

DO BANK FUNDAMENTALS MATTER FOR CAPITAL ADEQUACY? EVIDENCE FROM DSE LISTED BANKS IN BANGLADESH

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Abstract

Capital adequacy is a critical indicator of banking sector stability, reflecting a bank's ability to absorb unexpected losses, manage risks, and maintain financial resilience. This study investigates the influence of bank-specific fundamentals on the capital adequacy ratio (CAR) of commercial banks listed on the Dhaka Stock Exchange (DSE), Bangladesh. Using panel data from 25 listed commercial banks covering the period 2012–2023, the study examines the effects of Deposit-to-Asset Ratio (DAR), Equity Ratio (EQR), Loan-to-Asset Ratio (LAR), Debt-to-Equity Ratio (LEV), and Non-Performing Loan Coverage Ratio (NPLCR) on CAR. To estimate the relationship between bank-specific fundamentals and capital adequacy, the study employs the Feasible Generalized Least Squares (FGLS) estimation technique. The empirical findings reveal that the Equity Ratio (EQR) exerts a positive and statistically significant effect on CAR, indicating that stronger equity capitalization enhances banks' regulatory capital positions and financial stability. Conversely, the Deposit-to-Asset Ratio (DAR) and Non-Performing Loan Coverage Ratio (NPLCR) demonstrate significant negative relationships with CAR, suggesting that excessive dependence on deposit financing and heightened credit-risk exposure may weaken capital adequacy. The results further highlight the importance of maintaining a balanced capital structure, effective risk management practices, and sound asset quality in achieving regulatory compliance under the Basel III framework. The findings provide important implications for bank managers, regulators, and policymakers by emphasizing the need to strengthen Tier-1 capital, improve credit risk management, and promote sustainable funding structures. By offering evidence from an emerging economy, this study contributes to the growing literature on the determinants of capital adequacy and provides valuable insights into the role of bank-specific fundamentals in shaping regulatory capital outcomes.

Keywords: Capital Adequacy, Bank Fundamentals, Basel III; Commercial Banks, Dhaka Stock Exchange.

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01. Introduction

The financial system and, in particular, the banking sector, is the key determinant of long-term economic development and economic stability in any country, as it is the section that concentrates on concentrating savings, resource allocation, and investment (El Menyari, 2019; Odita et al., 2020). In that regard, the task of ensuring a sufficient capital level is among the most important of banks. Capital adequacy ratio (CAR) is a major measure of financial stability of a bank in terms of its ability to absorb unforeseen losses as well as being resistant to economic shocks. The banking system, being well capitalized, does not only safeguard the depositors and investors but also fosters the belief in the financial system, as well as sustainable economic growth.

In order to stabilize the financial system, both in the national and global scale, the international regulatory bodies like Basel Accords have developed the minimum capital requirements of banks. Basel I, II and Basel III was introduced by the Basel Committee on Banking Supervision (BCBS) as part of the Bank of International Settlement (BIS) and was a major enhancement of capital requirements in response to global financial crisis in 2009. The Basel III raised the minimum capital ratio to no less than seven percent of risk-weighted assets, together with other capital requirements, to enhance the ability of the banks to survive in case of the financial distress (Abba et al., 2013).

Capital adequacy is an essential part of banking regulation because it enables banks to absorb unexpected losses, to withstand financial shocks and to ensure the stability of the financial system. In order to protect the depositors and to build their confidence in the banking sector, regulatory authorities in various countries have set minimum capital requirements (Akande, 2016; Ünvan, 2020). The Basel Committee on Banking Supervision (BCBS) is the most influential international regulatory framework that regulates bank capital. The BCBS has introduced Basel III, a suite of regulatory requirements, in order to bolster banks' resilience after the global financial crisis, via improved capital quality, tighter leverage limits, and improved risk management standards. In this evolving and riskier financial landscape, the finalization and implementation of Basel III reforms continue to reinforce the need for having sufficient capital buffers (Basel Committee on Banking Supervision (BCBS, 2017). As a result, capital adequacy has emerged as one of the most important measures of banking system stability and regulation in developed and developing countries.

Regardless of this regulatory progress, it is still a significant issue to have optimal capital adequacy especially in the emerging economies like Bangladesh. The banking sector in Bangladesh has witnessed high growth in the last few decades but still has structural weaknesses such as an increase in non-performing loans (NPLs), low quality of asset and high leverage. All of this exerts significant pressure on the capital status of banks and can destroy financial stability in case of mismanagement (Sharpe et al.; Naoaj, 2023).

