UNIVERSITI TEKNOLOGI MARA

CAPITAL DECISION OF ISLAMIC AND CONVENTIONAL BANKS IN HIGH-INCOME AND MIDDLE-INCOME COUNTRIES: AN INTERACTION EFFECT OF COST EFFICIENCY

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CONFIRMATION BY PANEL OF EXAMINERS

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ABSTRACT

Banks must maintain adequate capital at all times; the importance of this cannot be overstated. This has become a crucial aspect of bank operations that helps ensure financial stability by safeguarding depositors and building trust in the banking system. The current study investigates the capital decision of Islamic and conventional banks in High-Income and Middle-Income (HIMI) countries from 1995 to 2024. With the absence of endogeneity, the analysis utilizes a static model involving 2,072 unbalanced panel data points taken from 10 HIMI countries spanning from 30 years. The final estimation employs a random effects model using cluster standard errors to address both heterogeneity and serial correlation. Interestingly, cost efficiency emerges as playing a pivotal role in influencing the relationship between bank diversification and capital level. The interaction effect is evident in the individual models of conventional banks, High-Income countries, and Middle-Income countries. High efficient banks are found to reduce their capital level when diversification activities increase. However, the relationship becomes positive for low cost-efficient banks in High-Income countries, implying that stronger capital buffers are maintained when diversification increases. Following the trade-off theory, Islamic and conventional banks in HIMI countries are found to reduce their capital level to support bank growth. Nevertheless, the moral hazard issue of being 'Too Big to Fail' (TBTF) is prevalent for both the conventional bank and High-Income country models. This validates the lack of market discipline among larger banks due to the belief that they are TBTF. In another notable finding, the capital decision of banks is influenced by the institutional characteristics and different income group level. Banks operating in High-Income countries reveal to hold significantly higher capital level than those banks in Middle-Income countries. In particular, Islamic banks in both High-Income or Middle-Income (HIMI) countries are revealed to significantly hold lower capital than conventional banks in HIMI countries. Despite this, during crises, the capital level of banks in High-Income countries is significantly higher than non-crisis period. The study recommends that the relevant regulatory bodies to coordinate the existing capital regulation with the distinct institutional characteristics and economic environment of the country. Greater emphasis should be placed on bank growth, whereby both Islamic and conventional banks need to strengthen their capital level as they expand. The study suggests banks to strategically strategize their diversification activities depending on the cost efficiency level to enhance the capital level. Above all, central banks should strengthen regulatory oversight, especially on larger conventional banks and those larger banks operating in High-Income countries, to mitigate the domino effect that could arise from the moral hazard of TBTF. Furthermore, it is equally important for banks to embrace the risk absorption hypothesis when engaging in high-risk activities to maintain bank stability and mitigating the impact of future shocks. Overall, the study contributes to the existing literature and regulatory practice by demonstrating the role of cost efficiency in shaping more effective capital risk management strategies, thereby supporting both regulators and banking institutions in strengthening capital adequacy and overall financial stability.

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Symbols

$\epsilon, \mu, \vartheta, \upsilon, \eta$	Error Term
$\alpha_0, \beta_0, \gamma_0, \delta_0, \lambda_0, \nu_0, \rho_0, \sigma_0, \tau_0, \varsigma_0, \varphi_0, \kappa_0, \chi_0, \pi_0, \omega_0, \psi_0, \xi_0, \theta_0, \phi_0, \zeta_0$	Constant
$\alpha_n, \beta_n, \gamma_n, \delta_n, \lambda_n, \nu_n, \rho_n, \sigma_n, \tau_n, \varsigma_n, \varphi_n, \kappa_n, n, \pi_n, \omega_n, \psi_n, \xi_n, \theta_n, \phi_n, \zeta_n$	Coefficient
i	Islamic and Conventional banks in High-Income and Middle-Income Countries
t	Period of Year
H_0	Null Hypothesis
H_A	Alternate Hypothesis

LIST OF ABBREVIATIONS

Abbreviations	
AFC	Asian Financial Crisis
AR1	Arellano Bond 1
AR2	Arellano Bond 2
AAOIFI	Auditing Organization for Islamic Financial Institutions
B	Bank Specialization
BD	Bank Diversification
BFSA	Banking and Financial Services Act
BG	Bank Growth
BOFIA	Bank and other Financial Institutions Act
BPLM	Breusch Pagan Lagrange Multiplier
BRICS	Brazil, Russia, India, China, and South Africa
BCBS	Basel Committee on Banking Supervision
CB	Conventional Banks
CBN	Central Bank of Nigeria
CE	Cost Efficiency
CR	Credit Risk
CP	Crises Period
CAP	Capital Level
CAR	Capital Adequacy Ratio

