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Impact of Revenue Diversification on Bank Performance and Risk: Evidence from Bangladesh

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Abstract

Purpose: This study examines whether revenue diversification improves or harms banks' profitability and financial stability in Bangladesh.

Method: A panel dataset covering 270 observations from DSE-listed banks spanning 2014 to 2023 is used. This study applies fixed-effects and random-effects regression models using STATA 13. Key performance indicators such as Return on Assets (ROA), Return on Equity (ROE), and Z-score (a measure of financial risk) are analyzed. The control variables include bank size, leverage, asset growth, the deposit-to-total-assets ratio, and macroeconomic indicators such as GDP growth and inflation.

Results: Revenue diversification negatively impacts profitability and financial stability. ROA, ROE, and Z-score have significantly negative relationships with revenue diversification. Larger banks tend to be less profitable and stable, whereas a higher deposit-to-total-assets ratio improves performance. GDP growth has a slight positive impact on profitability but does not significantly affect the financial stability.

Conclusions: Diversifying income sources may not always benefit Bangladeshi banks. This can reduce profitability and increase financial risk. Managing leverage and improving asset utilization are crucial for achieving better financial outcomes.

Limitations: This study is limited to DSE-listed banks in Bangladesh and does not consider unlisted banks or non-bank financial institutions in its analysis.

Contribution: This study contributes to the banking and finance field by offering insights into the effects of revenue diversification on bank performance and risk in a developing economy. This can help policymakers, bank managers, and financial analysts make better decisions regarding income strategies and risk management.

Keywords: *Bank Performance, Financial Stability, Non-interest income, Revenue Diversification, Z-Score*

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1. Introduction

1.1 Background

Banks are financial institutions that participate immensely in a country's economic development and growth. Globally, the banking industry has developed along with technological and globalization advancements. It plays a key role in mobilizing financial resources for investment by extending credit to businesses and investors (Maubi & Jagongo, 2014). In this role, households, businesses, and governments fall back on banks for credit. Thus, in well-functioning economies, banks tend to act as

quality controllers for successful capital-seeking projects, ensuring higher returns and enhancing growth. While banks have contributed positively to economic growth through enhanced investments and improved living standards, they are also increasingly exposed to risks arising from market volatility (Ismail, Hanif, Choudhary, & Ahmad, 2015). Therefore, this study aims to investigate the impact of banking revenue diversification on performance and risk.

Traditionally, banks have focused on generating revenue through net interest income from loans and deposits. However, in response to regulatory pressures, competitive forces, and technological advancements, banks have diversified. This trend underscores the growing importance of revenue diversification in modern banking systems. The debate surrounding diversification versus banking focus remains contentious. Advocates of diversification argue that it reduces risk through income smoothing and improves financial performance by spreading fixed costs and leveraging the economies of scope (Drucker & Puri, 2009). Moreover, agency costs and increased competition can undermine the benefits of diversification (Laeven & Levine, 2007).

Empirical studies have reported mixed results regarding the impact of revenue diversification on banks' performance and risk. While some studies highlight the risk-reduction and profitability-enhancing benefits of combining lending and non-lending activities, others point to increased volatility and managerial inefficiencies. This study examines the impact of revenue diversification on bank performance and risk in Bangladesh, a country with a rapidly evolving financial landscape. Understanding the implications of diversification is critical for bank managers, regulators, and policymakers striving to balance risks and returns effectively.

1.2 Context

In the banking sector, maintaining stable profitability and managing risks are essential goals. Revenue diversification has become an important strategy for achieving these objectives, attracting significant attention from researchers, policymakers and banking professionals. Changes in technology, regulations, and market conditions have encouraged banks to rethink their traditional business models and explore new income sources. Consequently, banks worldwide are focusing on revenue diversification as a key part of their strategy to improve performance and reduce risks. This study examines the relationship between revenue diversification, profitability, and risk in the Bangladeshi banking sector, aiming to provide insights into how this approach can enhance financial stability and growth in the banking sector. In recent years, Bangladesh's banking sector has undergone significant structural transformation, particularly in its income-generating activities. With an increasing reliance on non-interest income, such as fees, commissions, and trading income, understanding the impact of revenue diversification on bank performance and risk has become crucial. Unlike developed countries, where banking diversification strategies are more mature, Bangladeshi banks face unique institutional and operational constraints, warranting focused research.

