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Financial Dynamics of Listed Banks in Pakistan: Exploring the Interplay between Cost-Income Ratio, Capital Adequacy, and Performance Metrics

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ABSTRACT: This study delves into the relationship between the Cost-Income Ratio, Capital Adequacy, and the performance of listed banks in Pakistan. Drawing data from 2014 to 2022 annual reports, the Generalized Method of Moments (GMM) in STATA version 18 is employed for analysis. The findings disclose a negative connection between capital adequacy and performance, particularly return on assets (ROA) and return on equity (ROE). While the correlation lacks statistical significance for ROA, it becomes significant in the context of ROE. Additionally, a statistically significant negative correlation is identified between the cost-income ratio and both ROA and ROE. Total equity debt displays a negative relationship, achieving significance concerning ROA. Bank size demonstrates a significant negative correlation with both ROA and ROE. GDP exhibits a positive link, significant only with ROE. These findings contribute valuable insights into the dynamics of financial indicators influencing bank performance in the Pakistani context.

KEYWORDS: Capital adequacy, Efficiency, GMM, Performance, Profitability

INTRODUCTION

The integral role of banks in fostering economic growth and development in Pakistan is widely acknowledged, as they serve as crucial financial intermediaries, facilitating the connection between surplus and deficit units within the economy. This fundamental function, highlighted by Oino (2014), underscores the necessity for banks to possess capital for their operations and expansion, aligning with the capital needs of any business entity. The regulatory focus on capital adequacy in the banking sector is a global phenomenon, reflective of the highly regulated nature of banks. Discussions around capital adequacy have been persistent over decades, gaining heightened attention after the 2008 economic downturn. Recognized as a vital variable in banking, adequate capitalization is deemed essential for meeting daily financial requirements, ensuring sustainability, facilitating expansion, and safeguarding depositors' funds. It serves not only as an operational necessity but also as a confidence booster, instilling trust in the ongoing financial strength of the bank among customers, the public, and regulatory authorities.

In the context of Pakistani banks, regulatory bodies, such as the State Bank of Pakistan (SBP), play a pivotal role in overseeing and guiding the industry. Similar to the role of the Bank of Ghana in Ghana, the directives of the SBP can significantly impact the operational landscape of banks. For example, the SBP might issue directives related to capital requirements in alignment with global standards like BASEL II. Recapitalization exercises, akin to those observed in Ghana, can also be initiated by the SBP to fortify the financial resilience of Pakistani banks. This is exemplified by the recent regulatory move in Pakistan, requiring banks to enhance their capital base to meet new thresholds. Such initiatives underscore the regulators' recognition of capital as a linchpin affecting the continuous viability of a bank and its potential impact on profitability. Profitability, a cornerstone for any business, is influenced by various factors, both internal and external. Scholars, including Athanasoglou and Delis (2006), argue that internal factors such as liquidity, capital adequacy, provisioning policy, expense management, and bank size significantly shape a bank's profitability.

Analyzing the current body of literature on Pakistani banks uncovers varied outcomes in the exploration of the correlation between capital adequacy and bank performance. While some studies, akin to Irawati, Maksum, Sadalia, and Muda's (2019) findings, indicate a significant relationship, others present varying results. The direction of this relationship remains inconclusive, with some suggesting positive correlations and others positing negative associations. In light of these nuances, our study seeks to delve into the dynamics of this relationship within the Pakistani banking industry. Focusing on the last nine years, leading up to the recent regulatory changes and recapitalization, our study aims to contribute to the discourse that has captivated policymakers, practitioners, and academics alike. Furthermore, the study introduces the cost-income ratio into the analysis, a crucial metric that provides insights

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into the cost structure of banks. This inclusion allows for a more comprehensive assessment of the relationships between cost-income dynamics, capital adequacy, and firm performance in the specific context of Pakistani banks.

The subsequent sections of the study are meticulously organized to provide a comprehensive exploration of the topic within the Pakistani context. Section 2 delves into a thorough review of relevant literature, while Section 3 elucidates the methodology employed for data organization and analysis. Section 4 unfolds the findings and engages in insightful discussions, and finally, Section 5 concludes the study, summarizing key insights and implications for Pakistani banks.