A great variety of both internal and external factors affect capital adequacy. Most importantly within them, bank specific fundamentals are central to the determination of capital structure and risk profile of financial institutions. These fundamentals

comprise deposit-asset ratio (DAR), which tells how well the bank has been able to maintain the stability of its funding; the equity ratio (EQR) which is the percentage of capital buffer; loan-asset ratio (LAR) which determines the exposure of the bank to credit risk; the debt-equity ratio (LEV) which captures the financial leverage of the bank; and non-performing loan coverage ratio (NPLCR) which reflects how well the bank can cover the credit risk by means of provisioning. Collectively, these variables will present such a full picture of the financial health of a bank, its efficiency in operations, and its ability to manage risks.

Despite an increasing literature on the determinants of capital adequacy, the studies have tended to look at individual factors of profitability, liquidity or macroeconomic factors without combining several of the bank-specific fundamentals in a single analytical model. Besides, there is a lack of empirical findings in emerging economies especially Bangladesh, which is scattered. The changing regulatory landscape of Basel III along with the recent financial sector issues like rising credit risk and economic uncertainty signify the necessity of new and thorough empirical research. Thus, a major research gap is the lack of knowledge about the combination of these important financial indicators on capital adequacy in the Bangladeshi bank situation.

The paper has some significant contributions to the existing body of work. To begin with, it offers current empirical research on the determinants of capital adequacy in the context of an emerging market and this enriches the body of limited research in the area of the banking sector in Bangladesh. Second, it incorporates various banks' fundamentals under a single holistic framework which provides a better picture of the drivers of CAR. Third, panel GLS methodology has been used which maximizes strength and reliability of empirical results. Lastly, the research also has practical implications to policymakers, regulators and bank management by delivering information on how capital structure and risk management practices can be optimum to maintain financial stability as well as enforcement of international regulatory systems like Basel III.

In brief, capital sufficiency is an important issue to banks in more uncertain and competitive operating conditions. This study will help in advancing the academic research and policy making to enhance the strength and sustainability of banking sector of Bangladesh through the contribution of bank specific fundamental in the process of forming capital adequacy.

02. Literature Review

Capital adequacy is one of the essential measures of the financial strength and stability of a bank. The major sources of finance to the banks are retained earnings, debt and equity capital. The Capital Adequacy Ratio (CAR) is one of the most important regulatory indicators used to assess a bank's financial resilience and capacity to absorb unforeseen losses and shocks to the financial system without compromising its operations (Mendoza & Rivera, 2017). CAR is used by the regulatory authorities across the world to ensure the safety of the depositors, build confidence in the financial system, and minimize the risk of bank failures (Abba et al., 2013).

The Basel Committee on Banking Supervision (BCBS) has developed Basel I, II and III to improve resiliency of the banking system by setting minimum capital requirements. Banks are mandated by Basel III to build up sufficient regulatory capital against their risk-weighted assets (RWA) to enable them to withstand losses from credit, market and operational risks. Basel III places a strong focus on the quality of Tier-1 capital, capital conservation buffers and prudent leverage management for the long term financial stability.

Capital Adequacy Ratio (CAR) = (Tier-I + Tier-II)/Risk Weighted Assets

Tier-I capital is comprised of common equity, retained earnings and disclosed reserves, whereas Tier-II capital is made up of subordinated debt, revaluation reserves, and other supplementary capital instruments (Aspal & Nazneen, 2014). As such, CAR also shows both the amount and the quality of a bank's capital based on its risk exposure.

2.1 Bank Fundamentals and Capital Adequacy: Theoretical Perspective:

In the Basel III regime, the capital structure, asset composition, leverage position, credit risk exposure and funding structure of a bank will affect its capital adequacy. Because of this, there are some bank-specific fundamentals that are likely to impact CAR. Deposit to Asset Ratio (DAR) indicates the proportion of funds lent by the bank that comes from deposits by the bank's customer base. Deposits are a fairly stable funding source, but if deposits increase, so do assets and this can put pressure on CAR if the increase in regulatory capital has not matched the increase in assets (Parvin et al., 2020; Gharaibeh et al., 2022). The Equity Ratio (EQR) is the ratio of assets that are funded by shareholders' equity. Under Basel III, equity is the key element of Tier-I capital, and banks with a higher equity ratio are likely to perform better on capital adequacy metrics (Bateni et al., 2014; Nguyen & Nguyen, 2021).