1.3 Objectives

The primary objective of this study is to empirically examine whether the trend towards revenue diversification in Bangladeshi banks has been in the interests of bank financial performance. The objectives of this study are as follows:

1. This study examines the relationship between revenue diversification and bank profitability in the context of Bangladeshi banks using measures such as Return on Assets (ROA) and Return on Equity (ROE).
2. To assess the impact of revenue diversification on bank risk and financial stability, particularly using risk indicators such as the Z-score.
3. To analyze how structural factors, such as bank size, leverage, and deposit ratios, influence the effect of revenue diversification on performance and risk.
4. To evaluate the role of macroeconomic factors (e.g., GDP growth and inflation) in moderating the relationship between income diversification and bank outcomes.

5. This study provides empirical evidence and practical insights that can help policymakers, regulators, and bank managers formulate strategies for sustainable growth and risk mitigation through revenue diversification.

2. Literature review

2.1 Review of Related Literature

This chapter presents the theoretical framework of the study and examines empirical studies on the impact of diversification on financial performance and risk. This section is organized into two parts: the first part covers the theoretical background, while the second part reviews the literature on how diversification affects the financial performance and risk of banks.

2.1.1 Theoretical Framework

The performance and risk management of banks have been central themes in financial research because of the pivotal role these institutions play in economic stability and growth. Modern banking theories suggest that diversification of revenue streams, such as generating income from non-interest sources, may influence bank profitability and risk dynamics (Hassan & Bashir, 2003). Revenue diversification, defined as the shift from traditional interest-based income to non-interest income sources, is often considered a double-edged sword.

From a resource-based perspective, revenue diversification allows banks to leverage their resources more effectively, creating competitive advantages and reducing their dependency on a single income source. However, excessive diversification can dilute focus and result in inefficiencies (Masood & Ashraf, 2012). Additionally, macroeconomic conditions, such as GDP growth and inflation, play a crucial role in shaping banking performance, influencing both interest and non-interest income. These factors underscore the need to evaluate how revenue diversification interacts with bank performance and risk, particularly in the context of emerging economies, such as Bangladesh. This theoretical framework lays the foundation for understanding the interplay between revenue diversification, profitability, and risk, guiding the empirical investigation of these relationships in the Bangladeshi banking sector

2.1.2 Empirical Evidence

Various empirical studies have been conducted in the context of developed and developing economies. Despite extensive research on the economic consequences of diversification, the empirical evidence presents a "puzzle regarding the relationship between diversification and banks' performance and risk. Several studies have found that income diversification can enhance banks'stability by reducing risk, especially during economic crises. For instance, Adem (2022) and De Silva, Duong, Nguyen, and Nguyen (2023) suggest that diversification helps banks reduce risk by providing alternative sources of income beyond traditional lending. Li, Feng, Zhao, and Carter (2021) find that during the COVID-19 pandemic, noninterest income positively impacted bank performance and reduced risk, highlighting the benefits of revenue diversification when traditional lending declined. Diversification, particularly through non-interest income, improves financial stability during both normal and crisis periods, supporting the portfolio management theory (Adem, 2022; Uddin, Majumder, Akter, & Zaman, 2022). However, over-diversification can expose banks to risks, as it may dilute their focus and lead to inefficiencies (Adem, 2022).

Despite these advantages, diversification benefits are not universal. For example, Mawutor, Boadi, Antwi, and Tetteh (2023) indicate that income diversification negatively impacts profitability in Sub-Saharan African banks, with intellectual capital emerging as a significant factor in moderating this relationship. The findings highlight that while diversification can offer stability, it may not always lead to higher profitability, particularly when the banking sector is still developing or when intellectual capital is not adequately leveraged (Mawutor et al., 2023). Similarly, in the context of Vietnamese banks, Phan, Nguyen, and Hoang (2022) argue that while income diversification is a critical factor influencing business performance, its effects are contingent on other factors, such as the scale of credit activities and management efficiency.

The findings from different regions suggest that income diversification has a more pronounced positive effect on profitability and performance in developed markets, where regulatory environments and operational efficiency are stronger. In contrast, the results for emerging economies are more mixed. For instance, Ashraf and Nazir (2023) find that income diversification significantly enhances risk-adjusted returns, particularly when banks increase their size and equity ratios. Xie et al. (2022) examined seven Asian emerging economies and found that revenue diversification, along with non-interest income, gross domestic product (GDP), and market capitalization, significantly improves bank efficiency. In contrast, non-performing loans negatively affect efficiency, highlighting the strategic value of diversified income in promoting financial sustainability.

