

## An Assessment Of Banks Efficiency And Performance Of Banking Sector Of Pakistan By Using Camels Rating Framework

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### ABSTRACT

*A sound financial sector is considered essential for the economic development and prosperity of a country. The banking industry's ability to gather savings and distribute them through loans and other financial services is fundamental to the functioning of the financial sector and the broader economy. So, the main aim of this research study is to fulfill the research objective that is "To evaluate the Bank efficiency and performance of the banking sector in Pakistan by applying CAMELS approach". To fulfill this research objective, researcher has employing two-pronged strategy: first, to analyze the soundness and financial strength of banking sector by using the **CAMELS Rating framework** and second, is to check the impact of CAMELS approach on banking sector performance in terms of Efficiency by formulating **Regression equation**. The Internationally accepted CAMELS framework is comprised of rating parameters used to access banking sector performance. It is used to evaluate the overall condition of the commercial banks operating in Pakistan and identify its financial, managerial and operational strength and weaknesses. It includes six important components which includes; Capital, Assets, Management, Earnings, Liquidity, and Sensitivity to market risk — each components are rated on a scale from 1 to 5. These individual ratings serve as the basis for a composite rating, which also ranges from 1 to 5. This composite rating provides an overall assessment of the entity's financial health and risk profile, taking into account various aspects of its operations and financial stability. For this purpose, those banks are included which are listed on Karachi Stock Exchange.*

*The results shown that almost large banks typically outperform than smaller banks due to their advantages in scale, resources, diversified operations, regulatory compliance, access to capital markets and brand recognition. The top 5 Banks are Meezan Bank, NBP, MCB, HBL and UBL. These are nationalized banks of Pakistan except Meezan Bank. Only one small bank that is JS Bank is included in top 10 banks. Secondly, Pooled data of 15 sample banks during 2000-19 are employed. Both Random and Fixed effects models were estimated. Empirical results of the Generalized Least Square (GLS) method based on CAMELS ratios have shown that Asset quality, Liquidity and Earning have significant predictability.*

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**Key words:** *Capital Assets Management Earning Liquidity Sensitivity (CAMELS) rating system, Efficiency Ratio, performance of Banks, Banking industry of Pakistan.*

## **INTRODUCTION**

The sound functioning of financial sector is considered important for the country's economic growth. Pakistan have large variety of financial institutions; commercial and specialized banks, Islamic banks, investment banks, insurance and leasing companies, development financial institutions, stock exchanges, corporate brokerage and discount houses, national savings schemes and microfinance institutions. In accordance with SBP, an increasing growth of banking sector is vital for economic growth of country. The banking sector comprises central part the financial sector in Pakistan that collects saving from surplus unit of economy, in the form of deposits and provides it to deficit units of economy in the form of loans and advances.

The main objective of the study is to access the performance in terms of Efficiency of the banking sector in Pakistan by using CAMELS ratio. CAMELS Ratios and rating framework is used to achieve the objective. On November 13, 1979, The Federal Financial Institutions Examination Council (FFIEC) approved the Uniform Financial Institutions Rating System (UFIRS), replacing the original framework, known as CAMEL. In 1997 version of UFIRS, each financial institution receives a composite rating based on an evaluation of six key aspects of its operations and financial health.

These components are abbreviated into a composite "CAMELS" Rating. The acronym CAMELS stands for Capital Adequacy, Asset Quality, Management soundness, Earnings, Liquidity, and Sensitivity to Market Risk. Composite and component ratings are allocated using a numerical scale ranging from 1 to 5. A rating 1 signifies the highest rating, reflecting strong performance, robust risk management practices and minimal supervisory concern. Conversely, a rating 5 indicates the lowest rating, indicating weak performance, inadequate risk management practices, and consequently, the highest level of supervisory concern (FDIC, 1997).

At the end of December 1997, the CAMELS framework was established for both onsite and offsite supervision. This framework involves evaluating six parameters that indicate the health and condition of financial institutions. The financial position of all commercial, national and private banks in Pakistan is internally assessed by the banks themselves and externally evaluated by regulatory bodies through the CAMELS rating system. Banks in Pakistan mostly prefer for PACRA and JCR-VIS, their national credit rating agencies, for external credit ratings, rather than international rating agencies like S&P, Fitch and Moody's. The primary reason for this preference is the lower cost associated with obtaining ratings from national agencies compared to international ones. However, SBP opted for the CAMELS rating system as the most suitable method to line up the supervisory mechanism with international standards and requirements. The selection of the CAMELS system was not solely based on its theoretical soundness but rather on its established presence within the banking industry of Pakistan.

The series of bank failures witnessed in the USA during the Great Depression of the 1930s derived significant attention to bank performance, a concern that has continued to grow steadily ever since. The CAMELS rating system, which offered a framework for evaluating the financial situation and performance of individual banks, was implemented by US federal regulators in 1979. Both national and international economies realized after the global financial crisis of 2007–08 how crucial it was to keep an eye on bank performance and make sure that supervision was functioning properly.

The CAMELS rating system categorizes banks based on their financial and physical condition and various measurements related to financial, managerial, operational and performance aspects. Within the CAMELS Rating System, bank performance is assessed across six parameters; C-Capital adequacy, A-Assets quality, M- Management soundness, E-Earnings and Profitability, L-Liquidity and S-Sensitivity to market risk. Therefore, in this study the Generalized Least Square (GLS) method has been employed on CAMELS ratio to measure the efficiency of selected Commercial Banks.

## RESEARCH OBJECTIVES

**General objective:** To assess the banking performance of Pakistan by applying CAMELS Approach.

### Specific objectives

- To determine the financial position/health of banking sector by using CAMELS framework of financial ratios/ parameters.
- To evaluate the impact of CAMELS ratios on the efficiency of the banking sector, by utilizing a Regression model.

### Research Questions

Q: What will be impact of CAMELS Approach on Banking Sector in Pakistan by employing/considering CAMELS framework (Rating scale) and Regression analysis?

The statement of the problem is further bifurcated into two **sub-questions** which are as follows:

Q1: What will be the financial condition of banking sector of Pakistan, if assessed by employing CAMELS framework of financial ratios and CAMELS rating?

Q2: How we will assess the significance and magnitude of the relationship between these financial ratios of CAMELS framework and banking sector efficiency?

The research paper is structured as follows: Part two provides an in-depth review of the literature, encompassing studies from both national and international sources. Part three outlines the data sources and methodology employed in the study. Part four presents the analysis and discussion of the selected banks. Finally, part five concludes the study, summarizing the findings and recommendations from the research.

## LITERATURE REVIEW

The review of literature included earlier research work undertaken relating to performance of banking sector of Pakistan at national as well as international level.

**J. Baral (2005)** investigated Joint Venture Banks in Nepal and assessed Commercial Banks' health using the CAMEL framework. While joint venture banks showed better health compared to other commercial banks, the analysis of CAMEL indicators revealed their vulnerability to large-scale shocks, indicating relatively weaker financial health. **Patti and Hardy (2005)** examined bank productivity in terms of profit and efficiency gains among new entrants. After privatization, privatized banks improved profit efficiency, though only one significantly enhanced efficiency over time, while others didn't differentiate themselves from state-owned banks. Interestingly, new private domestic banks emerged as highly efficient, occasionally surpassing foreign counterparts.