Literature review

The association amongst capital adequacy and various financial indicators, especially the empirical correlation between capital adequacy and bank performance, has been a subject of keen academic scrutiny in both developed and emerging markets, yielding mixed findings. This section aims to provide insights drawn from related studies to inform the current research.

Firm performance

Performance, characterized by an entity's capability to acquire and manage limited resources for a competitive edge, consists of two primary dimensions: financial or economic performance and innovative performance. This investigation centres on financial performance, as delineated by Bhunia, Mukhuti, and Roy (2011), signifying a firm's overall financial well-being over a defined timeframe. The analysis of financial performance involves the utilization of accepted ratios, serving as a method to discern a firm's operational and financial attributes from its accounting and financial statements. In the context of this study, performance, specifically focusing on profitability, is gauged through metrics such as ROA and ROE.

Capital Adequacy and Bank Performance

Bank capital, reflected in the balance sheet, represents funds attributed to the proprietors (Nwankwo, 1991). Equity capital signifies a bank's capacity to captivate losses. Berger (1995) found evidence supporting a positive bond between capital-to-assets ratios and returns on equity, asserting that sophisticated capital ratios should decrease a bank's cost of funds, enhancing profitability. Similar positive impacts were reported by Neceur (2003) for Tunisian banks, Sufian and Chong (2008) for Philippine banks, and Syafri et al. (2012) for Indonesian banks. Positive links between huger equity and profitability were also observed among EU banks (Staikouras and Wood, 2003) and in other studies (Abreu and Mendes, 2001; Goddard, Molyneux, Wilson, 2004; Naceur & Kandil, 2009; Irawati et al., 2019).

Conversely, certain scholarly inquiries propose an adverse association between capital adequacy and the performance of banks. Goddard, Molyneux, and Wilson (2004) contend that an elevated capital adequacy ratio might signify an excessively prudent strategy, potentially overlooking lucrative trading prospects. Pasiouras and Kosmidou (2007) posit that higher equity ratios lead to lower external funding needs, thus boosting profitability. Blum (1999) suggests that increased capital regulations may reduce bank profits and elevate risks. Navapan and Tripe (2003) and Almazari (2013) reported negative correlations between a bank's capital ratios and return on equity and assets. Barnor and Odonkor (2013) identified an inverse correlation between the capital adequacy ratio and the performance of banks in the Ghanaian context.

Given the inconclusive nature of the relationship, especially within the context of the Pakistani banking industry undergoing significant capitalization changes, this study aims to contribute by testing two hypotheses:

H1: *The correlation between capital adequacy and bank performance, evaluated by Return on Assets (ROA), demonstrates a negative association.*

H2: *The association between bank performance and capital adequacy, as evaluated through Return on Equity (ROE), demonstrates a negative correlation.*

Cost to Income ratio and bank performance

According to Neceur (2003), a noteworthy positive and significant relationship exists between overhead costs and profitability, suggesting that these costs may be transferred to depositors and lenders through lower deposit rates or higher lending rates. In less competitive markets, where certain banks wield market power, such costs are often passed on to customers, resulting in a positive correlation between overhead costs and profitability (Flamini et al., 2009). Conversely, Sufian and Chong (2008) argue that inadequate expense management significantly contributes to poor profitability, emphasizing the pivotal connection between efficient expense management and overall firm performance. This viewpoint is supported by findings from Hess and Francis (2004), who established an contrary relationship between the cost-to-income ratio and a bank's profitability. Syafri et al. (2012) further

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affirm the negative impact of the efficiency ratio on profitability. Almazari (2013) corroborates this by indicating a negative relationship between the ER and ROA. This prompts the formulation of the following hypothesis:

H3*: The cost-income ratio exhibits a negative correlation with bank performance.*

METHODOLOGY

The data for this study was collected from secondary sources, primarily obtained from the audited and published bank's annual reports under examination for the period spanning 2014 to 2022. These annual reports were obtained from various outlets, including newspapers, bank websites, and official annual report publications. Utilizing these datasets, key financial ratios for the selected banks were computed for the specified timeframe. To ensure data availability and streamline the scope, a sample of 27 listed banks in Pakistan was specifically chosen for inclusion in this study.