Another key point emphasized in various studies is the role of macroeconomic factors in influencing the effectiveness of income diversification. For example, the impact of interest rates, GDP growth, and inflation on bank performance is highlighted in studies by Ashraf and Nazir (2023) and Phan et al. (2022). In Pakistan, higher interest rates improve risk-adjusted returns, whereas inflation and GDP growth have negative effects. These macroeconomic factors demonstrate that external conditions play a significant role in determining how income diversification impacts bank performance, further complicating the relationship between diversification and profitability.

Furthermore, the relationship between income diversification and bank stability is complex. While diversification can mitigate risks in some contexts, it can also introduce new sources of instability, particularly if banks overextend their non-traditional activities. For example, the study by Paltrinieri, Dreassi, Rossi, and Khan (2021) on Islamic and conventional banks found that while non-interest income contributed positively to profitability, the risk-adjusted profitability of Islamic banks was not significantly affected by diversification. Similarly, diversification into off-balance-sheet activities in financially liberalized markets has been shown to have a significant negative impact on risk-adjusted profits, especially after the global financial crisis (J. Nguyen, Parsons, & Argyle, 2021).

Stiroh (2004a) categorized non-interest income into components such as service charges, trading, and fiduciary income. He found that trading activities were highly volatile and diminished risk-adjusted returns, whereas fiduciary income positively impacted profitability. Abdymomunov, Gerlach, and Sakurai (2023) noted that larger U.S. banks rely heavily on non-interest income, which boosts profitability but simultaneously increases risk and earnings volatility. These findings align with Stiroh and Rumble (2006), who demonstrated that larger banks assume higher risks through diversification. Ahmed and Rozario (2024) found that off-balance sheet (OBS) activities, such as loan commitments and guarantees, significantly enhance bank profitability in Bangladesh. The study shows that OBS activities improve financial performance without increasing balance sheet risks, offering strategic insights for banks in emerging markets.

In emerging markets, Odesanmi and Wolfe (2007) concluded that a mix of interest and non-interest income activities can lower insolvency risk, even though risk-adjusted profits may be lower than in developed markets. Sharma and Anand (2020) found that geographic diversification improves performance for moderately risky banks, whereas focusing on specific industries reduces risk. However, focusing on a single geographical area increases risk, suggesting the need for a diversification strategy tailored to a bank's risk profile. The relationship between revenue diversification and bank performance continues to attract research attention, with several studies providing valuable insights into banks in Bangladesh. Kahloul and Hallara (2010) proposed that diversification leads to a reduction in risk, although it simultaneously increases systematic risk. Similarly, Saunders, Schmid, and Walter (2020) found that while non-interest income activities, such as trading, improve return on assets (ROA), they reduce risk-adjusted returns, as measured by the Sharpe ratio.

Githaiga (2021) found that while human capital positively influences bank performance, income diversification has a negative effect. However, Sanya and Wolfe (2011) showed that income diversification enhances risk-adjusted performance in emerging economies, as evidenced by the System

GMM approach, which accounts for endogeneity. Meslier, Tacneng, and Tarazi (2014) found that revenue diversification helps stabilize income in banks in the Philippines, particularly through greater reliance on noninterest income, such as trading activities. However, Natalia, Kurniawan, and Firsty (2016) observed that fee-based income enhances bank value, whereas broader diversification of non-interest income tends to reduce risk without influencing the market value.

Hidayat, Kakinaka, and Miyamoto (2012) found that while smaller banks benefit from product diversification in terms of reduced risk, larger banks face greater risk. Thakur and Arora (2023) found that income diversification in Indian banks is positively influenced by factors such as bank size, competition, and inflation. This highlights the importance of bank size in determining diversification effects. In contrast, Tharu and Shrestha (2019) analyzed the effect of bank size on profitability in Nepal using data from 2013 to 2018. Their findings show that bank size has no significant impact on profitability (ROA). Alhassan (2015) noted that banks with higher revenue diversification achieve greater profitability, particularly through non-interest business. They also emphasized that diversified banks tend to have higher market valuations and shareholder wealth than specialized banks.

Sawada (2013) found that in Japan, revenue diversification through fee income decreases various risks while enhancing franchise value. However, the impact of non-interest income depends on its composition, with trading and other non-interest activities contributing less to risk reduction. This is in line with Sharma and Anand (2020), who reported that the effectiveness of diversification strategies varies depending on a bank's risk profile and market conditions. In the context of Bangladesh, Mashrur and Tabassum (2023) identified macroeconomic factors as significant determinants of profitability. While inflation positively impacts performance, economic growth has a negative relationship, reflecting the complex interaction between external economic conditions and bank operations in developing economies. Similarly, Masood and Ashraf (2012) found that larger asset sizes and efficient management boost Islamic banks' profitability across multiple countries. Management efficiency, measured through operating expenses, is a key driver of bank performance.