**Sarkar (2006)** analyzed the CAMELS Rating System in the context of Islamic Banking. He reviewed the CAMELS standards and proposed a Shariah Matrix to gather feedback from Shariah experts and Islamic bankers. This approach aimed to establish a Shariah benchmark for regulating Islamic banks. Additionally, Sarkar suggested adding a "S" for Shariah rating to the CAMELS system, potentially creating the "CAMELSS" Rating System. **Wu, Chen and**

**Shiu (2007)** examined the relationship between financial development and operational performance in Chinese commercial banks. Analyzing data from 14 banks over 1996-2004, they found higher monetization linked to better ROA. Surprisingly, longer-established banks showed poorer ROA, and non-traditional banking efforts negatively affected profitability. Larger banks had lower ROA compared to smaller ones.

**Nimalathasan (2008)** analyzed the financial performance of the banking sector in Bangladesh from 1999 to 2006 using the CAMELS Rating System. Among 48 banks and 6562 branches, 3 banks received a "Strong" rating, 31 were rated "Satisfactory," 7 received a "Fair" rating, 5 were "Marginal," and 2 were deemed "Unsatisfactory." Notably, one NCB received an unsatisfactory rating, while three others received a marginal rating. **Atkogullari (2009)** employed a CAMEL framework to evaluate Northern Cyprus's banking sector performance, focusing on the five largest banks post-2001. Results showed improved management quality and profitability over time, though capital adequacy and liquidity levels declined during the period.

**Hermus and Narang (2010)** investigated the impact of financial liberalization on bank efficiency across 10 developing economies from 1991 to 2000, analyzing data from over 4,000 banks. They employed a Data Envelopment Analysis to calculate bank efficiency at the individual level and used a PLS fixed-effects model to measure efficiency. Their findings strongly supported the notion that financial liberalization had a positive impact on bank efficiency. **Christopoulos, et al. (2011)** examined Lehman Brothers' financial performance using CAMELS ratios from 2003 to 2007. They identified poor and uncertain credit quality, managerial ineffectiveness in reversing decline, non-compliance with regulatory rules, and inadequate risk management practices given its size. The study highlighted Lehman Brothers' vulnerability to risks and instability, suggesting that supervisory authorities, notably the US Federal Reserve, should have responded earlier to signs of its deteriorating condition.

**Teker et al. (2011)** assessed the performance of commercial banks in Turkey using a proposed model over the period 2003-2010. They studied 13 commercial banks listed on the Istanbul Stock Exchange, employing an indexing model to measure financial performance. The research ranked all banks each year based on this model and compared the results with annual net income and Return on Equity (ROE) of the banks. **PRASAD et al. (2011)** analyzed the performance of Indian banks using the CAMEL model from 2005-10. They found Karurvyasa Bank consistently ranked highest, followed by Andhra Bank and Baroda Bank. Central Bank of India performed least favorably. The largest public sector bank in India ranked 36th overall, indicating varied performance across banks despite their size. Each parameter in the CAMEL model was equally weighted in the evaluation process.

**Dincer et al. (2011)** inspected the Turkish banking sector's performance using CAMELS ratios after the global crises of 2001 and 2008. They observed positive improvements in the performance of state-owned, privately-owned and foreign banks during the period from 2002-09. **Said and Tumin (2012)** examined the influence of bank-specific factors—capital, credit, liquidity, operating expenses and size—on the performance of commercial banks in China and Malaysia. They measured performance using ROAA and ROAE. The study found that while capital and credit ratios consistently affected bank performance in both countries, operating expense ratios influenced performance only in China and not in Malaysia. The impact of liquidity and size ratios varied between the two countries. Overall, the research underscored the importance of considering local banking contexts when assessing the effects of these factors on bank performance.

**A. Mehta (2012)** examined the financial performance of UAE banks listed on the Abu Dhabi Stock Exchange from 2005-10, spanning periods before, during and after the global financial crisis. The study focused on financial ratios such as leverage, liquidity and profitability (ROA and ROE). It found that the crisis significantly reduced profitability and liquidity for UAE banks, while leverage ratios increased during the crisis compared to the pre-crisis period. **Prasad and Ravinder (2012)** evaluated the performance of 20 nationalized banks in India using the CAMEL framework. Their study concluded that private sector banks demonstrated superior performance and soundness compared to nationalized banks, positioning them at the top of the list in terms of overall performance.

**Hofmann (2012)** investigated how bond investors in the financial sector used accounting signals during economic downturns, particularly in the aftermath of the bank crisis. He focused on whether accounting ratios linked to the CAMEL framework affected decisions by investors holding portfolios of financial institution debt. The study found that during periods of market opacity and illiquidity, bond returns were mainly influenced by changes in "earning power" and credit ratings, indicating the importance of these factors in investor decision-making under uncertain economic conditions.

**Rozzani and Rahman (2013)** analyzed the performance of 19 conventional banks and 16 Islamic banks operating in Malaysia from 2008-11. The study found that both types of banks exhibited similar levels of overall performance. The research aimed to offer valuable insights for stakeholders to enhance investment decisions and encouraged banks to evaluate and improve their performance based on the study's performance metrics. **Ongore and Kusa (2013)** investigated the financial performance of commercial banks in Kenya using a regression model and GLS on panel data. Their findings indicated that bank-specific factors had a significant impact on performance, although the liquidity variable did not show a significant effect. However, the influence of macroeconomic variables on bank performance was uncertain at the 5% level of significance.

**Roman and sargu (2013)** analyzed the financial health of commercial banks in Romania using the CAMELS framework. Their study focused on 15 banks operating in Romania from 2004-11. The research identified strengths and weaknesses among the banks, emphasizing areas where decision-makers needed to enhance financial soundness to improve overall stability and resilience. **Rashid et al. (2015)** compared the financial performance of Conventional and Islamic banks in Pakistan from 2006-12 using a Financial Performance Index (FPI) based on the CAMELS framework. Conventional banks generally ranked higher than Islamic banks, with Islamic banks positioned 12th overall. The study observed that Islamic banks showed improved performance in 2012 compared to 2006. **Subhal and Vishal (2015)** assessed the financial performance of new private sector banks in India from 2009 to 2014. They found that Kotak Mahindra Bank emerged as the top performer among these banks during the period under study.

**Masood et al. (2016)** analyzed performance of Islamic banks by using CAMELS framework in 2015. The results found that out of 6 banks, 2 of Islamic banks were showing satisfactory results, while others were on fair position. Using the CAMEL Model, **N. Bawa's 2017** reassessed 19 nationalized banks from 2006 to 2016. It highlighted Andhra Bank's overall strong performance, Indian Bank's top position in capital adequacy, Bharatiya Mahila Bank's leading asset quality, and IDBI Bank's excellent management efficiency and earnings. These findings suggested insight into each bank's relative strengths in key financial metrics over the assessed decade.

**Shaddady and Moore (2019)** investigated the impact of financial regulation and supervision on bank stability across 2210 banks in 47 European countries from 2000-16. They found that strict capital regulations enhanced bank stability by strengthening capital reserves. However, tighter restrictions on deposit insurance and increased supervision had adverse effects, particularly destabilizing banks already considered stable. The study emphasized that commercial banks, smaller institutions, and banks in emerging markets were more susceptible to these regulatory impacts. This underscores the importance of balancing regulatory measures to maintain stability across diverse banking sectors and market conditions.

**Kulshrestha & Srivastava (2022)** compared the financial performance of private and public sector banks using the CAMEL approach. They analyzed 14 bank's audited financial reports from 2011-18, focusing on ratios like Capital, Asset, Management Soundness and Earnings and Liquidity. Their study developed a ranking method based on average ratios and applied statistical tests to assess differences. Results showed that private sector banks performed better overall, attributed to technological banking reforms and enhanced recovery mechanisms implemented by these banks.