CG	Country Group
COVID-19	Coronavirus Disease 19
EC	Economy
FEM	Fixed Effects Model
FDIC	Federal Deposit Insurance Corporation
FSA	Financial Services Act
GDP	Growth Domestic Products
G10	Group of Ten
GFC	Global Financial Crisis
GNI	Gross National Income
GCC	Gulf Cooperative Council
GMM	Generalized Method of Moments
HI	High-Income
HIMI	High-Income and Middle-Income
IB	Islamic Banks
IBRF	Islamic Banking Regulatory Framework
IFSA	Islamic Financial Services Act
IFSB	Islamic Financial Services Board
IFSB-2	Islamic Financial Services Board-2
IRB	Internal-Ratings Based
LCR	Liquidity Coverage Ratio

LI	Low-Income
LMI	Lower Middle-Income
LR	Liquidity Risk
MENA	Middle East and North Africa
MESA	Middle East and South Asia
NFSR	Net Stable Funding Ratio
OLS	Ordinary Least Squares
PLS	Profit and Loss Sharing
PMA	Palestine Monetary Authority
PROFIT	Profitability
PSIA	Profit-Sharing Investment Account
POLS	Pooled Ordinary Least Squares
QCB	Qatar Central Bank
REM	Random Effects Model
RWA	Risk-weighted Assets
ROA	Return on Assets
ROE	Return on Equity
SIZE	Bank Size
SSB	Shariah Supervisory Board
SEA	Southeast Asia
Stata	Stata Statistical Package

TBTF	Too Big to Fail
UMI	Upper Middle-Income
VIF	Variance Inflation Factor

CHAPTER 1
INTRODUCTION

1.1 Preface

This chapter begins with the background of the study by briefly explaining the important role played by bank capital level in the banking industry. An overview of banking institutions is discussed in this background section, followed by an outline of the dissimilarities between the banking systems in High-Income and Middle-Income (HIMI) countries. The background section also describes the procyclicality and countercyclicality behavior of the capital adequacy ratio in different economic phases. Capital regulation is also mentioned in the background, followed by the problem statement concerning the capital decision of Islamic and conventional banks in HIMI countries. The research questions and research objectives, as well as the purpose of the study, are identified, listed, and elaborated. The significance of the study is then explained, followed by a list of the definitions of key terms. The chapter concludes with a summary of the thesis.

1.2 Background of the Study

The capital level of a bank is considered a key ingredient in mitigating bank failure and safeguarding against possible losses. The bank capital level is usually measured using the capital adequacy ratio (CAR). The CAR is a crucial measure introduced by the Basel Committee on Banking Supervision to ensure banking institutions have sufficient capital to manage unexpected financial risks (Basel Committee on Banking Supervision, 1988). A high CAR signifies that a bank has sufficient capital to cover its risks, while a low CAR suggests that a bank might struggle to satisfy its obligations. This is because a higher CAR indicates a greater buffer enabling the bank to withstand financial shocks, making the bank less likely to become insolvent. Conversely, a low CAR poses significant risks to both the bank and the depositors. Therefore, maintaining an appropriate bank capital level is beneficial for both banks and customers because this provides a sense of security to customers and helps build trust in the banking institution. This trust is essential for preserving stability

in the financial system as it prevents panic withdrawals and bank runs (Bansal, 2021; Korbi & Bougatef, 2017).

The capital level signifies the bank's ability to absorb losses from its operations. Assessing the capital level of banks is essential to protect depositors' funds and ensure the soundness and stability of the banking financial system. When the public has confidence in banking institutions, they are more likely to deposit their money in banks, which subsequently helps finance economic growth. As a result, the capital level of banks is a fundamental concept in the banking industry and a key component of the Basel Regulations. For regulators, ensuring banks maintain an appropriate capital level is vital to prevent bank failures and avoid bank systemic risks. Meanwhile, from an investor's perspective, the capital level of a bank is a critical component in enabling them to evaluate the bank's financial health and make informed investment decisions. For that reason, banks strive to maintain an appropriate capital level to enhance profitability and maintain their reputation in the market.

Generally, prudently operated banks have greater capital ratios. This is because an undercapitalized bank is in danger of losing market trust and reputation (Andrieș & Sprincean, 2021; Beck et al., 2017). For financial institutions, maintaining a strong capital level is crucial for absorbing unexpected losses and remaining solvent. This is because the bank capital level plays a key role in maintaining public trust in financial institutions and preventing financial crises (Harkati et al., 2020). Even the Global Financial Crisis from 2007 to 2009 proves that banking stability can become a more serious issue, with sudden losses incurred in the banking sector eroding the capital of banks, particularly during a recession. As a result, it is critical to ensure that banks maintain an adequate capital level in order to avoid failure. In essence, the capital level is a vital component that allows banking institutions to remain sturdy while withstanding any economic crises. A bank with a strong capital position has the advantage of being able to pursue business opportunities. Meanwhile, these banks have greater capacity to cope with challenges caused by unexpected losses, leading to higher retained earnings (Huang & Xiong, 2015; Karim et al., 2014).