The role of revenue diversification in mitigating risk and enhancing performance is further supported by Ahokpossi (2013), who analyzed banks in Sub-Saharan Africa. The study found that higher market concentration, equity levels, and credit risk improved interest margins, whereas liquidity ratios had a negative effect. Inflation positively influences performance, although economic growth has mixed implications for bank performance. Al-Qudah and Jaradat (2013) in Jordan showed that capital adequacy and bank size positively influence ROA and ROE, while leverage has a negative effect. Conversely, Tosin and Otonne (2019) examined the factors affecting profitability in Nigerian commercial banks and found a significantly negative impact of capital adequacy. In conclusion, revenue diversification positively impacts bank performance, particularly by enhancing ROA and ROE. However, the relationship between diversification and risk is influenced by factors such as bank size, leverage, and asset growth. Macroeconomic variables, such as GDP growth and inflation, play an essential role in shaping banks' risk-return profiles. These findings provide valuable insights into the Bangladeshi banking sector, where effective diversification strategies can optimize performance while mitigating risks.

2.2 Hypothesis

Based on the literature, the following hypotheses were developed:
H.1. Revenue diversification has a significantly positive effect on profitability.
H.2. Revenue diversification has a significantly positive effect on stability..

2.3 Research Gap

Despite extensive studies on bank performance and risk, the role of revenue diversification in Bangladesh remains underexplored. Most existing research focuses on traditional factors, such as capital adequacy and asset quality, overlooking how non-interest income influences profitability and risk management. Additionally, the interplay between revenue diversification and macroeconomic factors in Bangladeshi banks has not been investigated thoroughly. This study addresses these gaps by

examining how revenue diversification impacts bank performance and risk in the unique context of Bangladesh.

3. Research methodology

3.1 Methodology and Research Design

3.1.1 Methodology

This study is experimental and adopts a quantitative research methodology, leveraging a panel data framework to analyze the relationship between revenue diversification and bank performance and risk in Bangladesh. The panel data approach captures both cross-sectional and time-series variations, enabling the control of unobserved heterogeneity and dynamic relationships. The analysis uses secondary data from financial statements and macroeconomic sources, applying statistical models to evaluate the impact of revenue diversification on performance indicators such as ROA, ROE, and Z-score. This methodology ensures robust and reliable findings for policymakers and financial institutions.

3.1.2 Research Design

This study adopts a quantitative research approach, utilizing panel data to examine The Impact of Revenue Diversification on Bank Performance and Risk. This study focuses on the banking sector in Bangladesh, covering a sample of 27 banks over the period–2014-2023. The research design is structured to investigate the relationship between revenue diversification and bank performance, using profitability measures such as Return on Assets (ROA) and Return on Equity (ROE), along with risk indicators like the Z-Score

3.2 Sample Size

This study includes 27 commercial banks listed on the Dhaka Stock Exchange (DSE) in Bangladesh. The final dataset is a balanced panel covering the period from 2014 to 2023, with 270 observations. The sample was limited to banks listed on the Dhaka Stock Exchange (DSE) with publicly available and consistent financial information for all required variables. Some banks were excluded because of data gaps, especially regarding non-interest income components and risk indicators. Data were collected from the financial statements of each bank, which are available on their websites. Macroeconomic control variables were obtained from the World Bank database, and additional information was gathered from books, journals, and online resources.

3.3 Variables in this Study

This study incorporates a range of variables to analyze the impact of revenue diversification on bank performance and risk. The dependent variables are Return on Assets (ROA), Return on Equity (ROE), and Z-score. ROA measures profitability relative to total assets, whereas ROE evaluates profitability concerning shareholders' equity. The Z-score is used as a measure of financial stability, indicating the likelihood of insolvency, with a higher Z-score suggesting a lower financial risk. These variables capture the core aspects of bank performance and risks.

The primary independent variable is revenue diversification, measured as the ratio of non-interest income (NII) to total income. This variable assesses the extent to which banks diversify their income sources beyond traditional interest income and its subsequent impact on their profitability and stability. This study aims to understand whether diversified income streams contribute to improved financial performance and reduced risk in the banking sector. Several control variables are included to account for the factors influencing bank performance and risk. These variables include bank size (natural log of total assets), asset growth rate, deposit-to-total asset ratio, loan-to-total asset ratio, capital adequacy ratio, and leverage, which reflect the internal characteristics of banks. Additionally, macroeconomic indicators, such as inflation and GDP growth rate, are considered to capture the external economic environment. Together, these variables provide a comprehensive framework for analyzing the relationship between revenue diversification, performance, and risk in Bangladeshi banks' operations.