In **Pakistan**, the research studies conducted by; **Masood et al. (2016)** analyzed the performance of Islamic banks by using CAMELS framework. **Jabeen (2011)** investigated Efficiency of the Banking Sector, whereas, **Sarker, A. (2006)** and **Khalid (2006)** investigated the performance of the banking sector by using CAMELS framework. The findings of these research scholars were limited because they have not employed comprehensive framework of CAMELS rating and ranking system. Nevertheless, none of the researcher used complete CAMELS framework of financial ratios and ranking in Pakistan; about the need, impact and strategies adopted by banks in the backdrop of performance of banking sector measures in Pakistan. Therefore, this study has comprehensively evaluated and measured the performance of the banks in Pakistan by using CAMELS methodology. So, in this study CAMELS framework of financial indicators as well as CAMELS ratings have been employed to access the performance of Banking Sector of Pakistan along with regression analysis.

## **DATA AND METHODOLOGY**

The CAMELS Rating System was applied to annual financial statements of 22 commercial banks listed on the Karachi Stock Exchange (KSE-100) in Pakistan (see list of Banks in Appedix-1). This research is a cross-sectional study covering fiscal years from 2000-19. It analyzes financial data from listed commercial banks in Pakistan, obtained through special request from the Securities and Exchange Commission of Pakistan (SECP). The study applies the CAMELS Rating System to evaluate and compare the financial performance and health of these banks over the specified period.

Banks are ranked according to their scores, with the best-performing bank receiving rank one and subsequent banks ranked accordingly. In cases where banks obtain the same average score, they are assigned the same rank. Based on the components of the CAMELS framework we have evaluated the performance of the commercial banks taken as sample. Secondly, Panel data, also known as longitudinal data, combines both time series (data collected over time for the same units) and cross-sectional (data collected at a single point in time for multiple units) elements. It represents information across both time and space, allowing researchers to study changes within units over time and differences across units at any given point. Panel data is valuable for analyzing dynamics, trends, and relationships over time while accounting for variations across different units in the dataset. (**Hibba et. al, 2020**). Therefore there are 15 banks and it covers the time period of 19 years. So **collectively**, there will be 285 (15\*19) total no. of observations.

### Statistical Tests;

Two-pronged strategy will be applied. This is as follows:

1. **CAMELS framework** of Rating and Ranking system,

**Initial statistical test:** Augmented Dickey Fuller (ADF) to check the Data Stationary.

2. **Generalized Least Square (GLS) technique** on regression equation.

### Classification of CAMELS Ratios

**C** stands for **Capital Adequacy**: Capital adequacy as a critical indicator of the financial position of the banking sector. It emphasizes the significance of banks' capacity to maintain capital in proportion to the risks they face, as well as the importance of effective risk management by bank managers (Suresh & Paul, 2010, Pg.64). In this research study, the Capital to Assets and Capital to liability ratio are used to calculate the ratio of capital adequacy. Consequently, the bank with the highest ratio for this indicator is ranked the highest, reflecting its superior capital adequacy and stability compared to other banks in the study.

**A** stands for **Asset Quality**: Asset quality is assessing the financial condition and earning capability of financial institutions or firms. Asset quality reflects the level of credit risk inherent in the bank's portfolio, including its loans, off-balance-sheet activities, investments, and advances. By analyzing the composition and quality of these assets, the measure provides insights into the magnitude of credit risk faced by the bank. A high-quality asset portfolio indicates prudent lending practices and lower credit risk, contributing to the bank's overall financial health and earning potential. Conversely, poor asset quality may signal elevated credit risk and potential financial instability for the institution.

The quality of assets usually can be calculated by using indicators like Total loans and advances to total assets and Non-performing loans to total advances (gross). Loans are a crucial component of a bank's assets, yet a high ratio of loans to total assets also indicates a structure that is more susceptible to potential losses from loan defaults (Roman& Sargu, 2013). Lower asset quality ratio shows higher performance of the bank.

**M** stands for **Management Soundness**: The critical role of management soundness in the growth and success of financial institutions or firms. It highlights the importance of effective oversight and decision-making by the Board of Directors (BODs) and senior managers in identifying, measuring, examining, and controlling risks associated with banking operations. Management quality serves as a qualitative measure that reflects the ability of leadership to implement robust risk management policies and processes. Strong management practices contribute to the institution's overall stability and growth by ensuring prudent risk-taking, efficient operations and strategic planning.

It is the ratio between total Non-markup expenses to total Non-markup income. Total non-markup expenses include Salaries and related expenses, other administrative expenses, other Provision and charges. While total non-markup Income includes Fee, commission, brokerage and dividend income, Income from dealing in foreign currencies, capital gains and any other Income. It indicates the ability of company to meet operating expenses from the revenues generated by the banks. The lower the ratio, the better will be the bank.

**E** stands for **Profitability and Earnings**: This indicator adds to the capital base when profits are generated, but losses diminish the capital base. It evaluates the consistency of predicted



earnings growth in the future in addition to displaying the amount and trend of earnings. Return on Equity (ROE) and Return on Assets (ROA) are the metrics most frequently used to assess profitability and earnings. The ratio of net profit after tax to total assets, or ROA, shows how much the bank has made on the assets it has used. Greater profitability in relation to asset size is indicated by a higher ROA. The ratio of net profit after taxes to total shareholder equity, or ROE (Return on Equity), shows how well a bank uses its own capital. It illustrates how profitable the bank is per unit of shareholder stock and shows how well it generates profits for its owners. (Christopoulos et al., 2011, pg.13).

**L** stands for **Liquidity**: The liquidity of a firm refers to its ability to quickly convert financial assets into cash to meet its financial obligations as they come due. Liquidity can be assessed using various financial ratios that measure different aspects of a firm's ability to meet short-term liabilities (Baber & Zeb, 2011). This measure evaluates the adequacy of a bank's current and future sources of liquidity, taking into account the strength of its funds management practices. The liquidity risk faced by any firm or institution can be assessed using the loans to deposit ratio.

A high ratio indicates liquidity problems for a bank. The Loans to Deposits ratio is calculated as Total Loans and Advances divided by Total Deposits. This ratio reflects a bank's ability to convert its deposits into higher-earning loans and advances. A lower ratio indicates a higher ranking because it suggests that the bank has more deposits available for lending relative to its outstanding loans and advances. Thus, a lower Loan to Deposits ratio generally signifies better efficiency in utilizing deposits for generating income through loans.

**S** stands for **Sensitivity to market risk**: It is the latest addition to the ratings parameters is the sensitivity analysis, which assesses the impact of changes in foreign exchange rates, interest rates, commodity prices, and equity prices on a bank's earnings and capital. This analysis helps evaluate how external economic factors can affect the financial performance and stability of banks (Suresh & Paul, 2010, P.64). Although fluctuations in financial asset prices significantly impact banking activities, many studies do not consider this as the sixth component of the CAMELS framework. This omission is primarily due to challenges in accurately measuring and incorporating these fluctuations into accounting and financial data used for regulatory and analytical purposes.

Thus, in its place in some studies (Roman & Sergu, 2013; Camelia & Angela, 2012; Sarker, 2006) it is considered the Size (S) of the bank, that is represented by that bank assets in the total assets of banking sector ratio. Thus, higher ratio them more important is bank's assets for that specified banking sector and higher the rank could be achieved (Camelia & Angela, 2012) (see Ratio formulas in Appedix-II).

### **Overall Composite Rating of CAMELS framework**

Composite ratings for commercial banks are typically derived from individual component ratings based on the CAMELS framework (Capital adequacy, Asset quality, Management quality, Earnings, Liquidity, and Sensitivity to market risk). These component ratings are aggregated, sometimes with weights applied to reflect their importance. However, the final composite rating may need adjustment to account for qualitative factors that influence the overall judgment of the bank's risk and stability. Factors like management quality, strategic direction, and economic conditions can significantly impact this assessment, ensuring a more nuanced evaluation beyond numerical ratings alone.