Another problem to be addressed when determining the amount of bank capital is the nature of banking itself. It is widely recognized that the nature of bank activities is to offer financing, and banks have historically held a prominent role in credit extension, which served as the primary sources of income for banks. Banks are funded

by short-term deposits, so it is expected that banks also provide short-term financing. However, banks mainly used these short-term funds to finance long-term financing, such as mortgage financing or car financing. This creates a mismatch between assets and liabilities (Bologna, 2018; Diamond, 1983; Segura & Suarez, 2017). In the case of an unexpected rise in interest rates, especially during a recession, banks may struggle to manage the potential losses. This is because, in normal times, a reduction in interest rate spurs the economy by increasing the money supply and encouraging borrowing, but this indirectly leads to an asset price bubble. To normalise the situation and prevent asset price bubbles from bursting, regulators raise the interest rate. This would make borrowing more expensive and ensure that banks are more cautious when making financing decisions. Nevertheless, in this situation, banks chase profits by eroding the capital buffer to continuously provide financing to the customer. In turn, banks may not have sufficient readily available capital to meet a sudden withdrawal request since raising this capital may be difficult for banks with lower earnings. Having an additional capital cushion may allow banks to absorb the potential losses and retain stability during stressful times. There are several factors that make the bank capital level is critical in the banking sector. The next subsection delves deeper into the importance of maintaining an adequate bank capital level in banking institutions.

1.2.1 Overview of Banking Institutions

A bank is a business entity that provides financial services such as vehicle, housing, and business financing by acting as an intermediary between savers and borrowers. In layman's terms, a bank is understood to be an institution that executes basic financial services such as receiving deposits and giving loans (Basel Committee on Banking Supervision, 2015). Moreover, a bank also undertakes additional duties such as safeguarding the funds of depositors, offering investment products, and providing fee-based services. This indicates that on a daily basis, banks deal mostly with people. Therefore, it is critical for banks to win the trust and confidence of the public.

Understanding the importance of holding an adequate level of capital is a crucial aspect of banking stability. Being in a strong capital position indicates that a banking institution is better equipped to weather any unexpected losses from credit defaults and

other risks (Siddika & Haron, 2020). Furthermore, a strong bank capital level helps boost public confidence in banking institutions and the broader banking system. However, the economy may significantly influence the capital level of a bank, and this cannot be ignored. When the economy is weak, banks may suffer losses on loans and investments, resulting in the reduction of capital bases. With a higher capital base, banks can confidently provide loans, stimulate economic growth, and support investment activities. This is because by maintaining an adequate capital level, banks can extend credit to businesses and individuals while still remaining solvent (Bank for International Settlements, 2019).

Within the commercial banking sector, two types of banking institutions coexist in the global financial system namely conventional banks and Islamic banks. The former is centuries old and was established on capitalist ideas. These banks conduct business by charging interest, which is forbidden under Islamic law. Conventional banks are more prone to risk transfer, which results in a lender and borrower relationship between the banks and their depositors. Islamic banking, on the other hand, is an alternative to conventional banking in which the bank conducts business without any interest charges. A principal and agent relationship exists between Islamic banks and the customers when entering into a contract. The terms “lending” and “financing” are used interchangeably from this point onward to depict the lending activities of both types of banks.

Nevertheless, Islamic banks and conventional banks operate and compete in the same market setting with the same rules and regulations. This leads to the possibility of Islamic banks behaving in a similar way to conventional banks (Khediri et al., 2015). This applies especially in countries where both types of banks are operating alongside each other, such as Malaysia, Pakistan, Kuwait, Bahrain, and Jordan. Furthermore, the capital level of banks could be affected differently in different countries, given their different economic environments and banking systems (Zhu & Chen, 2016). Henceforth, the dissimilarities between the banking systems in High-Income and Middle-Income countries are discussed in the next subsection.

1.2.2 Banking System in High-Income Versus Middle-Income (HIMI) Countries

The current study categorizes High-Income and Middle-Income countries following the income-level country classification employed by the World Bank Group.

The World Bank Group categorizes countries into four groups: High-Income (HI), Upper Middle-Income (UMI) countries, Lower Middle-Income (LMI), and Low-Income (LI) countries. HI countries are those with a Gross National Income (GNI) per capita of more than $13,935. UMI countries are those with a GNI per capita from $4,496 to $13,935, whereas LMI countries have a GNI per capita from $1,136 to $4,495. A country with a GNI per capita below $1,136 is considered LI. Table 1.1 shows the income group classification based on Gross National Income (GNI) per capita. However, the study focuses only on High-Income and Middle-Income countries to ensure data comparability. Low-Income countries are excluded due to their structural and institutional disparities such as weaker regulatory framework and underdeveloped capital market which could compromise the robustness and reliability of the analysis. Empirical evidence consistently shows that Low-Income countries face significant challenges meeting Basel III standards, largely due to limited market depth, weaker regulatory capacity, and liquidity constraints (Basel Committee on Banking Supervision, 2022; Beck & Rojas-Suarez, 2019). As a result, their capital level tends to be less stable than those of High-Income and Middle-Income countries, making it incomparable for comparative analysis.