Table 1. Variable list with Equation and type

Classification	Variables	Equation	References
Dependent	Return on Asset	$\frac{Net\ Income}{Total\ Asset}$	(Ahamed, 2017; Nisar, Peng, Wang, & Ashraf, 2018)
	Return on Equity	$\frac{Net\ Income}{Total\ Equity}$	(Sanya & Wolfe, 2011)
	Z-score	$Z = 6.56\boldsymbol{X1} + 3.26\boldsymbol{X2} + 6.72\boldsymbol{X3} + 1.05\boldsymbol{X4}$ ***X1*** *= Working Capital / Total Assets* ***X2*** *= Retained Earnings / Total Assets* ***X3*** *= Earnings before Interest and Taxes / Total Assets* ***X4*** *= Market Value of Equity / Total Liabilities*	(Elia, Toros, Sawaya, & Balouza, 2021; T. V. Nguyen, Le, & Le, 2023)
Independent	Revenue Diversification	$\frac{Non\ interest\ Income}{Total\ Income}$	(Akter, Majumder, & Uddin, 2018; Majumder & Uddin, 2017)
Control	Size	$ln\ (Total\ Asset)$	(Lepetit, Nys, Rous, & Tarazi, 2008; Sanya & Wolfe, 2011; Stiroh & Rumble, 2006)
	Asset Growth Rate	$\frac{Asset_{it} - Asset_{it-1}}{Asset_{it-1}}$	(Abuzayed, Al-Fayoumi, & Molyneux, 2018; Meslier et al., 2014; Stiroh, 2004b)
	Deposit to Total Asset	$\frac{Total\ Deposit}{Total\ Asset}$	(Abuzayed et al., 2018)
	Loan to Total Asset	$\frac{Total\ Loan}{Total\ Asset}$	(Abuzayed et al., 2018; Ahamed, 2017; Meslier et al., 2014)
	Capital Adequacy	$\frac{Tier\ 1\ +\ Tier\ 2\ Capital}{Risk\ Weighted\ Assets}$	(Mercieca, Schaeck, & Wolfe, 2007; Sanya & Wolfe, 2011; Stiroh & Rumble, 2006)
	Leverage	$\frac{Total\ Equity}{Total\ Asset}$	(Abuzayed et al., 2018; Meslier et al., 2014)
	GDP Growth	*Annual GDP growth rate*	(Sanya & Wolfe, 2011)

Inflation	*Annual consumer price inflation*	(Sanya & Wolfe, 2011)

3.4 Instruments

The instruments used in this study included software tools such as Microsoft Word, Microsoft Excel, and STATA 13. Microsoft Word was used to write and organize the research report, and Microsoft Excel was used for data organization and manipulation. STATA 13, a statistical software package, was used for data analysis and to run regression models. These software tools facilitated the processing and analysis of the collected data, ensuring accurate and reliable results for the research study.

3.5 Research Model

This study examines The Impact of Revenue Diversification on Bank Performance and Risk using panel data analysis. Both Fixed Effects (FE) and Random Effects (RE) regression models were employed to explore the relationship between revenue diversification and bank performance, measured through ROA, ROE, and risk indicators such as the Z-score. The Fixed Effects model was applied to control for unobserved, time-invariant characteristics unique to each bank, focusing on how changes in revenue diversification influence performance and risk over time. Conversely, the Random Effects model allowed for the analysis of both within- and between-bank variations, assuming that the unobserved effects were uncorrelated with the explanatory variables (Lee, Yang, & Chang, 2014).

The Hausman test was conducted to determine the appropriate model for this study. A significant test result indicates that the Fixed Effects model is more suitable, while an insignificant result favors the Random Effects model (Abu Khalaf, Awad, & Ellis, 2024). These models provide robust insights into the influence of revenue diversification, along with control variables such as bank size, leverage, and macroeconomic factors such as GDP growth and inflation, on bank performance and risk during the study period. This approach enabled a comprehensive understanding of the role revenue diversification plays in shaping the stability and profitability of banks in Bangladesh (Sanya & Wolfe, 2011).

$$Y_{it} = \alpha_i + \beta 1 REVDIV_{it} + \beta 2 SIZE_{it} + \beta 3 GRA_{it} + \beta 4 LTA_{it} + \beta 5 CA_{it} + \beta 6 Lev_{it} + \beta 7 GDPGR_{it} + \beta 8 INF_{it} + \varepsilon_{it}$$

Where,

Y_{it} = Dependent variable

α_i = Intercept for each individual

βi = Estimated coefficient

ε_{it} = Error term

i = individual index $1 < i < 270$

t = Time index $1 < t < 10$

In the selected model, the dependent variables Y_{it} are ROA (Return on Assets), ROE (Return on Equity), and Z-score

4. Results and discussions

4.1 Summary Statistics

The summary statistics provide a summary of the central tendency, variability, and range of the variables. These statistics can help understand the distribution of data and discover potential outliers or patterns that are important for research. It is critical to analyze the features of each variable and how they may affect the study aims and hypotheses when evaluating results.