Loan to Asset Ratio (LAR) is the ratio of total assets invested in loans. According to Büyükkşalvarcı & Abdioğlu, 2011; Gazi et al., 2022, an increase in LAR could increase risk-weighted assets and decrease CAR due to the risk weights that are generally applied to loans, unless there is an adequate capital buffer. The Debt to Equity ratio (LEV) is a measure of the leverage of a bank. This can make a bank more vulnerable to financial shocks, as well as to capital shortfalls, which can be caused by high leverage (Koehn & Santomero, 1980; Harris et al., 2014). Researchers (Ozili & Adamu, 2021; Viet et al., 2023) studied that the Non-Performing Loan Coverage Ratio (NPLCR) indicates the effectiveness of a bank's loss absorption capacity in case asset quality deteriorates. Loans classified as 'problems' can result in increased provisioning, which also can have a negative impact on regulatory capital and CAR. As a result, Basel III recommends that banks with better equity capital and less leverage, better lending practices and better credit risk management practices are more likely to have enough regulatory capital.

2.2 Empirical Evidence:

The findings from the various empirical studies conducted so far are inconclusive in their conclusions on capital adequacy determinants. Ghosh et al. (2003) determined

that the capital rules have a significant effect on banks' asset allocation decisions. Chen (2003) found that regulatory requirements and subordinated debt are significant contributors in bolstering capital buffers of the Chinese banks. Under Basel regulations, Chami and Cosimano (2003) maintained that the overall regulatory capital is the limiting factor, instead of equity capital.

Ho and Hsu (2010) noted that bank performance was positively related to capital adequacy whereas Mathuva (2009) found a negative relationship between equity capital and profitability. Also, Büyükkşalvarcı and Abdioğlu (2011) discovered that the loan loss reserve has a positive effect on CAR, whereas the loans leverage, and ROE have a negative effect on capital adequacy for Turkish banks. A number of studies on bank capital structure also offer valuable insights. Amidu (2007) found profitability, asset structure, size and growth as important factors that affect bank capital structure. Octavia and Brown (2010) showed weak evidence that macroeconomic factors affect the bank capital structures in developing economies. Similarly, Gropp and Heider (2010) and Jucá et al. (2012) found that traditional capital structure factors are also relevant in the banking sector for determining capital decisions.

While these studies make a valuable addition to the literature, their results are inconclusive and tend to focus on developed economies. Further, there is not much literature available on the interaction of funding structure, leverage, asset composition, and credit risk on capital adequacy in the context of Basel III in emerging markets like the case of Bangladesh.

2.3 Research Gap:

The literature shows there are three big gaps. First, most empirical research on capital adequacy has been undertaken in developed countries, and there is much less available for emerging economies. Second, most of the literature to date focuses on one or a few determinants of CAR and does not consider a combination of bank-specific fundamentals in one framework. Third, only a handful of studies have tried to explore the factors that affect capital adequacy in the context of the Basel III regulatory regime in Bangladesh. So, this study thus fills the above mentioned gaps by evaluating the effect of Deposit-to-Asset Ratio (DAR), Equity Ratio (EQR), Loan-to-Asset Ratio (LAR), Debt-to-Equity Ratio (LEV), and Non-Performing Loan Coverage Ratio (NPLCR) on the Capital Adequacy Ratio (CAR) of the DSE-listed commercial banks in the period 2012-2023.

2.4 Conceptual Framework

It is an essential analytical tool for research that helps show the correlation between desired variables. In this illustration, the following framework is highlighted: In this conceptual framework, it is shown that how banks specific fundamentals those are deposit asset ratio (DAR), equity ratio (EQR), loan asset ratio (LAR), debt equity (LEV), non-performing loan coverage ratio (NPLCR) affects capital adequacy ratio (CAR). The following framework is highlighted below:

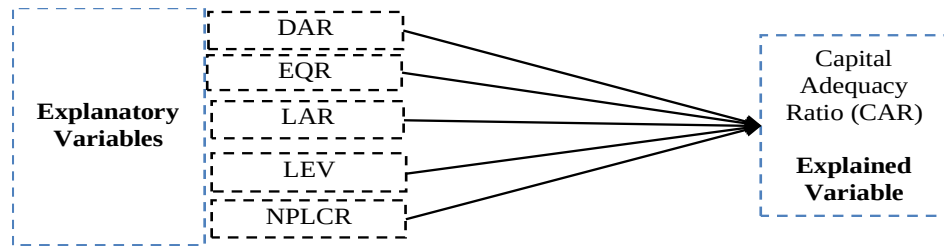


Figure-01: Conceptual Framework

03. Methodology of the Study

3.1 Data Collection:

This study is based on an unbalanced panel data of 25 commercial banks listed in Dhaka Stock Exchange (DSE) from 2012 to 2023. One state-owned commercial bank and twenty-four private commercial banks are included in the sample. To make data consistent, banks that did not complete annual reports or did not report in the study period were excluded. Banks listed on the DSE because they have a higher level of disclosure requirements, and can give up-to-date financial information. Findings are however generalizable to the non-listed commercial banks, specialized banks and Islamic banks in Bangladesh only, as the study has considered only listed banks. The variables are briefly demonstrated in Table 1.