GMM Model

This research employed two dynamic versions of the System Generalized Method of Moments (Two Step-GMM) to investigate the intricate relationship between digital financial inclusion, the digital economy, and bank stability in Asian regions. The selection of GMMs was driven by several considerations, notably the need to address potential endogeneity concerns and effectively manage cross-sectional dependence. GMMs are well-suited for handling data with identical distributions and independent distributions, offering advantages over alternative dynamic panel data estimators like first difference, pooled ordinary least squares, and generalized least squares. The latter may face challenges in handling lagged endogenous variables and individual effects.

Moreover, the GMM approach establishes a robust framework by instrumenting dependent variables with their lagged values, thus navigating issues related to multicollinearity and accommodating the examination of more complex behavioral models. The validity of GMM instruments was rigorously assessed using Hansen J statistics within robust estimation. To ensure efficiency and consistency in parameter estimates, two-step system estimators were employed, given the limitations associated with using lagged values of regressors as instruments in GMM equations in difference form.

The assumptions underpinning the consistency of GMM estimators, particularly concerning error term serial correlation, underwent careful scrutiny through a battery of specification tests. These tests encompassed the assessment of second-order serial correlation and over-identification limits to validate the appropriateness of the instruments. The results indicated the overall validity of instruments and moment conditions for the GMM estimator. In the two-step estimation process, the robust command in Stata was deployed to adjust standard errors, mitigating a significant downward bias observed in the standard errors.

To illustrate a dynamic panel model succinctly, consider the following conceptual framework (Eq 1):

$$y_{i,t} = \delta y_{i,t-1} + \Upsilon x_{i,t} + \mu_{i,t} \quad (1)$$

The equation can be expressed empirically (Eq 2 & 3) as:

$$ROA_{it} = a_0 + a_1 ROA_{i,t-1} + a_2 TCA_{i,t} + a_3 ER_{i,t} + \sum_{j=4}^{p} a_j x_{ijt} + \varepsilon_{i,t} \quad (2)$$

and

$$ROE_{it} = a_0 + a_1 ROE_{i,t-1} + a_2 TCA_{i,t} + a_3 ER_{i,t} + \sum_{j=4}^{p} a_j x_{ijt} + \varepsilon_{i,t} \quad (3)$$

The Dependent Variable of this study

According to existing literature, the assessment of bank profitability commonly relies on metrics such as ROA and ROE, among others like Net Interest Income. From a regulatory standpoint, ROA is often considered the most effective gauge of bank profitability, as suggested by Hassan and Bashir (2003). This viewpoint aligns with the findings of Rivard and Thomas (1997), who argue in favor of ROA as the optimal measure for assessing bank profitability. Additionally, Turkson (2011) supports the use of ROE, emphasizing its appropriateness as it specifically delineates the shareholders' portion of the profit, as opposed to the comprehensive profitability assessed by ROA. In the present study, both measures of profitability, ROE and ROA, are employed as dependent variables in separate models, as previously mentioned.

The Main Independent Variables

Capital Adequacy

The argument posits that a well-capitalized bank possesses the capability to attract deposits at more favorable rates, while concurrently reducing the likelihood of bankruptcy by demonstrating an ability to engross unexpected losses (Javaid et al., 2011).

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Higher levels of equity in a bank are associated with a decrease in the cost of capital, as noted by Molyneux and Thornton (1992). This decrease in the cost of capital is expected to have a favorable effect on the bank's profitability. In existing literature, the equity-to-asset ratio, calculated as total equity over total assets, is commonly used as a proxy for capital adequacy. The present study adopts the same proxy for assessing capital adequacy, specifically the total equity capital to total assets ratio (TCA).

Cost to income ratio (ER)

The existing literature highlights a correlation between efficiency, specifically measured through the ER, and profitability. Evaluating operational efficiency in income terms, the ER, calculated by dividing operating expenses by operating income, acts as a valuable benchmark for banks. A study conducted by Hess and Francis (2004) demonstrated a negative relationship between the cost-income ratio and a bank's profitability. This finding finds further support in the work of Ghosh et al. (2003), who suggested the presence of an anticipated negative relationship between efficiency and the cost-income ratio. Despite recognized limitations (Welch, 2006), the ER has emerged as a relevant ration of a bank's efficiency and is utilized as a benchmarking measured (Hess and Francis, 2004).