Table 1.1
Income Group Classification based on Gross National Income (GNI) per capita (USD)

Income Group	**GNI per capita (USD)**
High-Income Countries	>13,935
Upper Middle-Income Countries	4,496 – 13,935
Lower Middle-Income Countries	1,136 – 4,495
Lower-Income Countries	<1,136

Source: The World Bank Group

High-Income countries are generally more economically stable than Middle-Income countries due to their advanced technology, political stability, and well-developed financial systems. As highlighted by Nasim et al. (2024), banks in High-Income countries tend to operate more efficiently because of the stable monetary conditions and advanced financial infrastructure. In contrast, Middle-Income countries often struggle with weaker financial systems, slower technological progress, and political instability, which make them more vulnerable to economic fluctuations. Challenges such as corruption, a lack of transparency, and inadequate regulatory frameworks further hinder the effectiveness and efficiency of their banking systems (Mili et al., 2017; World Bank Group, 2020). This proves that the economic and

business environments of High-Income countries differ significantly from those of Middle-Income countries, as revealed by (Hunjra et al., 2020).

Mutarindwa et al. (2021) emphasize that effective governance and good institutional frameworks significantly promote the stability of a banking system. Similarly, Nakhli et al. (2020) show that strong regulatory settings promote economic activity by lowering uncertainty and transaction costs while boosting productivity growth, investment activities, trade, and real income. This is because most crises episodes have been linked to weak or insufficient regulatory and supervisory frameworks, which play a major role in triggering financial instability. Ullah et al. (2024) reveal that GDP growth and regulatory quality positively influence the financial stability of banks in High-Income countries, whereas inflation, government effectiveness, and control of corruption were found to negatively affect the financial stability of banks in Middle-Income countries. Alraheb et al. (2019) provide evidence from the Middle East and North African (MENA) region demonstrating that banks are safer in countries with better regulatory environments as these banks hold higher capital ratios relative to banks in countries with less developed regulatory frameworks. An empirical study by Ullah et al. (2022) also shows that stronger regulatory governance enhances financial stability, with countries having robust regulatory institutions exhibiting higher bank capital ratios and lower risk exposure. In addition, this study focuses only on High-Income and Middle-Income (HIMI) countries where a dual banking system exists, meaning Islamic banks operate alongside conventional banks. International Monetary Fund (2019) defines a dual banking system as the coexistence of Islamic and conventional banks under separate regulatory frameworks. This study considers only fully fledged Islamic banks and Islamic subsidiaries, resulting in 23 HIMI countries classified as having a dual banking system. Table 1.2 lists the regulation systems used in HIMI countries for Islamic and conventional banks.