Rating analysis	Interpretation
1.0-1.4	Strong and sound
1.5-2.4	Satisfactory
2.5-3.4	Fair (watch category)
3.5-4.4	Marginal (some risk of failure)
4.5-5.0	Unsatisfactory (high degree of failure)

### Regression analysis

The efficiency of the banking sector is analyzed through of econometric analysis, the more common descriptive approaches seen in previous research in Pakistan. By formulating regression equations and utilizing the Efficiency ratio as a key variable, the researchers are employing a methodology that offers deep insights into the dynamics of the banking sector's efficiency. This approach not only expands the scope of analysis but also introduces fresh perspectives on understanding the efficiency drivers within the banking industry. The Efficiency ratio, widely recognized among financial analysts, serves as a valuable proxy for assessing the operational efficiency and performance of banks. The efficiency ratio assesses how effectively a financial institution manages expenses in relation to generating revenue. It reflects the institution's productivity in terms of income generation, asset management and cost control. A lower efficiency ratio indicates that the institution is more efficient in managing costs relative to its revenue generation activities (Hays et al.2009; Jabeen, 2011 and Demireli et al.2013)

### Regression equation of the study

$$ER_{it} = \alpha_0 + \beta_1 (\text{Capital Ratio})_{it} + \beta_2 (\text{Asset Ratio})_{it} + \beta_3 (\text{Management Ratio})_{it} + \beta_4 (\text{Earnings and Profitability Ratio})_{it} + \beta_5 (\text{Liquidity ratio})_{it} + \beta_6 (\text{Sensitivity to risk ratio})_{it} + X_t + \epsilon_{it}$$

$$\epsilon_{it} = v_i + u_{it}$$

Where:  $ER_{it}$  = Efficiency Ratio of bank i at time t.

$\alpha_0$  = Intercept of relationship in the model/constant

$\beta_1 - \beta_6$  = Coefficients of each independent or explanatory variable

$\epsilon_t$  = Error term or disturbance at time t.

$v_i$  = Capturing the unobserved bank effect.

$u_{it}$  = the idiosyncratic error.

The Efficiency Ratio measures a bank's financial performance by dividing its non-interest expenses by total operating income. It reflects how efficiently the bank manages its overhead costs relative to the income generated from both interest and non-interest sources. A lower efficiency ratio indicates better cost management and profitability, as the bank spends less on expenses relative to its overall income. It determines show efficiently a bank utilizes its overhead expenses, including salaries and other operating costs, to generate revenues. It assesses the effectiveness of cost management in relation to revenue generation activities within the bank.

The fixed effects (FE) and random effects (RE) models are used by researchers using extended least squares approaches. Using panel data from the E-VEIWS 10 program, this model was evaluated. In a RE model, it's assumed to be random and the estimation technique is generalized least squares (GLS). In a FE model, the  $v_i$ 's are fixed parameters to be estimated.

Note: All of the "untouched" control variables in this case are represented as  $X_t$ , and they are often interpreted as vectors if the study's explanatory variables (Deshmukh, 2003).

## EMPIRICAL FINDINGS AND ANALYSIS

There are two sections of findings; in **first section** CAMELS rating is done which will present in tables of each component of CAMELS rating system with brief description of the ratios and used financial terms. After that, these ratios can be further used for analysis of their efficacy by employing OLS techniques, to find out how well they relate to efficiency of the individual financial institutions.

### SECTION 1; CAMELS Rating and Ranking framework

There is no standardized definition of CAMELS Rating. But it might be stated as follows:

- CAMELS framework is a procedure to evaluate the financial condition, health soundness and operating performance of the banks;
- It provides meaningful and brief information about the condition of banks;
- This system acts as a tool to monitor banks, identifying those experiencing issues needing closer supervision;
- A tool to categorize banks based on their financial health;
  - Rating 1 or 2 shows Sound Bank,
  - Rating 3 or 4 shows Early Warning Bank,
  - Rating 5 shows Problematic Bank.
  - It serves as a highly effective supervisory tool used by central banks (Iqbal, 2012).

### CAMELS Rating Base:

Under the UFIRS (Uniform Financial Institutions Rating System), each financial institution receives a composite rating based on six key components evaluating its financial condition and operations. These components assess capital adequacy, asset quality, management capability, earnings quality, liquidity adequacy and market risk sensitivity. Ratings consider factors such as institution size, complexity of activities and risk profile (FDIC, 1997).

The CAMELS rating model evaluates six components of a bank and each on a scale of 1 to 5. A rating 1 indicates a strong position, while 5 signify the weakest position in that component. These ratings are based on specific criteria tailored to prevailing financial and economic conditions. (Saltzman & Salinger, 1998).

Key ratios of CAMELS rating system to evaluate the rating for different banks are:

CAMELS Rating Components	Rating1 (%)	Rating2 (%)	Rating3 (%)	Rating4 (%)	Rating5 (%)
Capital Ratio1	$\geq 20$	15-19.99	10-14.99	5-9.99	$\leq 4.99$
Capital Ratio 2	$\geq 25$	18-24.99	12-17.99	6-11.99	$\leq 5.99$
Assets Ratio1	$\leq 30$	39-31.99	49-40.99	59-50.99	$\geq 60$
Assets Ratio2	$\leq 0.5$	1.59-0.6	2.69-1.6	3.79-2.7	$\geq 5$
Management	$\leq 100$	260-101.9	420-261.9	580-421.9	$\geq 581$
Earnings(ROA)	$\geq 1.5$	0.9-1.49	0.3-0.89	0.1-0.29	$\leq 0$
Earnings(ROE)	$\geq 25$	19-24.99	13-18.99	7-12.99	$\leq 6.99$
Liquidity Ratio	$\leq 50$	60-51.99	70-61.99	80-71.99	$\geq 81.99$
Sensitivity Ratio	$\geq 15$	10-14.99	5-9.99	1-4.99	$\leq 0.99$

To assess the **capital adequacy** of banks in our sample, we have utilized two key indicators: Capital to Assets ratio and Capital to Liability ratio. These indicators help gauge the financial strength of a bank, commonly represented by its Capital Adequacy Ratio (CAR). Regulatory authorities in many countries establish and monitor minimum CAR requirements for commercial banks to ensure their stability and ability to absorb potential losses. Minimum CAR determined by SBP is 14% (Baber & Zeb, 2011). The majority of sampled banks exhibit a strong Capital Adequacy Ratio, indicating their adherence to regulatory requirements and reflecting their financial soundness.

**Table1: Capital Ratio for the banks from the sample**

k name	CAR1 Avg (%)	Rating	CAR2 Avg (%)	Rating	Composite Rating
BL	4.13	5	4.55	5	5
KBL	5.82	4	6.18	4	4
AFL	4.95	5	5.22	5	5
AHL	5.57	4	5.90	5	4.5
IPL	20.65	1	31.24	1	1
OP	7.53	4	8.09	4	4
ASBB	10.06	3	11.48	4	3.5
OK	13.95	2	16.28	3	2.5
ABL	10.33	3	11.26	3	3
BL	7.47	4	8.14	4	4
EBL	11.99	3	14.12	3	3
BP	10.14	3	11.47	4	3.5
MB	7.61	4	8.25	4	4
CB	9.65	3	10.93	4	3.5
IB	15.36	2	13.01	3	2.5
BL	19.29	2	24.34	2	2
MBL	19.25	2	32.21	1	1.5
BL	25.80	1	35.36	1	1
LK	4.58	5	4.89	5	5
NBL	7.67	4	8.32	4	4
CBPL	14.70	3	17.36	3	3
BL	13.45	2	8.31	4	3

**Source: Researcher's calculations based on SECP data sheet.**

It has been observed that the smaller banks typically have a higher auto-financing level compared with the large ones. Samba bank and Bank Islami are the banks having best composite CAR and have best regulatory requirements. This is there as on these banks have a component rating of "1". Almost all sample banks have a good capital adequacy ratio and are rated between 2 and 3. Hence, they show satisfactory position of the sample banks. However, Allied bank, Silk bank and Bank Al-Falah have lower CAR values and their regulatory requirements are below average. That's why they have a composite rating of "5". Contrary to the results of large banks Habib Bank, Askri bank and Habib metropolitan bank have rating "4" in capital adequacy.