Table 2. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROA	270	.882	.393	.01	2.06
ROE	270	11.321	4.206	.08	29
Z-Score	270	.158	.693	-2.362	1.973
REVDIV	270	1.172	2.836	-.676	35.025
SIZE	270	5.425	.257	3.979	6.264

GRA	270	.117	.137	-.887	1.605
DTA	270	.789	.472	.515	8.431
LTA	270	.708	.323	.39	5.852
CA	270	.076	.052	.024	.768
Lev	270	.906	.151	.078	1.147
GDPGR	270	6.51	1.138	3.5	7.9
INF	270	6.2	.825	5.5	7.7

Source: Processed data by STATA (2013)

The above table presents summary statistics for the key variables used in this study. The dataset comprises 270 observations from the banking sector in India. The dependent variables include Return on Assets (ROA), Return on Equity (ROE), and Z-score (a proxy for financial stability). The independent variable is Revenue Diversification (REVDIV), while the control variables include measures of bank size, asset growth, capital adequacy, and macroeconomic indicators such as GDP growth and inflation. The average ROA is 0.882, with a standard deviation of 0.393, indicating a moderate variation in banks' profitability relative to their assets. ROE averages 11.321%, with a wider dispersion (standard deviation of 4.206), reflecting differences in banks' ability to generate returns for their shareholders. The Z-score has a mean of 0.158 and ranges from -2.362 to 1.973, highlighting varying levels of financial stability among banks.

Revenue Diversification (REVDIV) has a mean value of 1.172, with a maximum of 35.025, suggesting significant differences in banks' diversification strategies across countries. Bank size, measured as the logarithm of total assets, has a mean of 5.425 and a relatively low variation (standard deviation of 0.257), indicating that the sampled banks are fairly comparable in size. The control variables provide additional insights into bank performance and structure. The average Growth Rate of Assets (GRA) is 11.7%, with some banks experiencing negative growth (-0.887) or exceptionally high growth (1.605). On average, 78.9% of banks' total assets are financed by deposits (DTA), and 70.8% are allocated to loans (LTA). The average capital adequacy ratio (CA) is 7.6%, suggesting moderate capitalization levels across the sector.

The mean value of Lev (0.906) reflects reliance on debt financing. Finally, the macroeconomic environment, represented by GDP growth (GDPGR) and inflation (INF), shows average values of 6.51% and 6.2%, respectively, which is consistent with a stable economic backdrop during the sample period. These descriptive statistics highlight key differences in bank profitability, risk, and operational characteristics, providing a foundation for analyzing the impact of revenue diversification on performance and humrisk dynamics. to be analyzed.

4.2 Pearson Correlation Coefficient Matrix

Table 3. Pearson correlation coefficient matrix

Variables	ROA	ROE	ZScore	REVDIV	SIZE	GRA	DTA	LTA	CA	LEV	GDPGR	INF
ROA	1.000											
ROE	0.798	1.000										
ZScore	0.211	0.058	1.000									
REVDIV	-0.312	-0.387	0.005	1.000								
SIZE	-0.364	-0.153	-0.078	0.061	1.000							
GRA	0.137	0.092	0.043	-0.098	-0.289	1.000						
DTA	0.014	0.039	-0.110	-0.020	-0.098	-0.049	1.000					
LTA	-0.032	0.021	-0.137	-0.014	0.006	-0.065	0.975	1.000				
CA	-0.012	0.013	-0.033	0.081	-0.192	-0.035	-0.020	-0.047	1.000			

Lev	- 0.221	- 0.096	-0.084	0.077	0.444	- 0.388	- 0.036	- 0.011	- 0.031	1.000		
GDPGR	0.056	0.091	0.019	0.011	0.036	0.069	- 0.035	0.008	- 0.052	- 0.004	1.000	
INF	0.065	0.025	-0.007	-0.015	- 0.172	- 0.189	0.092	0.059	0.157	- 0.020	-0.073	1.000

Source: Processed data by STATA (2013)
Notes- Strongly significant level *** p<0.01, ** p<0.05, * p<0.1 weakly significant level

The correlation analysis highlighted significant relationships among the variables in this study. ROA and ROE exhibit a strong positive correlation (0.798), indicating that higher asset-based profitability is closely aligned with shareholder returns. However, the Z-score, a measure of financial stability, shows weak correlations with ROA (0.211) and ROE (0.058), suggesting a limited influence of profitability on stability. Revenue diversification (REVDIV) is negatively correlated with ROA (-0.312) and ROE (-0.387), implying that increased diversification may reduce profitability.