Table 1: Variables Measurement

S. No.	Variable Name	Variable Definition	Sources
Dependent Variable			
1	Capital Adequacy Ratio (CAR)	The capital adequacy ratio (CAR) is a metric utilized to evaluate a bank's capacity to withstand future losses, ensuring it possesses adequate capital to cover its risk-weighted assets. It is articulated as a percentage of a bank's capital relative to its risk-weighted assets.	(Bukair, 2019); (Maharjan, 2023)
Independent Variables			
2	Deposit Asset Ratio (DAR)	The deposit asset ratio (DAR) quantifies the percentage of a bank's assets financed by customer deposits. It assesses the bank's dependence on deposit-based funding in comparison to alternative capital sources.	(Gharaibeh et al., 2022); (Irfany & Ulhaqqi, 2023).
3	Equity Ratio (EQR)	The equity ratio (EQR) is a financial metric that reflects the percentage of a company's assets funded by shareholders' equity. An elevated equity ratio indicates diminished financial leverage and an enhanced capacity to endure financial challenges.	(Dao et al., 2023); (Nguyen & Nguyen, 2021)

4	Loan Asset Ratio (LAR)	The loan asset ratio (LAR) quantifies the fraction of a bank's total assets constituted by loans. It denotes the degree to which a bank's assets are allocated to lending activities, affecting its risk exposure.	(Gazi et al., 2022); Tan et al., 2021)
5	Debt Equity (LEV)	The debt equity ratio (LEV) quantifies a company's financial leverage by comparing its total debt to shareholders' equity. An elevated ratio indicates a company's increased dependence on borrowed capital to finance its operations.	(Harris et al., 2014); (Neuberger & Rissi, 2024)
6	Non-Performing Loan Coverage Ratio (NPLCR)	The non-performing loan coverage ratio (NPLCR) signifies the ratio of non-performing loans that are secured by provisions for loan losses. It indicates a bank's capacity to endure losses from loans that are not returned as stipulated.	(Iskandar et al., 2022); (Viet et al., 2023)
Control Variables			
7	Net Interest Margin (NIM)	Net interest margin (NIM) is a profitability metric that indicates the disparity between the interest income earned by a bank and the interest disbursed to its depositors, in relation to its earning assets. It indicates the efficacy of a bank's interest rate differential.	(Hidayat et al., 2024); (Siagian et al., 2024)
8	Assets (Size)	Assets are resources possessed by a corporation, bank, or individual that are anticipated to yield future economic advantages. Assets may be classified as tangible, such as real estate and machinery, or intangible, like patents and trademarks.	(Samad et al., 2024); (Li, Yang, et al., 2010)
9	Return on Equity (ROE)	Return on equity (ROE) is a financial term that assesses a company's performance relative to the equity invested by its shareholders. It signifies the efficiency with which a corporation employs its equity basis to generate profits.	(Hawaldar, et. al., 2022); (Rahmah, et. al., 2020)

3.2 Hypothesis Development:

Hypothesis involves a critical examination of the literature and the use of logical reasoning to formulate hypotheses that can be empirically tested using statistical methods. The process of such a methodological decision not only guides the structuring of the study but also forms a consistent framework of analyzing the interrelations between independent and dependent variables in quantitative research environments (Creswell and Creswell, 2018; Sekaran and Bougie, 2016; Saunders et al., 2019). Based on the Basel III framework and existing empirical evidence, the following hypotheses are proposed in our research:

3.2.1 Deposit Asset Ratio (DAR)

According to (Parvin et al., 2020), the Deposit-to-Asset Ratio (DAR) indicates the proportion of a bank's assets that are financed by client deposits. A more stable financial source is indicated by a greater DAR, which lowers liquidity risk and raises the CAR. Higher-DAR banks are typically less dependent on erratic a funding source, which improve their CAR and enhance their overall stability (Gharaibeh et al., 2022; Irfany & Ulhaqqi, 2023).