A good body of literature explains that the bank's management has been concerned with the quality of their assets because cost control plays an important role in profit making capability of a bank. The Assets quality can be measured using financial ratios like to total loans and advances to total assets and NPLs to total advances (gross). Calculations have shown that the majority of large banks have showed good asset quality and rated between 2 and 3. All small banks such as BOP, Faysal Bank, NIB Bank and Soneri Bank have shown marginal asset quality, therefore rated 4.

In regard to other ratio, almost all banks, regardless of whether they are national or private, large or small, have non-performing loans that exceed the provisions they have set aside for these loans. However, non-performing loans of Al-Habib bank has not exceeded edits loan provisions that's why it is rated "1". Empirical findings shows that all small banks (in terms of assets) such as; BOK, KASB Bank, JS Bank, NIB Bank, Samba Bank, Standard chartered and summit bank have large amount of NPLs and all of the mare rated 4 and 5 on the component rating for asset quality. Whereas majority of large banks have good asset quality and have been rated "2". In regard of composite rating of asset quality, all sample banks lies in rating 2 and 3 that is the reason they show satisfactory position.

**Table2: Asset quality ratios for the banks from the sample**

Bank name	AQR1 (%) average	Rating	AQR2(%) Average	Rating	Composite rating
ABL	49.91	3	1.90	3	3
AKBL	52.01	4	1.56	2	3
BAFL	49.62	3	0.82	2	2.5
BAHL	50.10	4	0.50	1	2.5
BIPL	30.06	1	0.62	2	1.5
BOP	50.16	4	2.26	3	3.5
KASBB	47.59	3	3.48	4	3.5
BOK	35.53	2	3.08	4	3
FABL	57.42	4	0.95	2	3
HBL	49.97	3	1.56	2	2.5
MEBL	49.50	3	0.87	2	2.5
NBP	43.85	3	1.50	2	2.5
HMB	49.97	3	1.03	2	2.5
MCB	45.48	3	1.25	2	2.5
NIB	53.40	4	3.45	4	4
JSBL	31.13	2	1.61	3	2.5
SMBL	46.01	3	3.29	4	3.5
SBL	36.92	2	4.72	5	3.5
SILK	51.24	2	2.77	3	2.5
SNBL	50.20	2	1.07	2	2
SCBPL	43.81	3	3.69	5	4
UBL	49.92	2	1.58	2	2

**Source; researchers' calculation.**

In the findings, **management soundness** of most sampled banks has shown considerable strength. However, it is not surprising that the management of large national and private banks has generally outperformed that of smaller banks. The primary reason for the superior performance of large national and private banks lies in their access to substantial resources and funds. This enables them to attract and hire top-management personnel available in the market, contributing to their higher rankings (ranked 1 and 2) in terms of management effectiveness. Samba Bank and Bank islami are identified as the worst-performing banks requiring stringent regulatory oversight due to management issues. Summit Bank, BOK and NIB Bank have component ratings indicating concerns with management performance with Summit Bank possibly facing managerial challenges following a merger involving Arif Habib Bank Limited and Atlas Bank Limited. Regulatory bodies need to closely monitor these banks to ensure they address their management issues effectively (Baber & Zeb, 2011).

**Table3: Management ratio for the banks from the sample**

<b>Bank name</b>	<b>Management Ratio(%)</b>	<b>Rating</b>
Allied Bank Limited	237.1	2
Askari Bank Limited	183.3	2
Bank Al-Falah Limited	189.3	2
Bank Al-Habib Limited	187.1	2
Bank Islami Pakistan Limited	585.2	5
Bank of Punjab	149.4	2
KASB Bank Limited	250.4	2
Bank of Khyber	323.1	3
Faysal Bank Limited	114.7	2
Habib Bank Limited	187.3	2
Meezan Bank Limited	175.7	2
National Bank of Pakistan	150.6	2
Habib Metropolitan Bank	93.51	1
MCB Bank Limited	194.6	2
NIB Bank Limited	359.7	3
JS Bank Limited	280.2	2
SummitBank Limited	410.4	3
Samba Bank Limited	748.6	5
Silk Bank Limited	199.5	2
Soneri Bank Limited	143.2	2
Standard Chartered Bank	181.1	2
United Bank Limited	177.8	2

**Source: researcher's calculations.**

It's evident that all commercial financial institutions engage in business activities and assume risks primarily to achieve positive earnings. Currently, Pakistan's economy is in a phase of recovery following a global financial crisis and a historically devastating flood. Earnings across most sectors of the economy have decreased as a result. The earnings of our sampled banks reflect a similar trend, with nearly all small banks reporting negative earnings. Banks with negative earnings are typically rated "5" in their earnings component rating under the rating system used. Medium size banks such as Askari Bank Ltd, Bank Al-Falah Ltd, Silk Bank and Standard Chartered Bank have satisfactory earning and are rated as "3" in their earnings

component rating. It is only the large banks such as ABL, Bank Al-Habib, HBL, MCB Bank, NBP and UBL that have adequate earnings that's there as on they are rated 1 and 2.

**Table4: Earning ratios for the banks from the sample**

Bank name	ROA (%) average	Rating	ROE (%) Average	Rating	Compositerati ng
ABL	0.53	3	37.08	1	2
AKBL	0.91	2	16.46	3	2.5
BAFL	0.74	3	15.79	3	3
BAHL	1.25	1	22.45	1	1
BIPL	-0.11	5	0.752	5	5
BOP	0.13	4	-28.09	5	4.5
KASBB	-1.67	5	-24.09	5	5
BOK	0.68	3	5.511	5	4
FABL	1.53	1	13.18	3	2
HBL	1.29	2	16.12	3	2.5
MEBL	1.45	2	14.18	3	2.5
NBP	1.36	2	12.93	4	3
HMB	1.31	2	17.35	3	2.5
MCB	2.2	1	21.14	2	1.5
NIB	-1.01	5	-8.85	5	5
JSBL	-0.11	5	-0.59	5	5
SMBL	-1.53	5	-36.53	5	5
SBL	-2.61	5	-11.89	5	5
SILK	-0.97	5	25.89	1	3
SNBL	0.96	5	12.89	4	4.5
SCBPL	1.46	2	12.53	4	3
UBL	1.06	2	-28.23	5	3.5

**Source:** researcher's calculations.

The application of **ROA and ROE** revealed that only Bank Al-Habib has best earnings and profitability that's why it is rated "1". All large national, nationalized and private banks have adequate earning and profitability, and they are rated 2 and 3 in their composite rating. However, all small banks whose have either negative earnings are rated 4 and 5 in terms of composite rating.

It has been observed that almost all banks maintain a good level of **liquidity position**, and there are no significant liquidity concerns identified for any particular bank. Only NIB and Silk bank show minor weaknesses in their liquidity levels, but these can be addressed with proper attention from both the banks' management and regulatory authorities. Some large and medium size banks have showed satisfactory level of liquidity position that why these banks are rated 2 and 3 in their liquidity component rating. Whereas, some small bank such as BOK and Bank Islami have good liquidity position and rated as "1" in terms of component rating.