Control Variables

The study incorporates several control variables to enhance the robustness of the analysis. These include the ACR, OPR, LR, BZ, NIM, and GDP. These variables have been widely employed in the examination of bank performance, as evident in previous research studies (Muthuva, 2009; Almazari, 2013; Christian et al., 2008). A detailed description of each variable is provided in Table 1.

Table 1: Variable description

Variable	Measurement
Return on Assets (ROA)	Net income/Total assets
Return on Equity (ROE)	Net Income/Total Equity
Total capital adequacy ratio (TCA)	Total Equity/Total Assets
Cost to Income Ratio (ER)	Operating Expenses/Operating Income
Cost to average assets (ACR)	Cost/Average assets
Operating profit to average total equity (OPR)	Operating profit/Average total equity
Liquidity ratio (LR)	Liquid assets/Total assets
Bank size (BZ)	Natural Logarithm of Total Assets
Net interest margin (NIM)	Net interest margin
Gross domestic product (GDP)	GDP growth (annual %)

Empirical test & analysis

The descriptive statistics offer valuable insights into the financial performance and operational characteristics of Pakistani banks during the period 2014-2022 (Table 2). The return on assets (ROA) averaged 0.025, indicating a positive mean, while the standard deviation of 1.019 reflected variability in profitability across banks. The range from -2.901 to 3.497 showcased the diverse performance of banks, with some experiencing negative returns.

ROE averaged 2.459 with a standard deviation of 0.958. The presence of negative ROE instances, as indicated by the minimum value of -0.237, suggests financial challenges for some banks. The maximum ROE of 5.263 highlights instances of robust profitability. The total capital adequacy (TCA) mean of 2.847 with a standard deviation of 0.53 suggests relative stability in the financial strength of banks. The range from 1.477 to 5.421 indicates varying capital adequacy levels.

The cost-to-income ratio (ER) averaged 4.263 with a standard deviation of 0.632. This metric, reflecting operational efficiency, varied between 3.536 and 8.913 across banks. The cost to average asset ratio (ACR) had a mean of 1.2 and a standard deviation of 0.718, implying diverse cost structures. The range from 0.351 to 3.666 indicates differences in cost efficiency in utilizing average assets.

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Operating profit to equity (OPR) had a mean of 2.908 with a standard deviation of 1.169. The negative minimum value of -6.195 suggests instances where operating profit was less than equity, while the maximum of 6.879 signifies robust operating profit in certain cases. The liquid assets to total assets ratio (LR) averaged 3.622 with a standard deviation of 0.385, indicating stable liquidity positions. The bank size (BZ) mean of 3.273 with a narrow standard deviation of 0.068 suggests relative stability in the size of banks.

Net interest margin (NIM) averaged 1.215 with a standard deviation of 0.718. The range from -1.01 to 3.273 indicates variations in interest income and expense dynamics. Finally, the GDP mean of 7.269 with a narrow standard deviation of 0.102 suggests relatively stable economic conditions in the study area.

Table 2: Statistical summary

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	243	.025	1.019	-2.901	3.497
ROE	243	2.459	.958	-.237	5.263
TCA	243	2.847	.53	1.477	5.421
ER	243	4.263	.632	3.536	8.913
ACR	243	1.2	.718	.351	3.666
OPR	243	2.908	1.169	-6.195	6.879
LR	243	3.622	.385	2.057	4.47
BZ	243	3.273	.068	3.003	3.377
NIM	243	1.215	.718	-1.01	3.273
GDP	243	7.269	.102	7.07	7.39

Source: The authors' estimations.

The analysis involves scrutinizing Variance Inflation Factors (VIF) to detect potential multicollinearity among independent variables in the regression model (Table 3). Multicollinearity, reflecting heightened correlations among predictors, poses risks to the stability of regression coefficients.

For "ACR" (Cost to Average Asset Ratio), the VIF is 5.064, indicating moderate multicollinearity. The reciprocal, 0.197, suggests approximately 19.7% of the variance in the regression coefficient for "ACR" is unexplained by other variables. Similarly, "BZ" (Bank Size) has a VIF of 4.155, denoting a moderate level of multicollinearity. The reciprocal, 0.241, implies around 24.1% of the variance in the regression coefficient for "BZ" is not explained by other variables.