H1: Deposit Asset Ratio (DAR) negatively influences CAR because excessive dependence on deposit funding may increase liquidity and regulatory capital pressure.

3.2.2 Equity Ratio (EQR):

The Equity Ratio (EQR) is the percentage of a bank's assets funded by shareholders' equity. A stronger capital basis is indicated by a greater EQR, which supports a higher CAR and helps guard against any losses (Dao et al., 2023; Nguyen & Nguyen, 2021). Because it acts as a cushion to absorb shocks during hard times, maintaining a strong equity ratio is crucial to financial stability and to fulfilling regulatory capital requirements.

H2: Equity Ratio (EQR) positively influences CAR because higher shareholder equity strengthens the capital base under Basel III requirements.

3.2.3 Loan Asset Ratio (LAR):

The percentage of a bank's assets that are devoted to loans is shown by the Loan to Asset Ratio (LAR). The bank's capital reserves may be under strain if the LAR is higher, as this indicates the bank is taking on more credit risk (Gazi et al., 2022; Tan et al., 2021). A lower LAR, however, can indicate a more conservative lending strategy, which could support a higher Capital Adequacy Ratio (CAR). Because more loans entail greater risk, banks with higher LARs are frequently under more pressure to maintain their CAR.

H3: Loan Asset Ratio (LAR) negatively influences CAR because higher loan concentration increases risk-weighted assets and capital requirements.

3.2.4 Debt Equity (LEV):

The amount of debt a bank employs to finance its assets is measured by its leverage (LEV). Leverage raises financial risk even if it can boost returns (AL-Habashneh, 2022). Since more leverage raises the bank's risk-weighted assets, it may lower the CAR. As a result, banks must carefully manage leverage to maintain a sufficient CAR and comply with regulatory capital requirements (Harris et al., 2014; Neuberger & Rissi, 2024).

H4: Leverage (LEV) negatively influences CAR because excessive debt financing increases financial risk and weakens regulatory capital positions.

3.2.5 Non-performing Loan Coverage Ratio (NPLCR):

A bank's ability to cover losses from non-performing loans is gauged by its Non-Performing Loan Coverage Ratio (NPLCR) (Iskandar et al., 2022; Viet et al., 2023).

According to (Ozili & Adamu, 2021), the bank's CAR is positively affected by a higher NPLCR, indicating it has sufficient provisions for potential loan losses. Because it ensures the bank has sufficient resources to absorb the risk of bad loans, maintaining a high NPLCR is crucial for financial stability.

H5: Non-performing Loan Coverage Ratio (NPLCR) positively influences CAR because stronger provisioning capacity enhances banks' resilience against credit losses.

3.3 Econometric Model:

This study investigated the impact of bank-specific factors on capital adequacy ratio (CAR) using a Generalized Least Squares (GLS) model. This model worked well and was deemed appropriate because the research focuses on the simultaneous interactions between the capital adequacy ratio and bank-specific factors. The regression model used in the study is as follows:

$$CAR = \beta_0 + \beta_1 DAR_{it} + \beta_2 EQR_{it} + \beta_3 LAR_{it} + \beta_4 LEV_{it} + \beta_5 NPLCR_{it} + \beta_6 NIM_{it} + \beta_7 Size_{it} + \beta_8 ROE_{it} + \varepsilon_{it} \dots \dots \dots (i)$$

Where CAR stands for capital adequacy ratio and explanatory variables are deposit asset ratio (DAR), equity ratio (EQR), loan asset ratio (LAR), debt equity (LEV), and non-performing loan coverage ratio (NPLCR). In addition, the three control variables in the model are net interest margin (NIM), assets (Size) and return on equity (ROE). Moreover, the coefficient of variables in the equation above is denoted by β , and the residual error of the regression is represented by β_0 .

Several diagnostic tests were performed prior to estimating the model. The possibility of multicollinearity was assessed by the Variance Inflation Factors (VIF), with all the values below 10, suggesting that indicate is no serious multicollinearity concern. The Modified Wald Test for Groupwise Heteroskedasticity was used to test for heteroskedasticity. The test revealed that the variance of the residuals was not the same for all banks. The Wooldridge Test for Serial Correlation in Panel Data was used to test for autocorrelation and the result verified the existence of first-order serial correlation.

The classical OLS assumptions were breached which led to the use of Generalized Least Squares (GLS) estimation. By making adjustments to the variance-covariance matrix, GLS can give efficient and unbiased estimates when there is heteroskedasticity and autocorrelation. Hence, it is better to use GLS than pooled OLS and fixed effects estimators to estimate parameters with reliability.