**Table 5: Liquidity ratio for the banks from the sample**

Bank name	Liquidity ratio(%)	Rating
Allied Bank Limited	59.34	2

Askari Bank Limited	65.30	3
Bank AlFalah Limited	60.37	2
Bank AlHabib Limited	65.05	3
Bank Islami Pakistan Limited	44.30	1
Bank of Punjab	57.35	2
KASB Bank Limited	65.37	3
Bank of Khyber	50.23	1
Faysal Bank Limited	80.41	4
Habib Bank Limited	62.12	3
Meezan Bank Limited	63.46	3
National Bank of Pakistan	54.46	2
Habib Metropolitan Bank	74.11	4
MCB Bank Limited	59.46	2
NIB Bank Limited	90.81	5
JS Bank Limited	45.60	1
Summit Bank Limited	68.06	3
Samba Bank Limited	64.91	3
Silk Bank Limited	72.60	4
Soneri Bank Limited	66.49	3
Standard Chartered Bank	65.38	3
United Bank Limited	62.13	3

**Source: researcher's calculations.**

**Sensitivity to market risk** is assessed based on the size of the bank, which is represented by its ratio of total assets to the total assets of the banking sector. A higher ratio indicates that the bank's assets are more significant within the banking sector, potentially leading to a higher ranking in terms of importance and market risk sensitivity. It is observed that in the sample banks, 2 banks i.e; NBP and HBL has extreme level of with its assets and have a component rating of "1" in sensitivity ratio. While medium sized bank suchas Faysal bank, Habib Metropolitan Bank, Al-Falah and BOP are banks are rated 4 and 3 on the component rating. Some small sized banks such as BankIslami, KASB bank, JS bank and BOK are rated "5" in the sensitivity component rating.

**Table6: Sensitivity ratio for the banks from the sample**



<b>Bank name</b>	<b>Sensitivity ratio (%)</b>	<b>Rating</b>
Allied Bank Limited	5.806	3
Askari Bank Limited	3.512	4
Bank AlFalah Limited	4.780	4
Bank AlHabib Limited	2.592	4
Bank Islami Pakistan Limited	0.457	5
Bank of Punjab	2.712	4
KASB Bank Limited	0.641	5
Bank of Khyber	0.692	5
Faysal Bank Limited	2.570	4
Habib Bank Limited	15.01	1
Meezan Bank Limited	1.405	4
National Bank of Pakistan	16.55	1
Habib Metropolitan Bank	2.80	4
MCB Bank Limited	9.52	3
NIB Bank Limited	1.867	4
JS Bank Limited	0.142	5
Summit Bank Limited	0.758	5
Samba Bank Limited	0.327	5
Silk Bank Limited	1.044	4
Soneri Bank Limited	1.455	4
Standard Chartered Bank	4.839	4
United Bank Limited	9.597	3

**Source: researcher’s calculations based on FSA reports by SBP.**

#### **Banks Ranking on the basis of CAMELS rating system**

In Table 7, all sample banks are ranked based on their total component scores, with lower scores indicating better rankings. It has been observed that almost all large banks are positioned at the top of the list, reflecting their superior performance compared to smaller banks. The top 5 Banks are; Meezan Bank, NBP, MCB, HBL and UBL. These are nationalized banks of Pakistan except Meezan bank. Only one small bank that is, JS Bank is among the top 10 banks. Better performance is shown by large banks, across all components of the CAMELS Rating system, resulting in lower individual component ratings. Consequently, they achieve lower total scores for component ratings, securing top rankings in the table. These banks maintain strong performance standards, excellent risk management practices, and high-quality management, which collectively ensure a good level of liquidity and overall stability.

**Table7: Sample banks Ranking**

<b>Bank name</b>	<b>Total component score</b>	<b>Ranking</b>
Allied Bank Limited	17	<b>6</b>
Askari Bank Limited	18.5	<b>9</b>
Bank AlFalah Limited	18	<b>8</b>
Bank AlHabib Limited	17	<b>6</b>
Bank Islami Pakistan Limited	18.5	<b>9</b>
Bank of Punjab	20	<b>12</b>
KASB Bank Limited	20	<b>12</b>
Bank of Khyber	18.5	<b>9</b>
Faysal Bank Limited	18	<b>8</b>
Habib Bank Limited	15	<b>4</b>
Meezan Bank Limited	13.5	<b>1</b>
National Bank Of Pakistan	14	<b>2</b>
Habib Metropolitan Bank	18	<b>8</b>
MCB Bank Limited	14.5	<b>3</b>
NIB Bank Limited	23.5	<b>15</b>
JS Bank Limited	17.5	<b>7</b>
Summit Bank Limited	21	<b>13</b>
Samba Bank Limited	22.5	<b>14</b>
Silk Bank Limited	18.5	<b>9</b>
Soneri Bank Limited	19.5	<b>11</b>
Standard Chartered Bank	19	<b>10</b>
United Bank Limited	16.5	<b>5</b>

**Source: Researcher's calculations**

The aforementioned banks maintain a satisfactory level of CAR and quality of assets on their balance sheets. This indicates their robust financial health and prudent management of capital and asset quality. Whereas, all small banks besides JS bank, BOK and Bank islami limited are ranked lower in the ranking table of the sample banks. There reasons are the negative earnings of the banks because of large amount of non-performing loans became the cause of inefficient management which had to manage bank's assets efficiently and efficiently.

### **CAMELS' Composite Rating**

**Table8: CAMELS composite rating**

<b>Bank</b>	<b>C</b>	<b>A</b>	<b>M</b>	<b>E</b>	<b>L</b>	<b>S</b>	<b>Composite Rating</b>
<b>ABL</b>	5	3	2	2	2	3	2.8
<b>AKBL</b>	4	3	2	2.5	3	4	3.1
<b>BAFL</b>	5	2.5	2	3	2	4	3.08
<b>BAHL</b>	4.5	2.5	2	1	3	4	2.8
<b>BIPL</b>	1	1.5	5	5	1	5	3.08
<b>BOP</b>	4	3.5	2	4.5	2	4	3.3
<b>KASBB</b>	3.5	3.5	2	5	3	5	3.3
<b>BOK</b>	2.5	3	3	4	1	5	3.08
<b>FABL</b>	3	3	2	2	4	4	3
<b>HBL</b>	4	2.5	2	2.5	3	1	2.5
<b>MEBL</b>	3	2.5	2	2.5	3	4	2.25
<b>NBP</b>	3.5	2.5	2	3	2	1	2.33
<b>HMB</b>	4	2.5	1	2.5	4	4	3
<b>MCB</b>	3.5	2.5	2	1.5	2	3	2.4
<b>NIB</b>	2.5	4	3	5	5	4	3.9
<b>JSBL</b>	2	2.5	2	5	1	5	2.9
<b>SMBL</b>	1.5	3.5	3	5	3	5	3.5
<b>SBL</b>	1	3.5	5	5	3	5	3.75
<b>SILK</b>	5	2.5	2	3	4	4	3.08
<b>SNBL</b>	4	2	2	4.5	3	4	3.25
<b>SCBPL</b>	3	4	2	3	3	4	3.16
<b>UBL</b>	3	2	2	3.5	3	3	2.75

**Source: Researcher's calculations.**

In this research study CAMELS framework of rating and ranking system has been applied on 22 sample banks operating in Pakistan. All these banks are rated on the numerical scale of 1 to 5. Out of 22 banks none bank from sample is able to achieve a composite rating 1, total 3 banks from sample have a composite rating of "2" that is Meezan bank NBP and MCB. The rating suggests that these banks are generally sound and safe, with minor weaknesses that can be easily corrected. These corrections can typically be managed within the normal operations of banking companies or financial institutions, requiring minimal supervisory attention.

