3). To begin with, we employed the White Heteroscedasticity test in order to know the heteroscedasticity defects in the deployed aggregate model. Null hypothesis is rejected in our aggregate model at the 5% significance level, where the p-value is between 0.0000 and 0.0020, according to the test findings. This shows that there is a problem in aggregate pooled model relevant to heteroscedasticity, and the use of random effect estimates is thus advised.

Table 3. Results of the Diagnostic test

Statistics	Hausman test	Breusch and Pagan test/ autocorrelation test	Arrelano-Bond Test	White Heteroscedasticity test
Prob>chi2 Prob>z	0.0031**	0.0000	0.621	0.0000**

To choose between the random effect's estimations and pooled OLS, a test, namely, Bresuch Pagan LM, is employed. This test checks that if the pooled OLS method is a proved to be a BLUE estimator, which is autocorrelation-free, and it indicates that the specific term is zero for cross-sections. LM employed chi square distribution with one degree of freedom under null hypothesis. There was a clear rejection of null hypothesis when the estimated value exceeded the tabulated chi-square, indicating that cross-section individual effects were present, and the random effects model was the most preferable methodology. It is advisable that random effects model is preferred upon the pooled OLS, in accordance with LM test findings in Table 1. The next step is to decide whether to use a random or fixed effects model. In order to show the difference

between fixed effect estimator μ1 and random effect estimator μ2, the Hausman specification test is employed. Estimator μ2 is proved to be an unbiased and efficient estimator of the true parameters, according to the null hypothesis. No systematic difference should be existing between the two estimators in this case. It has been projected in Table 4 that the null hypothesis is not supported and that the fixed effects model is preferred. Regarding GMM analysis of the paper, the Arellano-Bond test for the sake of zero autocorrelation was employed, as shown in the table below. The Pearson test was used to determine cross-sectional dependence for each model. The test findings reveal that the cross-sections are cross-sectionally dependent. We can utilize the Panel Corrected Standard Error (PCSE) and Feasible Generalized Least Squares (FGLS) with balanced panel datasets (PCSE). Due to the unbalanced nature of our panel datasets, we employed the robust and clustering option after each model. The data was clustered across banks.

If our GMM model is an identifiable model, each endogenous variable has only one instrument. Because our model is an identified model with only one instrument for each of the endogenous variables, we cannot test for over-identification restrictions in this scenario. As a result, diagnostic tests are reported after GMM estimation, which determines the instrument's validity using autocorrelation tests (Arrelano-Bond Test). The Arrelano-Bond Test, on the other hand, found no existence of autocorrelation. As a result, the aggregate model's fixed effect and GMM estimates appear to be the most appropriate estimates.

Table 4. Regression Results

	2	3	4
ROA_{t-1}	0.356*	-	-
ROE_{t-1}	-	0.427***	-
EVA_{t-1}	-	-	0.240***
CAD	-0.354***	-0.738**	-0.431**
LIQ	0.451***	0.724**	0.312**
AQ	-0.239***	-0.223**	-0.231***
$MGTE$	0.340**	0.651**	0.421**
$ERNQ$	0.451**	0.431**	0.343**

4. Discission and Conclusion

The results of the difference GMM are shown in the table 4 below. Table 4 shows the negative and significant link between CA and bank performance, in line with the results of (33) in the context of China's banking sector post-financial crisis. The country's banks faced challenges in increasing their capital due to higher funding costs which in turn reduced their ability to make profit. In the context of Malaysia, the negative link between CA and bank performance could be the result of the gradual execution of Basel III from 2013 to 2019. Basel III aims to reinforce the capital quality of banks as finalized by BNM in mid-2012 following the publication of the capital adequacy reporting guidelines under Basel III and of which became effective in January 2013. Following the increment of the minimum capital requirement and the announcement of a capital buffer, an adjustment was made to the risk-weighted capital ratio. Resultantly, banks were required to have multiple capital buffers to fulfill the minimum capital requirement, owing to inadequate capital for expanding or supporting the bank's business activities. Therefore, the current findings elucidate the negative but significant effect of CA on bank performance.