Larger banks (SIZE) tend to be less profitable, as evidenced by their negative correlation with ROA (-0.364) and ROE (-0.153). Similarly, leverage (LEV) negatively impacts profitability, with correlations of -0.221 and -0.096 for ROA and ROE, respectively. Macroeconomic indicators, such as GDP growth (GDPGR) and inflation (INF), exhibit weak positive correlations with profitability, highlighting their minimal influence on bank performance. Overall, the analysis suggests that profitability, risk, and bank characteristics are interrelated, with diversification and leverage playing a pivotal role.

4.3 Regression Model Results

4.3.1 Model-1 for ROA

Table 4. Pearson correlation coefficient matrix

ROA	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	
REVDIV	-.028	.01	-2.88	.004***	-.046	-.009
SIZE	-.46	.124	-3.71	0***	-.703	-.217
GRA	-.109	.156	-0.70	.485	-.415	.197
DTA	.506	.262	1.93	.054*	-.009	1.02
LTA	-.77	.38	-2.03	.043**	-1.515	-.025
CA	-.503	.411	-1.22	.221	-1.308	.302
Lev	-.592	.253	-2.34	.019**	-1.087	-.096
GDPGR	.032	.017	1.94	.053*	0	.065
INF	-.002	.024	-0.07	.947	-.048	.045
Constant	3.945	.728	5.42	0***	2.517	5.372
Mean dependent var		0.882	SD dependent var			0.393
Overall r-squared		0.207	Number of obs			270
Chi-square		56.301	Prob > chi2			0.000
R-squared within		0.174	R-squared between			0.288
*** *p<.01, ** p<.05, * p<.1*						

Source: Processed data by STATA (2013)

Notes- Strongly significant level *** p<0.01, ** p<0.05, * p<0.1 weakly significant level
The regression analysis explores the impact of revenue diversification and other variables on bank performance, measured by Return on Assets (ROA). The overall model was statistically significant, as indicated by the chi-square statistic (56.301, $p < 0.001$), confirming the model's explanatory power. The within-, between-, and overall R-squared values are 0.174, 0.288, and 0.207, respectively, indicating that 20.7% of the variance in ROA is explained by the model. Revenue diversification (REVDIV) demonstrates a significant negative relationship with ROA ($\beta = -0.028$, $p = 0.004$), implying that higher diversification reduces bank profitability. Similarly, bank size (SIZE) negatively influences ROA ($\beta = -0.46$, $p < 0.001$), suggesting that larger banks tend to have lower profitability,

possibly because of higher operational inefficiencies or reduced focus on core activities. The loan-to-total assets ratio (LTA) also has a significant negative effect on ROA (β = -0.77, p = 0.043), while leverage (Lev) exhibits a similar negative relationship (β = -0.592, p = 0.019), indicating that higher leverage adversely affects profitability.

In contrast, the deposit-to-total assets ratio (DTA) has a marginally significant positive effect on ROA (β = 0.506, p = 0.054), suggesting that a higher deposit base improves bank profitability by reducing reliance on expensive funding sources. Additionally, the GDP growth rate (GDPGR) positively contributes to ROA at a marginal level of significance (β = 0.032, p = 0.053), indicating that favorable macroeconomic conditions support better bank performance. Other variables, including growth rate of assets (GRA), capital adequacy (CA), and inflation (INF), do not show statistically significant effects on ROA. Overall, the results highlight that while revenue diversification and certain structural bank characteristics negatively impact profitability, strong deposit bases and economic growth mitigate these effects. These findings underline the importance of managing diversification strategies, leverage, and structural factors to enhance bank performance effectively