Majority of banks are able to secure composite rating "3". This rating indicates the fair condition of these banks. It also shows bank's weaknesses from fair to unacceptable in financial, operational and obedience. This rating also shows the susceptibility to unfavorable business situation and possibility to depreciate the condition of banks. Banking companies that display important illustration of non-compliance with policies, legislation and instruction may fall in this rate (FDIC, 1997). The overall financial capability and strength of these banks are still such as to make failure only a distant option.

Small banks that are Summit Bank and Samba bank have achieved composite rating of "4". This rating indicates that these banks have serious financial weaknesses. Unless effectual action will be taken in-order to address these weaknesses these banks could face the hazard of insolvency. Banking and financial companies in this category require close supervision or special attention to execute a corrective action plan required to achieve long-term sustainable progression.

Before selecting an econometric model, it is essential to evaluate the integration order of time series data. In literature, it is established that both stationary and non-stationary time series data

are conditions necessary to determine the co-integration property between sequences. This assessment helps ensure the appropriate modeling approach is chosen based on the properties of the data (Enders, 2004). To investigate the presence of Unit-root or to test out the **Stationarity of Data** by applying following test; Levin, Lin and Chu test, W-Stat, ADF-Fisher Chi-square test. These tests help econometricians and researchers determine whether a time series is stationary or non-stationary, which is crucial for selecting suitable models and drawing reliable conclusions from the data.

**Test Table; Panel unit root test**

**Panel unit root test: Summary**

**Exogenous variables: Individual effects**

Newey-West bandwidth selection using Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.93376	0.0000	15	255
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.16766	0.0008	15	255
ADF - Fisher Chi-square	60.4636	0.0008	15	255

\*\* Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

The test results indicate that for all variables, the null hypothesis of a unit root in levels is rejected, with corresponding p-values less than 0.05. This suggests that none of the variables exhibit a unit root in levels and are therefore stationary in their levels. Additionally, the ADF-Fisher tests also reject the null hypothesis of a unit root in levels for all variables, further confirming that each variable is level and stationary.

**Fixed or Time effect Model**

**Table 1; fixed effect model**

**Dependent Variable: Efficiency Ratio**

**Method: Panel Least Squares**

**Periods included: 19**

**Cross-sections included: 15**

**Total panel (balanced) observations: 285**

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Capital Adequacy Ratio	0.081232	0.165559	0.490654	0.6243

Asset Quality 1	-0.311411	0.092560	-3.364416	0.0010*
Asset Quality 2	-1.396339	0.550177	-2.537980	0.0121**
Liquidity ratio	-0.048593	0.015957	-3.045170	0.0027*
Management Quality	-0.005461	0.009695	-0.563278	0.5740
Earning (ROA)	-4.099456	0.907105	-4.519272	0.0000*
Sensitivity Ratio	-0.671216	0.440534	-1.523643	0.1296
Constant	56.65299	6.996149	8.097739	0.0000*

\*significant at 1%\*

\*significant at 5%

### Effects Specification

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Cross-section fixed (dummy variables)

Period fixed (dummy variables)

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R-squared	0.671589	F - Statistic	9.537947
Adjusted R-squared	0.592225	Prob (F-statistic)	0.000000
Durbin-Watson stat	1.333505		

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### Explanation of F.E.M Results and Discussion:

In the panel data analysis by using the Fixed Effects Model has identified significant variables related to asset quality and financial performance in banks. In study, asset quality (represented by AQ1, AQ2) and financial health indicators (LR and ROA) significantly influence the performance of banks. The presence of high NPLs and the resulting credit squeeze are highlighted as critical issues impacting the banking sector's profitability and lending activities. Addressing these challenges is crucial for sustaining the financial health and stability of banks over the long term (SBP; FSA, 2011-12).

Due to negative relation of LR, the ER reduces by 4.85%. Maintaining adequate liquidity is fundamental for banks to operate smoothly, manage risks effectively, support growth opportunities, maintain stakeholder confidence, comply with regulations, and mitigate financial uncertainties. It is a cornerstone of financial health and stability in the banking industry. The Earning variable, defined as net income after tax divided by total assets, is highly significant. A 1% increase in this earnings ratio leads to a substantial 409.94% reduction in the efficiency ratio. This finding aligns with theoretical expectations: as the profitability of a financial entity improves, its efficiency also increases, resulting in a lower efficiency ratio. This relationship underscores the critical impact of earnings on operational efficiency within financial institutions (Jabeen, 2011). While certain variables like capital adequacy ratio, management quality, and sensitivity ratio show positive relationships with bank performance, their effects are not statistically significant in this analysis. The significant constant term implies a baseline effect on bank efficiency that is robust and independent of the other variables studied.

The constant value of 56.66 is statistically significant with a p-value of 0.00, indicating a predicted 56.66% increase in ER (bank performance) when all other variables remain constant. The R-squared value of 0.67 (67%) signifies that 67% of the variation in ER (banking sector

performance) can be explained by the independent variables (CAMELS Ratio) included in the model. The remaining 33% of the variation is due to factors not considered in the model. The F-statistics probability value of 0.00 indicates that the collective influence of the independent variables (CAMELS Ratio) on ER (banking sector performance) is statistically significant. Additionally, the Durbin-Watson value is near to 2, indicating the absence of a multicolliniarty issue.

### Random Effect model

**Table 2; random effect model**

**Dependent Variable: EFF**

**Method: Panel EGLS (Two-way random effects)**

Total panel (balanced) observations: 285

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CAR	0.159840	0.176281	0.906732	0.3657
AQ1	-0.189942	0.080667	-2.354651	0.0196
AQ2	-1.586084	0.508341	-3.120119	0.0021
LIQ	-0.058955	0.016885	-3.491647	0.0006
MQ	-0.006240	0.009444	-0.660768	0.5096
ROA	-3.874891	0.836419	-4.632716	0.0000
SR	0.185656	0.209697	0.885353	0.3771
C	46.22620	5.323259	8.683816	0.0000

#### Effects Specification

	S.D.	Rho
Cross-section random	2.602229	0.0962
Period random	0.000000	0.0000
Idiosyncratic random	7.975759	0.9038

#### Weighted Statistics

R-squared	0.281743	F-statistic	10.47895
Adjusted R-squared	0.254857	Prob(F-statistic)	0.000000

#### Unweighted Statistics

R-squared	0.296827	Durbin-Watson stat	0.864847
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### **Explanation of the R.E Results and discussion:**

In Random Effect model, the  $v_i$ 's are assumed to be random variable that are uncorrelated with the independent variables and  $u_{it}$  the idiosyncratic error term specific to each observation  $i$  at time  $t$ . GLS in the Random Effects model of panel data analysis utilizes cross-section weights and true variance components to produce efficient estimates. It integrates information from both within-entity deviations and between-entity means to account for unobserved heterogeneity and improve the precision of parameter estimates. This approach enhances the robustness of statistical inference in panel data studies (see Baltagi, 2001).

While variables like AQ1, AQ2, ROA and LR show significant predictive power in both Fixed and Random Effect models, CAR has a positive sign, but the relationship is not significant at predictability of p-value at 0.365. Capital Adequacy Ratio (CAR) does not exhibit a statistically significant relationship with the outcome variable despite its critical role in ensuring financial soundness and risk management in banks.