04. Statistical Analysis and Findings

The study then employed a Generalized Least Squares (GLS) model to examine how well it could forecast the influence of specific determinants on the capital adequacy ratio of listed banking institutions on the Dhaka Stock Exchange (DSE) in Bangladesh. The model, descriptive statistics, multicollinearity tests (VIF and tolerance), heteroskedasticity tests, serial correlation tests, and regression analysis were all included.

Table 02: Summary Statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis
Capital Adequacy Ratio (CAR)	300	12.817	1.729	10.110	16.42	.381	2.361
Deposit Asset Ratio (DAR)	300	78.14	5.585	66.816	86.096	-.521	2.342
Equity Ratio (EQR)	300	7.721	2.101	3.590	11.846	.033	2.638
Loan Asset Ratio (LAR)	300	67.301	7.273	49.692	77.433	-.812	3.061
Debt Equity Ratio (LEV)	300	17.79	11.406	7.540	46.2	1.372	3.623
Non-performing Loan Coverage Ratio (NPLCR)	300	50.37	35.463	7.980	124	.71	2.207
Net Interest Margin (NIM)	300	2.441	.994	0.579	4.374	-.045	2.498
Assets (Size)	300	12.388	.505	11.358	13.245	-.302	2.402
Return on Equity (ROE)	300	10.986	4.168	1.850	17.55	-.421	2.621
<i>Notes: The table shows the mean, standard deviation, minimum, median, skewness, kurtosis of capital adequacy ratio (CAR), deposit asset ratio (DAR), equity ratio (EQR), loan asset ratio (LAR), debt equity (LEV), non-performing loan coverage ratio (NPLCR), net interest margin (NIM), assets (Size) and return on equity (ROE) for the period of 2012-2023.</i>							

Table 2 show the results of the descriptive statistics of the examined variable of this study where data is employed from twenty-five commercial banks of Bangladesh from 2012 to 2023. Here, the mean of the capital adequacy ratio (CAR), deposit asset ratio (DAR), equity ratio (EQR), loan asset ratio (LAR), debt equity (LEV), non-performing loan coverage ratio (NPLCR) are 12.817, 78.140, 7.721, 67.301, 17.79, and 50.37 respectively, whereas, the standard deviations are 1.729, 5.585, 2.101, 7.273, 11.406, and 35.463 compatibly. This indicates that the variations of all parameters are under the standard level. Further, the skewness and kurtosis value of all these variables are near or within the standard level.

4.1 Test of Multicollinearity:

When independent variables in a multivariate regression analysis are highly correlated, that is contained redundant information, multicollinearity occurs. This may lead to inaccurate statistical conclusions by making it challenging to evaluate the specific impact of each variable on the dependent variables and by inflating the variances of the parameter estimates.

Table 03: Correlations Matrix

Variables	CAR	DAR	EQR	LAR	LEV	NPLCR	NIM	Size	ROE	VIF
Capital Adequacy Ratio (CAR)	1.000									-
Deposit Asset Ratio (DAR)	0.086	0.083	-0.103*	1.000						1.650
Equity Ratio (EQR)	0.213***	-0.275***	1.000							1.860
Loan Asset Ratio (LAR)	-0.446***	1.000								2.060
Debt Equity Ratio (LEV)	-0.070	0.237***	-0.630***	0.121*	1.000					1.630
Non-performing Loan Coverage Ratio (NPLCR)	0.195***	-0.387***	0.241***	-0.291***	-0.308***	1.000				1.590
Net Interest Margin (NIM)	0.076	0.004	0.213***	0.215***	-0.198***	-0.054	1.000			1.570
Assets (Size)	0.166***	-0.107*	-0.416***	0.338***	0.216***	0.009	-0.222***	1.000		1.480
Return on Equity (ROE)	0.210***	0.001	0.098	0.167***	-0.124*	0.019	0.363***	-0.184***	1.000	1.370

Statistically Significant * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$; t statistics are enclosed in parentheses. Notes: The table shows the Pearson's correlation coefficients between the variables under study whereas data from 25 DSE-listed banking firms from 2012 to 2023 were used. Additionally, the variance inflation factors (VIF) mean is 1.650.