Table 1.2
Regulation of Islamic and Conventional Banks in HIMI Countries

No.	Countries	Islamic Banks Regulation	Conventional Banks Regulation
High-Income Countries			
1.	Bahrain	Central Bank of Bahrain Rulebook –Volume 2: Islamic Banks	The Central Bank of Bahrain and Financial Institutions Law 2006
2.	Brunei	Islamic Banking Order 2008	Banking Order 2006
3.	Kuwait	Law No. 30 of 2003	Law No. 32 of 1968
4.	Oman	Islamic Banking Regulatory Framework (IBRF) 2012	Banking Law – Royal Decree No. 114/2000
5.	Qatar	Same Law and Qatar Central Banks directives specific to Islamic Finance	Qatar Central Bank (QCB) Law No. 13 of 2012
6.	Saudi Arabia	Banking Control Law and Shariah Governance Framework issued by Saudi Central Bank	Banking Control Law (1966, amended)
7.	United Arab Emirates	Federal Law No. 6 of 1985 with additional Shariah governance requirements and oversight by the Higher Shariah Authority	Federal Law No. 14 of 2018
Upper Middle-Income Countries			
8.	Indonesia	Law No. 21 of 2008 on Sharia Banking	Law No. 7 of 1992 on Banking (amended by Law No. 10 of 1998)
9.	Kazakhstan	Law on Banks and Banking Activities (2009, amended) to accommodate Islamic Finance	Law on Banks and Banking Activities
10.	Malaysia	Islamic Financial Services Act (IFSA) 2013	Financial Services Act (FSA) 2013
11.	Maldives	Islamic Banking Regulations 2011	Maldives Banking Act 2010
Lower Middle-Income Countries			
12.	Bangladesh	Islamic Bank Companies Act (Draft proposed in 2024)	Bank Companies Act 1991, amended in 2013
13.	Jordan	Islamic Banking Law No. 30 of 1985	Central Bank of Jordan Banking Law No. 28 of 2000
14.	Lebanon	Islamic Banking Law-Law No. 575 of 2004	Code of Money and credit (1963) by Banque du Liban
15.	Nigeria	CBN and BOFIA Act with special guidelines for Islamic Banks	Central Bank of Nigeria Act (CBN) 2007 and Bank and other Financial Institutions Act (BOFIA) 2020
16.	Pakistan	Shariah Governance Framework (2018, revised 2022)	Banking Companies Ordinance, 1962
17.	Palestine	PMA Law (1997) with Islamic Finance provisions	Palestine Monetary Authority (PMA) Law (1997)
18.	Philippines	Republic Act No. 1149 (Islamic Banking Act of 2019)	General Banking Law of 2000
19.	Senegal	Banking Law 2008 and Central Bank of West African States regulations for Islamic Finance	Banking Law 2008 and Central Bank of West African States regulations
20.	Sri Lanka	Banking Act No. 2 of 1988 (2005, amended)	Banking Act No. 30 of 1988
21.	Tajikistan	Law on Islamic Banking Activity (enacted in 2014)	General Banking Law
22.	Tunisia	General Banking Law and Credit Institutions Law (2016, amended) with specific provisions for Islamic Finance	General Banking Law and Credit Institutions Law
23.	Zambia	Governed under BFSA with additional guidelines issued by the Bank of Zambia	Banking and Financial Services Act (BFSA), revised in 2017

Source: Official website of each country.

As illustrated in Table 1.2 above, countries across different income levels have adopted separate regulations to govern Islamic and conventional banks, even when both types operate in the same market settings. For instance, Brunei, a High-Income country, established an Islamic Banking Order in 2008 specifically to regulate Islamic banks, while conventional banks are governed under the Banking Order of 2006. Similarly, Qatar, a Gulf Cooperation country with a mature financial sector, has taken a firm stance by requiring conventional banks to close their Islamic banking windows in 2011 (Qatar Central Bank, 2011) while allowing only fully fledged Islamic banks to operate. As a result, Islamic banks in the country are regulated under Qatar Central Bank (QCB) Law No. 13 of 2012, in addition to specific QCB directives on Islamic Finance.

Malaysia, an example of an upper Middle-Income country, has institutionalized a dual banking system supported by the Islamic Financial Services Act 2013 for Islamic banks, while conventional banks operate under the Financial Services Act 2013. Malaysia has also invested heavily to become a global financial hub by developing the Islamic Interbank Money Market and Bursa Suq Al-Sila. These two platforms are tailored specifically to Islamic liquidity management to enable Islamic banks to conduct Shariah-compliant transactions efficiently while maintaining market liquidity (Abdullah, 2010). Meanwhile, in Bangladesh, to formalize the dual banking system, Bangladesh Bank has drafted the Islamic Bank Companies Act 2024 to create a level playing field between Islamic and conventional banks (Hasan, 2024).

These dual regulatory frameworks across different geographical regions highlight a global recognition of the unique operational and ethical principles that underpin Islamic banking. These frameworks help facilitate Islamic banks competing in the same market settings as traditional conventional banks. However, countries are growing increasingly intertwined, as demonstrated by the recent shutdown of two large financial institutions in the United States, Silicon Valley Bank and Signature Bank in 2023, later bringing about the collapse of another three banks. Each country displays singularity in terms of its economic activities and the structure of its financial sector (Noreen et al., 2016; Turguttopbas, 2018). Nevertheless, Younsi and Nafla (2019) argue that there is no such thing as a country being an ‘island’ in terms of economic and financial stability. Issues arising in the banking sector can ripple across various areas and influence other countries. This is because the negative impacts of banking failure are interconnected, meaning the failure of one bank can trigger a chain reaction

affecting other financial institutions and, consequently, the broader economic system. The repercussions may include disruptions to financial markets, a loss of confidence among investors, and a decline in overall economic stability. Ensuring economic and financial stability has become a shared concern and a pressing issue on both a national and a global level.

Thus, a strong capital level enables banks to manage risk in a very effective and efficient manner. A higher bank capital level indicates a larger capital buffer, allowing banks to absorb any unexpected losses (Abad & Pascual, 2022). Banks with higher capital are considered more secure and unlikely to fail, whereas those with lower capital are seen as risky and more prone to fail (Sivec & Volk, 2023). By maintaining a high capital level, banks have sufficient capital to act as a buffer against any potential losses. Concurrently, this helps sustain the confidence of depositors and investors, as well as promote overall banking stability. Indirectly, this encourages banks to adopt a prudent approach when executing financing or investment activities so that the institution avoids potential failures.