Additionally, the Management Quality (MQ) variable, defined as total non-interest expenses divided by total non-interest income, exhibits an insignificant and negative relationship with the Efficiency Ratio (ER). This suggests that higher non-interest expenses relative to income do not significantly impact efficiency, possibly due to these expenses being a relatively small proportion of income and assets. As financial institutions grow, these expenses are expected to decrease further as a percentage of their total operations (Jabeen, 2011).

Similarly, Sensitivity Ratio (SR) serves as a proxy for the significance of individual banks within the banking sector. A higher SR indicates a larger share of assets held by a bank compared to others in the sector, suggesting greater significance. Despite the positive relationship, the insignificance of SR in predicting ER suggests that while size (as indicated by SR) influences bank efficiency, its specific impact in this context is not statistically significant in the models used. Specifically, the Efficiency Ratio (ER) of larger banks tends to increase, while that of smaller banks decreases. This outcome reflects how the concentration of assets impacts operational efficiency across different sizes of banks within the sector.

From CAMELS ratios, particularly AQ ratios, LR and ROA, are effective in assessing and predicting the efficiency ratios of the sample banks studied. This understanding provides insights into how these financial metrics contribute to the overall operational efficiency and performance of banks.

### **CONCLUSION**

The core purpose of research study was to fulfill the research objective that is "To access the performance of the banking sector in Pakistan by applying CAMELS approach". To fulfill this research objective, I am employing two-pronged strategy: first, to analyze the soundness and financial strength of banking sector by using the CAMELS rating framework and second, is to check the impact of CAMELS approach on banking sector performance in terms of Efficiency Ratio by formulating regression equation.

CAMELS are an internal supervisory rating system for examination of the banks, so, we decided to practically implement and evaluate the performance of 22 sample banks that are listed in KSE. The study utilized secondary data sources such as SECP data sheets, SBP FSA reports, annual reports of banks and existing research in the banking industry. Researchers applied CAMELS ratios, which show the internal rating system used by regulatory bodies but



are derived from publicly available information. This allowed them to assess the efficiency and performance of sample banks, providing insights into their financial health despite the confidential nature of official CAMELS Ratings.

The results of CAMELS rating systems on 22 sample banks are assessed. It is observed that almost all large banks are included on the top of the list that shows their better performance as compare to the small banks. The top 5 Banks are Meezan bank, NBP, MCB, HBL and UBL. These are nationalized banks of Pakistan except Meezan bank. Only one small bank that is JS Bank which is included in top 10 banks. Large banks showed better performance in all components of CAMELS rating system and are rated lower on the individual component ratings and finally they have lower total for component ratings and secure top ranking.

In a sample of 22 banks, none achieved the highest composite rating of "1". Three banks—Meezan Bank, NBP, and MCB—received a composite rating of "2", indicating they are generally sound with correctable weaknesses. The majority of banks received composite rating of "3", indicating fair overall condition but with moderate to unsatisfactory weaknesses in financial, operational, and compliance areas. Medium-sized banks like Askari Bank, BOP, Bank Al-Falah, Faysal Bank, Habib Metropolitan, and Standard Chartered Bank Limited fall into this category. Small banks like Bank Islami Pakistan Limited, BOK, JS Bank, and NIB Bank showed varying results, while only Summit Bank and Samba Bank among small banks received a composite rating of "4", indicating serious financial weaknesses requiring close supervisory attention and corrective action. Overall, these ratings illustrate a range of strengths and weaknesses across banks, with larger banks generally faring better and smaller banks facing more pronounced challenges that need regulatory oversight and improvement strategies.

The GLS (Generalized Least Squares) method results indicate that the CAMELS ratios are effective in measuring the efficiency ratios of the sample banks under consideration. Panel data analysis using both Fixed and Random Effect models demonstrated significant predictability in four out of seven independent variables: Asset Quality (AQ1, AQ2), Liquidity (LR), and ROA (Return on Assets or Earnings). These findings are consistent with prior research, suggesting that AQ1, AQ2, LR, and ROA play substantial roles in influencing the Efficiency Ratio (ER) within the banking sector.

However, it's noteworthy that while AQ1, AQ2, LR, and ROA are important factors influencing ER according to the statistical analysis, banks with a good ER do not necessarily rank similarly high in terms of AQ1, AQ2, LR, and ROA ratios. This suggests that while these financial metrics are significant predictors of ER, other factors or variations exist that impact a bank's overall efficiency standing beyond these specific ratios.

## **RECOMMENDATIONS**

At the end of research, we are able to put forward few recommendations to State Bank of Pakistan (SBP) that is supervisory and regulator bank of the country and Securities and Exchange Commission of Pakistan (SECP).

□ After assessment of CAMELS rating system in the context of Pakistan banking industry and its application in analyzing bank performance, adopting CAMELS as a supervisory rating system would be beneficial for strengthening the regulatory framework and ensuring the resilience of the Pakistan banking industry.

□ Some large banks such as MCB Bank, ABL, HBL, UBL and NBP some time avail the services of Moody's, JCR-VIS and PACRA credit rating agencies and pay high cost for it. We strongly recommend that SBP should prioritize efforts to develop a customized regulatory

supervisory rating system tailored for evaluating the performance of commercial banks and related financial institutions in Pakistan's banking industry. If developing a customized system proves challenging, adopting the CAMELS rating system would be the next best approach. CAMELS have demonstrated effectiveness internationally and offer a comprehensive framework for assessing and monitoring bank performance, ensuring robust oversight and promoting financial stability in Pakistan.

Security and Exchange Commission of Pakistan (SECP) is required to critically evaluate procedures of national credit rating agencies such as CAMELS Rating, PACRA and JCR-VIS and bring them to the level of international standard.

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**APENDIX I**

**Presentation of sample Banks:**

Table represents sample banks which are listed in Karachi Stock Exchange.

BankName	Symbol	YearofListing
AlliedBankLimited	ABL	2005
AskariBankLimited	AKBL	1992

BankAlFalahLimited	BAFL	2004
BankAlHabibLimited	BAHL	1992
BankofPunjab	BOP	1991
KASBBankLimited	KASBB	1995
FaysalBankLimited	FABL	1995
HabibBankLimited	HBL	1992
MeezanBankLimited	MEBL	2002
NationalBankOfPakistan	NBP	2000
MCBBankLimited	MCB	1992
NIBBankLimited	NIB	2003
Samba Bank Limited	SBL	2003
SoneriBankLimited	SNBL	1995
UnitedBankLimited	UBL	1992

**Source:** Securities Exchange Commission of Pakistan (SECP) and State Bank of Pakistan (SBP).

## APENDIX II

### Ratios of CAMELS measuring framework

#### 1. Capital Adequacy Ratio

$$\text{Capital to Asset} = \text{Total Capital} / \text{Total Assets}$$

$$\text{Capital to Liability} = \text{Total Capital} / \text{Total Liabilities}$$

#### 2. Asset Quality Ratio

$$\text{Earning Assets to Total Asset s} = \text{Total Loans \& Advance} / \text{Total Assets}$$

$$\text{NPLs to Gross advances} = \text{Total NPLs} / \text{Total Loans (gross)}$$

#### 3. Management Soundness

$$\text{Total Expenses to Total Income} = \text{Total Non-markup Expenses} / \text{Total Non- markup Income}$$

#### 4. Earnings and Profitability

$$\text{Return on Assets} = \text{Net Profit} / \text{Total Assets}$$

$$\text{Return on Equity} = \text{Net Profit} / \text{Total Equity}$$

#### 5. Liquidity Ratio

$$\text{Loans to Deposits} = \text{Total Loans} / \text{Total Deposits}$$

#### 6. Sensitivity to Market Risk

$$\text{Size of bank's Asset} = \text{Bank assets} / \text{total assets of the banking sector.}$$