Pearson analyzed the pairwise correlations between the independent variables to find the correlation coefficient. From the above table 3, it has been found that there is no multi-collinearity among the all-independent variables that are deposit asset ratio (DAR), equity ratio (EQR), loan asset ratio (LAR), debt equity (LEV), non-performing loan coverage ratio (NPLCR) as the correlation coefficient among the variables not exceeds 0.80. The variance inflation factor (VIF) also mentioned in Table 3 evaluated the extent of multicollinearity among the independent variables. The test indicated a mean VIF of 1.650 significantly lower than the criterion of 10, so demonstrating the absence of multicollinearity (Hair et al., 2010) which also supported the correlation matrix and did not have multi-collinearity among the all-independent variables.

4.2 Regression Analysis:

Table 4 reports the regression results using both Robust Pooled OLS and Feasible Generalized Least Squares (FGLS) estimators. In addition to coefficients, the table provides standard errors, p-values, and 95% confidence intervals to improve transparency and facilitate statistical interpretation. The consistency of coefficient signs and significance levels across both models indicates the robustness of the empirical findings. The GLS estimates are emphasized because they account for potential heteroskedasticity and serial correlation commonly observed in panel datasets, thereby providing more efficient parameter estimates.

Table 4: Analyzing the Banks Fundamentals regarding Capital Adequacy:

Variables	Model I: Pooled OLS (Robust)				Model II: GLS			
	Coef.	Std. Err.	P-value	95% CI	Coef.	Std. Err.	P-value	95% CI
Deposit Asset Ratio (DAR)	-0.143***	0.018	0.000	[-0.179, -0.107]	-0.143***	0.019	0.000	[-0.180, -0.106]
Equity Ratio (EQR)	0.129**	0.064	0.047	[0.002, 0.256]	0.129*	0.066	0.052	[-0.001, 0.258]
Loan Asset Ratio (LAR)	0.019	0.016	0.219	[-0.012, 0.050]	0.019	0.018	0.270	[-0.015, 0.054]
Debt Equity Ratio (LEV)	-0.010	0.012	0.414	[-0.033, 0.014]	-0.010	0.011	0.397	[-0.032, 0.013]
Non-performing Loan Coverage Ratio (NPLCR)	-0.007**	0.003	0.023	[-0.013, -0.001]	-0.007**	0.003	0.018	[-0.013, -0.001]
Net Interest Margin (NIM)	0.074	0.132	0.577	[-0.187, 0.335]	0.074	0.113	0.515	[-0.148, 0.296]
Assets (Size)	1.432***	0.233	0.000	[0.971, 1.893]	1.432***	0.249	0.000	[0.943, 1.920]
Return on Equity (ROE)	0.094***	0.029	0.002	[0.036, 0.152]	0.094***	0.028	0.001	[0.039, 0.148]
Constant	2.947	3.197	0.358	[-3.360, 9.254]	2.947	3.686	0.424	[-4.278, 10.172]
R2	0.481				-			
F-Stat/ Chi-Square	25.940***				179.156***			
Prob > F / Chi-square	0.000				0.000			
Number of observations	300				300			
The dependent variable is Capital Adequacy Ratio (CAR). Standard errors are reported in parentheses. The sample consists of 25 DSE-listed commercial banks over the period 2012–2023. Model I reports robust pooled OLS estimates, while Model II presents Feasible Generalized Least Squares (FGLS) estimates. Statistical significance is denoted as *** p < 0.01, ** p < 0.05, and * p < 0.10.								

The regression analysis indicates that a relationship exists between the five explanatory variables and the dependent variable. Adj. R-squared shows the proportion of the target field's volatility that can be explained by the inputs. In the pooled OLS, the study reveals that the value of Adj. R-squared is 0.481.

The loan to asset ratio (LAR) has a significant positive influence on the capital adequacy ratio (CAR) in the regression results, confirming hypothesis H1. The models' coefficients for Pooled OLS and GLS regression, -.143 ($t = 7.85$, $p < 0.01$) and -.143 ($t = 7.58$, $p < 0.01$), indicates that a low loan to asset ratio is associated with standard capital adequacy, suggesting a negative and significant relationship between the loan to asset ratio and the capital adequacy ratio. This study has also been supported by empirical findings of other researchers named Lestari, R. F. D., Susbiyani, A., & Suharsono, R. S. (2024), that the equity ratio (EQR) has a positive and significant impact on the capital adequacy ratio (CAR).