In this study, AQ was revealed to be negatively and significantly related to bank performance, similar to the findings of Trinugroho et al. (2014). Larger loan assets lead to a higher probability of exposure to non-performing loan loss due to default payments. Loan provisions would be established by the bank as a form of credit risk mitigation. The Financial Reporting Standard necessitates for banks to acknowledge the provisions upon the incurrence of significant loan losses, which necessitates banks to establish proper provisions to mitigate possible future loan losses such as undrawn loan commitments. In sum, a higher loan asset quality leads to a higher chance of exposure to credit risk which would ultimately affect the performance of the bank.

In the current study, MGTE was found to be negatively and significantly related to financial performance, similar to the result derived by Yin (2013). A bank with high operational efficiency would be able to give higher payouts to its staff and senior management owing to higher KPI (key performance indicator) achievement. The bank may undertake earnings retention for the purpose of giving salary increments, incentives, bonuses and commissions to its high-performing employees so as to motivate them and ascertain their continuous commitment and integrity on the job. In sum, bank earnings are determined by management efficiency.

In this study, EA was found to have a positive and significant effect on the financial performance of banks, consistent with the findings of Prakash et al. (2021) and Mairafi et al. (2018). According to the derived findings, a higher interest rate leads to higher interest income and ultimately higher earnings. Banks have always relied on interest and non-interest incomes as their primary source of income. Banks charge an interest to all granted loans at base lending rate (i.e., funding cost for the bank) plus spread (which varies based on the borrowing risk). Therefore, the bank's interest income earning is contributed by the spread charged on every granted loan's interest rate. Additionally, a part of the bank's earnings comes from the non-interest income derived from the service charge imposed on all provided financial services.

In this study, it was found that LIQ is significantly and positively linked to ROA, significantly and negatively linked to EVA, but insignificantly and positively linked to ROE. The significant and positive finding was likewise reported by Tesfai (2015). It was unveiled that banks with highly liquid financial assets are more likely to demonstrate higher financial performance. Short-term assets can easily be turned into cash to fulfill short-term liabilities and to be used as cash surplus for expanding the bank's business and for supporting its day-to-day operations. Therefore, cash flow stability facilitates banks in managing the maturity gap that exists between assets and liabilities. Yet, this study also found an insignificant link between LI and ROE, whereby liquidity has no effect on ROE. Banks operate on a business model under the strict governance of the central bank i.e., BNM, unlike other organizations. The banks' liquidity is influenced by the availability of a vault cash for satisfying customers' cash withdrawal requests and for meeting BNM's requirement for a Statutory Require Reserve (SRR) towards preventing bank failures. ROE is computed by dividing the

bank's net income with its equity. Despite the ability to increase ROE by increasing leverage, this move is bounded by BNM's set guidelines. Therefore, the bank's ROE is barely affected by its liquidity.

5. Study Implications

The aim of this current study is to offer empirical evidence regarding the effects of conventional measures of financial performance of banks. Past research has indicated that the usage of the CAMEL framework is highly effective for this purpose i.e., evaluating bank performance. The CAMEL framework represents the internal banking factors that offer vigorous measures for assessing the general financial performance of banks.

Cash amount by year-end is rarely reflected by the standard accounting profits, but the usage of the EVA model may enable the NOPAT to reveal profitability based on the widely recognized accounting principles (i.e., GAAP). Although the WACC is a rather complicated capital structure function and diverges based on the internal banking policies and guidelines, its consistent implementation can facilitate banks in identifying the most profitable investment and thus outdo their competitors with negative or lower EVA. Stern Stewart added that the WACC is also a crucial determinant of stock performance via its ability to provide signals of the increasing positive EVA value as affected by the bank.

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