Therefore, recognizing the distinctions between the banking systems of High-Income and Middle-Income (HIMI) countries is necessary to promote banking safety and soundness in order to limit bank collapses and the panic these might cause. Indeed, a well-functioning and efficient banking system positively contributes to financial stability and economic growth. Nonetheless, the bank capital level can exhibit both procyclicality and countercyclicality behavior during different economic stages (Adesina & Mwamba, 2018; Saadaoui & Hamza, 2020). During economic upturns, as customer default rates improve, potentially excessive risk-taking by banks may occur, leading to a decrease in the capital level. On the other hand, during economic downturns, an elevated rise in the credit risk compels banks to raise the capital level. This is to absorb the deterioration of credit quality, prompting banks to engage in reduced financing activities. This method may exacerbate the effects of an economic downturn. Empirical evidence shows that bank credit ratings decline and default rates fluctuate significantly during economic expansions and downturns (Athanasoglou et al., 2014; García-Suaza et al., 2012). The terms procyclicality and countercyclicality are extensively discussed in the next subsection.

1.2.3 Procyclicality and Countercyclicality Behavior of Capital Adequacy Ratio

Procyclicality and countercyclicality refer to a mechanism that banks may opt to follow during good or bad economic growth. Procyclicality behavior is one of the most frequently used mechanisms that banks practice in both types of economic conditions. A procyclicality behavior is where the relationship between the economy and the capital level is negatively related, while a countercyclicality behavior is where the economy is positively influencing the capital level. Grosse and Schumann (2014) explain procyclicality behavior as banks decreasing the capital level during upturns and increasing the capital level during economic downturns. Akinsola and Ikhide (2018), on the other hand, assert that procyclicality behavior occurs when banks extend loans by reducing the capital level to take advantage of business opportunities. Banks then increase the capital level when the economy is performing badly by cutting back on loans. Basically, this indicates that the risk appetite of banks grows during healthy economic periods, with the banks inclined to finance more money due to the lower risks. However, when the economy shifts and recession occurs, non-performing loans begin to skyrocket, prompting banks to adopt more cautious financing activities to reduce the risk level. Athanasoglou et al. (2014) claim that the procyclicality of the capital adequacy ratio has led banks to exacerbate the impact of changes in economic activity rather than mitigate the impacts. Subsequently, this could influence financial stability and economic development.

Several studies in the literature relate the procyclicality behavior of banks to a backward-looking attitude (Beyle de Araújo et al., 2018). The latter involves banks practicing loan loss provisions based on current losses. According to Chan-Lau (2012), reduced loan loss provisioning is used by banks in favorable economic conditions due to the lower potential for credit risk. However, during times of financial stress, high loan loss provisioning is required by banks to absorb the high potential credit losses. Consequently, the lenient financing standards followed by banks with reduced loan loss provisioning during boom periods prevent the banks from being able to handle a sharp rise in risk when recession occurs. This is because the capital buffer that functions to absorb unexpected losses is insufficient as the bank capital erodes when banks increase the credit supply to the market during good times. Hence, during a recession, banks tend

to react by cutting financing due to the pressure of needing to meet the minimum regulatory capital requirement to avoid a capital crunch.

Unexpected bank losses should be covered by bank capital (Basel Committee on Banking Supervision, 1988), whereas forecasted losses should be covered by loan loss provisions. Given this, when banks extend credit, loan loss provisions ought to rise accordingly. Therefore, banks may absorb the risk without eroding the capital cushion and remain viable when the credit loss unexpectedly materializes under weak market conditions. Despite this, banks consistently change the financing standards from rigorous to flexible across different phases of the economy (Andersen, 2011; Bushman & Williams, 2012). Consequently, this has a significant impact on all aspects of economic activity, further exacerbating slow economic growth rather than helping to improve the economy. Soedarmono et al. (2017) regard a procyclicality behavior of the capital level as a main factor contributing to the systemic instability of banks, which renders these organizations vulnerable to financial crises.

In contrast, in terms of countercyclicality behavior, banks accumulate capital buffers during upturns that are to be consumed during downturns, when losses are highly likely. This leads to a positive relationship between the economy and the capital level. Moreover, the injection of additional capital is cheaper during good economic conditions compared to times when the economy is in a recession, when banks consider the cost of raising new equity to be expensive. This countercyclicality behavior is considered forward-looking, meaning that banks building up capital buffers during favorable economic conditions can anticipate future losses. As a result, banks that adopt countercyclicality behavior can easily provide financing during a recession, without breaching the minimum statutory capital requirement. This also helps relieve the procyclicality impact on the economy.