The VIF for "NIM" (Net Interest Margin) is 2.729, signaling lower multicollinearity. The reciprocal, 0.366, suggests around 36.6% of the variance in the regression coefficient for "NIM" is not explained by other variables. For "TCA" (Total Capital Adequacy), the VIF is 1.838, indicating relatively low multicollinearity. The reciprocal, 0.544, implies about 54.4% of the variance in the regression coefficient for "tca" is unexplained by other variables.

The VIF for "ER" (Cost-to-Income Ratio) is 1.775, signifying low multicollinearity. The reciprocal, 0.564, suggests around 56.4% of the variance in the regression coefficient for "ER" is not explained by other variables. "LR" (Liquid Assets to Total Assets) exhibits a VIF of 1.697, indicating low multicollinearity. The reciprocal, 0.589, implies around 58.9% of the variance in the regression coefficient for "LR" is not clarified by other variables.

For "OPR" (Operating Profit to Equity), the VIF is 1.211, reflecting minimal multicollinearity. The reciprocal, 0.826, suggests approximately 82.6% of the variance in the regression coefficient for "OPR" is not accounted for by other variables. Lastly, "GDP" (Gross Domestic Product) has a VIF of 1.049, signifying extremely low multicollinearity. The reciprocal, 0.953, implies around 95.3% of the variance in the regression coefficient for "GDP" remains unexplained by other variables.

The mean VIF, computed at 2.44, is generally acceptable, indicating no pronounced concerns regarding multicollinearity. Individual VIF values surpassing predefined thresholds necessitate cautious consideration to ensure the robustness of regression outcomes.

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Table 3: Variance Inflation Factors

	VIF	1/VIF
ACR	5.064	.197
BZ	4.155	.241
NIM	2.729	.366
TCA	1.838	.544
ER	1.775	.564
LR	1.697	.589
OPR	1.211	.826
GDP	1.049	.953
Mean VIF	2.44	.

Source: The authors' estimations.

The correlation matrix presented here illustrates the associations among key financial variables over the specified time period (Table 4). Notably, the variable representing the time period (1) exhibits a perfect correlation of 1.000 with itself, as expected. Moving to financial metrics, the Cost-to-Income Ratio (ER) (2) displays a marginal positive correlation of 0.100 with the time period.

Return on Equity (ROE) (3) shows a modest correlation of 0.098 with the time period and a negative correlation of -0.256 with the Cost-to-Income Ratio (ER). Return on Assets (ROA) (4) demonstrates a nuanced pattern of correlations, including a negative correlation of -0.016 with the time period and positive associations with various financial variables, such as ER, ACR, TCA, OPR, LR, BZ, NIM, GDP, and ID.

Table 4: Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) period	1.000										
(2) ER	0.100	1.000									
(3) ROE	0.098	-0.256	1.000								
(4) ROA	-0.016	0.245	0.708	1.000							
(5) ACR	-0.089	0.404	0.139	0.543	1.000						
(6) TCA	-0.088	0.262	-0.130	0.404	0.488	1.000					
(7) OPR	0.173	0.111	0.711	0.687	0.016	0.005	1.000				
(8) LR	0.138	-0.214	0.094	-0.052	-0.449	0.017	0.177	1.000			
(9) BZ	0.226	-0.410	0.089	-0.344	-0.817	-0.517	0.171	0.476	1.000		
(10) NIM	-0.124	-0.069	0.212	0.499	0.653	0.424	0.075	-0.353	-0.463	1.000	
(11) GDP	0.573	0.058	0.025	-0.058	-0.058	-0.104	0.044	0.013	0.137	-0.043	1.000

The Cost to Average Asset Ratio (ACR) (5) exhibits correlations with ER, ROE, ROA, TCA, and NIM. Total Capital Adequacy (TCA) (6) displays associations with ER, ROA, ACR, OPR, and LR. Operating Profit to Equity (OPR) (7) is correlated with ER, ROA, LR, and BZ, indicating relationships with these financial indicators. Liquid Assets to Total Assets Ratio (LR) (8) is associated with ROE, ROA, ACR, OPR, and BZ.

Bank Size (BZ) (9) reveals correlations with ER, ROA, ACR, OPR, and LR, highlighting connections with these financial measures. Net Interest Margin (NIM) (10) shows associations with ROE, ROA, ACR, and TCA. Gross Domestic Product (GDP) (11) is correlated with all financial variables, suggesting potential economic influences on financial metrics. Lastly, the variable ID (12) exhibits associations with ER, ROE, ROA, ACR, TCA, OPR, LR, BZ, and NIM, indicating a comprehensive network of relationships.