The equity ratio (EQR) has a significant positive influence on the capital adequacy ratio (CAR) in the regression results, confirming hypothesis H2. The Pooled OLS and GLS models coefficients are .129 ($t = 2.00$, $p < 0.05$) and .129 ($t = 1.95$, $p < 0.10$) respectively which indicates that a high equity ratio is associated with standard capital adequacy, suggesting a positive and significant relationship between the equity ratio and the capital adequacy ratio. This study has also been supported by empirical findings mentioned by Bateni, L. et. al. (2014) that the equity ratio (EQR) has a positive and significant impact on the capital adequacy ratio (CAR).

The non-performing loan coverage ratio (NPLCR) has a considerable influence on the capital adequacy ratio (CAR) in the regression results, confirming hypothesis H5. The two models. Pooled OLS and GLS Regressions, coefficients are -.007 ($t = -2.30$, $p < 0.05$) and -.007 ($t = -2.37$, $p < 0.05$), indicates that a decrease in non-performing loans is associated with standard capital adequacy, suggesting a negative and significant relationship between the non-performing loan coverage ratio and the capital adequacy ratio. Researchers' analysis (Brastama, R. F., & Dudi Permana, 2021) reveals that non-performing loans have a negative and statistically significant impact on the capital adequacy ratio.

Overall, the regression analysis indicates that capital adequacy has specific determinants that significantly influence maintaining the standard level of capital in financial organizations. Moreover, the three control variables that are: net interest margin (NIM), assets (Size) and return on equity (ROE) also incorporated in the regression models whereas assets (Size) and return on equity (ROE) play a positive and considerable role in determining the firm's standard level of capital adequacy that are also supported by some other analysis conducted by Dahal, J. et. al., 2024; Widyakto et. al. (2023).³

4.3 Discussion and Implications:

Based on the results of this study, there are important regulatory and managerial implications regarding capital adequacy in banking sector. The positive correlation between the Equity Ratio (EQR) and Capital Adequacy Ratio (CAR) indicates that banks with higher equity ratios are in a better position to meet Basel III capital requirements and are more resilient to financial shocks. Bangladesh Bank need to facilitate the commercial banks to boost their Tier-1 capital through retained earnings, equity generation and proper capital management.

On the other hand, the negative correlation between Deposit-to-Asset Ratio (DAR) and CAR suggests that an excessive dependence on deposit financing could be of stress on the capital buffers, thus the attention of the regulators on the aggressive deposit financing and the need to preserve the pace of capital growth in line with the pace of the balance sheet growth. Likewise, the adverse effect of Non-Performing Loan Coverage Ratio (NPLCR) on CAR highlights the importance of proper management of credit risk and asset quality; since the quality of the loan portfolio can lead to higher provisioning and lower regulatory capital ratios. Improving credit appraisal processes, loan monitoring and recovery processes are therefore important policy priorities. Bankers should manage their capital structure optimally, avoid unnecessary leverage, manage their asset quality, and implement effective risk management procedures to support good regulation, financial strength and sustainability.

05. Conclusion

This research analyzed the relationship between the bank specific fundamentals and capital adequacy ratio (CAR) of Dhaka Stock Exchange (DSE) listed commercial banks for the period of 2012-2023. The results obtained from the use of the Feasible Generalized Least Squares (FGLS) estimation technique indicate that the Equity Ratio (EQR) has a positive and significant impact on the CAR while the Deposit-to-Asset Ratio (DAR) and Non-Performing Loan Coverage Ratio (NPLCR) have a negative and significant impact on CAR. These findings indicate that the more equity is capitalized, the better is the capital position of the banks, but the more they rely on deposit financed growth and the lower their asset quality, the less their capital position is adequate.

The study will add to the literature with empirical evidence on the determinants of capital adequacy in the context of Basel III regulatory framework in an emerging economy. The research brings together funding and capital structure and credit-risk indicators in a single framework to provide insights into the factors driving regulatory capital positions in the banking sector in Bangladesh. The results have far-reaching implications for regulators and bank managers. Good capital planning, prudent balance-sheet management and credit-risk management are key to ensuring adequate capital. Building the financial strength of equity capital and asset quality is especially crucial to bolster financial resilience and sustainability of banks.

There are a number of limitations of this study. Only bank-specific determinants of capital adequacy are considered and the analysis is limited to the commercial banks listed on DSE. Thus, the results of the analysis might not be representative of the broader population of non-listed banks or other financial institutions. Further research can build on this analysis by including macro-economic data, institutional change and comparison across country to examine the factors influencing capital adequacy in various institutional and economic settings.

The study concludes that the importance of maintaining financial stability, regulatory compliance, and sustainable development of the banking sector in Bangladesh is undeniable as bank fundamentals play a crucial role in determining capital adequacy.

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