A countercyclicality behavior of the capital level is found in the African banking system. The positive movement of the capital level in African banks during expansionary periods is due to a reliance on profits to build capital (Adesina & Mwamba, 2018). Other studies also discover a countercyclicality behavior of the capital level in several countries, such as Germany, Brazil, India, and Hong Kong (Fonseca & González, 2010; Moudud-Ul-Huq, 2019; Stolz & Wedow, 2011). In contrast, in the context of the Turkish banking sector, Aysan and Ozturk (2018) provide evidence that the capital level of Islamic banks behaves in a procyclical manner with the economy.

This is because these banks strive to uphold their market position while competing with conventional banks. Similarly, Malaysian Islamic banks also portray a procyclicality behavior with the economy as Islamic banks in the country try to compete and grow within a dual banking system (Ibrahim, 2016).

This highlights the need for well-informed policy decision making to strengthen the banking systems in HIMI countries. The interdependence of today's banking systems underscores the importance of implementing strong regulatory measures, specifically regarding bank capital level. These measures are important tools for mitigating the consequences of bank failure and guaranteeing the soundness of the banking sector. Understanding the bank capital level helps prevent bank failure and increase long-term bank stability, whether in High-Income or Middle-Income countries. Bank capital regulation is discussed in the next subsection.

1.2.4 Bank Capital Regulation

Bank regulation is a type of government ruling that imposes obligations, restrictions, and guidelines on banks. This regulatory structure, among others, fosters transparency between banking institutions and individuals, as well as in firms with which banks do business. Every central bank in a host country has the power to develop strong bank regulation. Central banks are responsible for monitoring and supervising banks so that banks act prudently, as the national and global economies depend on the conditions of banking institutions. Hence, bank capital regulation has become one of the main tools of contemporary banking regulation. The goal is to ensure that banks have adequate capital level in adverse economic conditions and to create a mechanism to deter banks from taking excessive risks that may affect their stability. The capital adequacy ratio is one of the primary metrics that regulators use to evaluate the financial soundness of a banking institution. Therefore, central banks need to keep control over banking institutions by standardizing the procedures.

Thus, efforts are being made by the Basel Committee on Banking Supervision (BCBS) to establish common standards for bank capital level, with the Basel Regulations introduced to address this challenge. As a result, the Basel Committee on Banking Supervision (1988) has set a minimum capital adequacy ratio of 8 percent to ensure the stability and soundness of the global banking system. The 8 percent

requirement is designed to safeguard depositors' funds by guaranteeing that banks have sufficient capital available to absorb losses and continue operating, even in challenging economic conditions. Simultaneously, this helps increase the confidence of depositors and the overall financial stability. However, achieving international harmonization of the capital adequacy ratio is a significant challenge, partly due to the different regulatory frameworks used in various countries, which stem from their distinct economic and business environments, as discussed previously. Consequently, High-Income and Middle-Income (HIMI) countries have varying bank capital level. Table 1.3 presents the capital adequacy ratio of the banking sectors in the selected HIMI countries for 2023 and 2024.

Table 1.3
Capital Adequacy Ratio of the Banking Sectors in HIMI countries for 2023 and 2024

No.	Countries	2023	2024
High-Income Countries			
1.	Bahrain	19.7%	21.2%
2.	Brunei	19.5%	19.6%
3.	Kuwait	19.9%	19.4%
4.	Oman	19.0%	N/A
5.	Qatar	19.2%	19.6%
6.	Saudi Arabia	20.1%	19.6%
7.	United Arab Emirates	17.9%	17.8%
Upper Middle-Income Countries			
8.	Indonesia	27.69%	26.69%
9.	Kazakhstan	19.2%	N/A
10.	Malaysia	19.0%	18.3%
11.	Maldives	50.6%	54.0%
Lower Middle-Income Countries			
12.	Bangladesh	11.64%	3.08%
13.	Jordan	17.9%	18.0%
14.	Lebanon	N/A	N/A
15.	Nigeria	13.0%	12.5%
16.	Pakistan	19.7%	20.6%
17.	Palestine	16.2%	16.6%
18.	Philippines	16.4%	16.2%
19.	Senegal	13.6%	13.7%
20.	Sri Lanka	18.4%	18.0%
21.	Tajikistan	21.3%	21.8%
22.	Tunisia	14.2%	14.5%
23.	Zambia	23.5%	22.9%

Note: N/A refers to not available.
Source: Latest Islamic Financial Stability Report of each country.

Based on Table 1.3, the capital adequacy ratio of the banking sector in each of these High-Income and Middle-Income countries differs between the two country groups. The capital adequacy ratio is strong in High-Income countries relative to Middle-Income countries (upper and lower), reflecting the high banking stability and resilience against crises. Banks in both High-Income and Middle-Income countries can

maintain their capital level well above the minimum capital requirement mandated by the respective central banks. Despite this, the minimum capital adequacy ratio set by the central bank of each HIMI country differs. For instance, Bangladesh mandates banks to consistently uphold a minimum capital to risk-weighted assets ratio of at least 10 percent (*Central Bank of Bangladesh*, 2024). In contrast, Malaysia has set this ratio far lower, at 8 percent, which banks must consistently uphold (*Bank Negara Malaysia*, 2024). This lack of harmonization can create inconsistencies and impede banking stability across HIMI countries. The next subsection provides an extensive discussion on the Basel Regulations, highlighting the ongoing efforts of the BCBS to preserve the stability of the global banking sector.