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These correlation coefficients provide a nuanced understanding of the interplay between financial metrics, temporal dynamics, and economic factors. The results offer valuable insights for further examination within the context of the study, fostering a comprehensive understanding of the relationships among the specified variables.

The analysis conducted pertains to the Westerlund test for cointegration, with the central objective of examining the presence of shared stochastic trends across multiple panels (Table 5). The null hypothesis (H0) posits the absence of cointegration, suggesting that there are no common stochastic trends among the panels. Conversely, the alternative hypothesis (Ha) proposes the existence of cointegration, indicating the presence of shared stochastic trends among some panels.

The test involves 27 panels over a span of 9 periods. The cointegrating vector is identified as panel-specific, implying that each panel may exhibit its unique cointegrating relationship. The consideration of panel means is incorporated into the analysis, and a time trend is not included. Additionally, the autoregressive (AR) parameter is specified as panel-specific.

The computed statistic for the variance ratio is 59.9541, yielding a p-value of 0.0000. The variance ratio statistic is a crucial indicator in cointegration testing, and in this instance, the obtained value, coupled with the extremely low p-value, provides robust evidence against the null hypothesis of no cointegration. Consequently, the results strongly suggest the presence of significant cointegrating relationships among the panels, supporting the alternative hypothesis that some panels share common stochastic trends.

In conclusion, the outcomes of the Westerlund test underscore compelling evidence in favor of cointegration among the panels, indicating the existence of shared stochastic trends within the specified dataset.

Table 5: Correlation Matrix

Variable	Statistic	p-value
Variance ratio	59.95141	0.0000

Main Estimations

Noteworthy findings from the 2 System-GMM (ROA) model reveal that the lagged value of ROA is positively significant at the 1% level, signifying a robust association with past performance (Table 6). Conversely, Total Capital Adequacy (TCA) exhibits a negative and statistically significant relationship at the 1% level, indicating that higher capital adequacy is associated with a decrease in ROA. The Cost-to-Income Ratio (ER) demonstrates a pronounced negative impact on ROA, as evidenced by the highly significant negative coefficient of -0.728 at the 1% level.

Furthermore, the positive and statistically significant coefficients associated with Cost to Average Asset Ratio (ACR) and Operating Profit to Equity (OPR) in the 2 System-GMM (ROA) model suggest their favorable influence on ROA. In contrast, Bank Size (BZ) and Net Interest Margin (NIM) show negative associations, implying that larger banks and higher net interest margins are related with lower ROA. The GDP exhibits a positive, albeit marginally significant, relationship with ROA.

In the context of the 2 System-GMM (ROE) model, the lagged value of ROE is positively significant at the 1% level, indicating a persistent impact on equity returns(Table 6). Total Capital Adequacy (TCA) displays a negative and highly significant relationship at the 1% level, suggesting that higher capital adequacy is associated with a reduction in ROE. Similar to the ROA model, the Cost-to-Income Ratio (ER) exerts a significant negative impact on ROE, with a coefficient of -0.070 at the 1% level.

Additionally, the positive and significant coefficients of Cost to Average Asset Ratio (ACR) and Operating Profit to Equity (OPR) in the 2 System-GMM (ROE) model imply favorable influences on ROE. Notably, Bank Size (BZ) and Net Interest Margin (NIM) exhibit negative relationships with ROE, suggesting that larger banks and higher net interest margins are associated with lower equity returns. The Gross Domestic Product (GPD) displays a positive and highly significant relationship with ROE.

Both models report auxiliary statistics such as AR2 and Hansen statistics, providing insights into the robustness of the estimated models. The large number of observations (216) contributes to the statistical reliability of the results.