4.3.2 Model-2 for ROE

Table 5. Regression Results- ROE

ROE	Coef.	St.Err.	t-value	p-value	[95% Conf Interval]	
REVDIV	-.248	.128	-1.94	.054*	-.501	.004
SIZE	-.138	1.675	-0.08	.934	-3.438	3.161
GRA	-1.307	1.802	-0.73	.469	-4.858	2.243
DTA	7.524	3.321	2.27	.024**	.981	14.067
LTA	-11.233	4.785	-2.35	.02**	-20.661	-1.806
CA	-8.074	4.965	-1.63	.105	-17.857	1.708
Lev	-21.365	5.293	-4.04	0***	-31.793	-10.936
GDPGR	.454	.192	2.37	.019**	.076	.832
INF	-.023	.274	-0.08	.933	-.562	.516
Constant	31.694	11.763	2.69	.008***	8.519	54.869
Mean dependent var		11.321	SD dependent var		4.206	
R-squared		0.131	Number of obs		270	
F-test		3.927	Prob > F		0.000	
Akaike crit. (AIC)		1412.586	Bayesian crit. (BIC)		1448.570	

**** p<.01, ** p<.05, * p<.1*

Source: Processed data by STATA (2013)

Notes- Strongly significant level *** p<0.01, ** p<0.05, * p<0.1 weakly significant level
The regression analysis investigates the impact of revenue diversification and other variables on bank performance, measured by Return on Equity (ROE). The overall model was statistically significant, as evidenced by the F-statistic (3.927, p < 0.001), confirming the explanatory power of the model. The R-squared value is 0.131, indicating that 13.1% of the variance in ROE is explained by the independent variables in the model.

Revenue diversification (REVDIV) demonstrates a marginally significant negative relationship with ROE (β = -0.248, p = 0.054), suggesting that increased diversification might reduce equity returns, possibly due to higher complexity or inefficiencies in diversified activities. The deposit-to-total assets ratio (DTA) has a significant positive effect on ROE (β = 7.524, p = 0.024), implying that banks with a higher proportion of deposits tend to achieve better equity returns. Conversely, the loan-to-total assets ratio (LTA) negatively affects ROE (β = -11.233, p = 0.020), indicating that a greater proportion of loans relative to assets may erode profitability, possibly because of increased risk or credit management issues.

Leverage (Lev) shows a strong negative association with ROE (β = -21.365, p < 0.001), highlighting the adverse impact of excessive leverage on profitability. The GDP growth rate (GDPGR) has a significant positive effect on ROE (β = 0.454, p = 0.019), indicating that favorable economic conditions support improved equity returns. Other variables, including bank size (SIZE), asset growth rate (GRA), capital adequacy (CA), and inflation (INF), do not have statistically significant effects on ROE. The constant term is statistically significant (β = 31.694, p = 0.008), suggesting that the baseline ROE is substantial when all independent variables are held constant.

These findings highlight the nuanced effects of revenue diversification, leverage, and structural characteristics of banks on equity returns. While diversification and leverage negatively impact profitability, strong deposit bases and favorable macroeconomic conditions positively influence equity. The results underscore the importance of balancing structural and economic factors to enhance bank profitability in the region.

5. Conclusion

5.1 Conclusion

This study investigates the impact of revenue diversification on the performance and stability of Bangladeshi banks. The findings reveal that diversification negatively affects both profitability (ROA and ROE) and financial stability (Z-score). Larger and highly leveraged banks are more vulnerable, whereas a higher deposit-to-total-assets ratio enhances performance. This study achieves its objective by offering empirical insights into the trade-offs involved in diversification within the Bangladeshi banking sector.

5.2 Practical Implications

This study highlights the impact of revenue diversification on bank profitability and risk in Bangladesh. By examining ROA, ROE, and risk measures, this study offers valuable insights for stakeholders. Policymakers can use the findings to enhance sector stability, managers can refine income strategies and risk controls, and regulators can design frameworks that support sustainable banking and economic resilience.

5.3 Suggestion

Banks should adopt diversification strategies cautiously, ensuring alignment with operational capacity and risk management frameworks. Policymakers should promote balanced diversification while encouraging deposit mobilization. Future research should include comparative studies, account for qualitative variables, and examine the role of regulatory and technological factors.

5.4 Limitation and Future Research

This study is limited to Bangladeshi banks and may not reflect the dynamics of other regions. It primarily uses quantitative data and does not consider qualitative factors such as management practices, technological adoption, or regulatory changes that may influence outcomes. Future research could extend this study in several ways. First, researchers may investigate the role of bank-specific factors, such as ownership structure, managerial efficiency, and digital capability, in moderating the impact of diversification. Second, cross-country comparative studies involving other South Asian or developing economies could provide broader insights. Third, the influence of regulatory reforms, governance practices, and macroeconomic shocks on diversification outcomes can be explored using qualitative or mixed-method approaches.

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