Table 6: GMM (Main estimations)

Variable	2 System-GMM (ROA)	2 System-GMM (ROE)
l.roa	0.205**	
l.roe	.	0.260***

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Tca	- 0.207***	- 0.253***
er	- 0.728***	- 0.070***
acr	0.530***	0.387***
opr	0.685***	0.504***
lr	0.019*	0.010*
Bz	- 0.241*	- 1.436***
nim	- 0.299**	- 0.037***
gdp	0.191*	0.526***
Constant	1.427	6.111
AR2	0.555	0.357
Hansen	0.187	0.187
Observations	216	216

DISCUSSIONS AND TEST OF HYPOTHESES

This section delves into the study's findings, drawing connections with pertinent existing literature. The impact of capital adequacy and the cost-income ratio on firms' performance, specifically in terms of ROA and ROE, is thoroughly examined. Conclusions pertaining to the hypotheses posited in the study are also presented in this discussion.

Capital Adequacy and Performance

Additionally, the outcomes of the present study align with and confirm the conclusions of Barnor et al. (2013), who identified a negative and insignificant relationship between TCA and bank performance (ROA), coupled with a negative yet significant relationship between TCA and performance (ROE) among banks in Pakistan. However, it's worth noting that this negative relationship observed in the present study contrasts with the results of other earlier works such as those by Neceur (2003), Sufian and Chong (2008), Staikouras and Wood (2003), Almazari (2013), Goddard et al. (2004), Naceur & Kandil (2009), and Irawati et al. (2019), which found a positive relationship between TCA and firm performance.

Efficiency Ratio and Bank Performance

The findings of the study reveal a negative bond between the ER and both ROA and ROE, and this relationship is statistically significant in influencing the performance of banking firms, regardless of whether performance is measured by ROA or ROE. Therefore, the null hypothesis positing a negative bond between the ER and bank performance is accepted. This aligns with the observations of Hess and Francis (2004), who noted an inverse relationship between the ER and a bank's profitability. The study's outcomes are reinforced by Ghosh et al. (2003), who posited a negative correlation between efficiency and the ER. Correspondingly, Hassan et al. (2023) identified a negative impact of the cost-to-income ratio on profitability, as measured by ROA.

Moreover, the results are consistent with the findings of Almazari (2013), who identified a negative correlation between the cost-income ratio (CIR) and both ROA and ROE. This implies that banks failing to effectively manage their efficiency, as measured by the cost-income ratio, may experience a negative impact on their profitability.

CONCLUSION

This study aims to investigate the relationship between capital adequacy, the cost-income ratio, and the performance of listed banks in Pakistan. After conducting diagnostic and specification tests to address the basic assumptions of the GMM and running regressions for two separate working models (ROA and ROE), the study reveals that ER is negatively correlated to firm performance, whether measured by ROA or ROE.

Moreover, the study reveals a negative association between the cost-income ratio and both ROA and ROE, highlighting its statistical significance in impacting the performance of banks in Pakistan. Furthermore, the total adequacy ratio shows a negative correlation with ROA, reaching statistical significance, while the association with ROE lacks statistical significance. In terms of bank size, a negative relationship is observed with both ROA and ROE, and it is statistically significant, emphasizing the pivotal

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role of BZ in determining bank profitability. Lastly, GDP demonstrates a positive relationship with both ROA and ROE, although statistical significance is absent for ROA and present for ROE.

In conclusion, this study contributes to existing literature by confirming a negative relationship between capital adequacy and profitability. Nevertheless, the discovery of the statistical insignificance of capital adequacy in determining firm performance when measured by ROA, and its significance when measured by ROE, implies that simply increasing capital may not be the remedy for poor performance. The study underscores the significance for regulators and practitioners to concentrate not only on advocating for an augmentation in banks' capital base for sustainability but also on fortifying regulations regarding the pragmatic application and optimal utilization of available funds. Additionally, the study suggests that banks in Pakistan should aim to improve their efficiency, especially in managing the ER, to enhance profitability, acknowledging the crucial role of effective expense management in determining performance.

Policy suggestions and limitations of the study

The study's findings suggest important policy considerations for regulators, policymakers, and banks in Pakistan. Regulatory guidelines should not only focus on capital adequacy but also emphasize effective capital utilization. Enhanced oversight through regular audits is essential. Policymakers should promote efficiency improvements in banking operations, offering incentives for adopting cost-effective measures. Encouraging strategic investments aligned with economic goals is crucial. However, the study's applicability is limited to Pakistani banks, and caution should be exercised in generalizing to other contexts. Data limitations and reliance on specific timeframes also warrant consideration. Policymakers should interpret findings in the local context, recognizing potential causal complexities and external factors impacting bank performance.

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