1.2.4.1 Basel Regulations

The Basel Regulations are guidelines and recommendations on banking and financial regulations published by the Basel Committee on Banking Supervision (BCBS). The BCBS serves as a leading global authority in setting standards for the prudential regulation of banks by providing a platform for cooperation on banking supervisory issues. The BCBS was officially founded in 1974 with the primary goal of strengthening global banking regulation, supervision, and practices to improve financial resilience. The initial members were the central bank governors of the Group of Ten (G10) but the Committee has now expanded to include 45 organisations from 28 jurisdictions. The Basel Regulations developed by the BCBS to regulate capital adequacy ratios are widely adopted by most countries. Bank capital is improved through the Basel Regulations by catering to credit risk in Basel I, focusing on market risk and operational risk in Basel II, and lastly focusing on liquidity risk in Basel III (Tahtamouni & Qaisi, 2016).

The first international standards on capital regulation, known as Basel I, were released in 1988. According to the Basel Committee on Banking Supervision (1988), the main idea behind Basel I is to set a minimum capital adequacy ratio to which banks must adhere, resulting in the 8 percent capital adequacy requirement. The required 8 percent capital must be comprised of Tier 1 and Tier 2 capital. Basel I mandates banks to hold at least 4 percent of Tier 1 capital in the form of common shares and retained earnings. Meanwhile, another 4 percent should come from Tier 2 capital, which includes

supplementary capital or other capital that does not fit within Tier 1 capital. The capital adequacy ratio is calculated using capital as the numerator divided by risk-weighted assets (RWAs) as the denominator. However, there are problems with how risk-weighted assets are calculated, so the BCBS provides banks with a consistent technique for computing RWAs. This is to consider the various degrees of risk level associated with different assets. Therefore, the categorization of assets is introduced, which can be divided into five categories (0 percent, 10 percent, 20 percent, 50 percent, and 100 percent) according to the credit risk weightings.

Basel I has been criticized by bankers as a standard that only caters to credit risk issues but neglects market risk, operational risk, and other possible risks that banks consider major threats that could indirectly influence their stability. As a result, the Basel Committee on Banking Supervision (2004) proposed three pillars under the Basel II Regulation, in 2004, with the goal of making the capital level of banks more risk-sensitive. However, this could trigger procyclicality behavior among banks. The first pillar is the minimum capital adequacy requirements. The revision of these minimum requirements in Basel II is intended to address credit risk, market risk, and operational risk. The 8 percent minimum statutory requirement is maintained, as per Basel I. Despite this, banks are given the choice about which approach to apply when calculating risk exposure. The first approach is the standardized formula of measuring the bank's credit risk level based on the five categories of asset classes provided in the Basel I Regulation. The second approach is the internal ratings-based (IRB) approach. This allows a bank to use internal rating models to assess the credit risk level. This means that instead of using a standardized risk weighting, banks are allowed to tailor their risk assessment and capital requirements based on their specific portfolio and risk profile. This may lead to more efficient capital allocation and better risk management, with banks able to align the capital level with the actual risk.

Following that is pillar two, the supervisory review process. This is designed to assess in detail and comprehensively the activities of banks and the bank capital level to prevent any operational risk. Four fundamental keys are highlighted in the supervisory review process. Firstly, banks are required to evaluate the overall capital level relative to the bank risk profile and strategy in order to maintain the bank capital. Secondly, regulators are responsible for evaluating and reviewing the process of assessment mode conducted by the bank, as well as the strategies adopted. Thirdly,

regulators must ensure that banks comply with the minimum regulatory capital ratio and have the capacity to hold capital above the required minimum capital requirements. Finally, regulators should intervene whenever necessary to prevent the capital from dropping below the minimum level required. They should undertake a quick remedial response should the capital fail to increase, or the banks fail to maintain it at the minimum of 8 percent.

The third pillar is market discipline, whereby banks are required to be transparent to the public and investors in terms of risk profiles and capital adequacy. This is intended to ensure that banks always act prudently when undertaking business activities. The components about which banks need to be transparent are the Tier 1 capital, total capital ratio, and total required capital ratio on a quarterly basis. Unfortunately, the Global Financial Crisis from 2007 to 2009 demonstrated that the Basel I and Basel II Regulations still could not protect the financial sector from the effects of the crisis. For instance, Lehman Brothers went bankrupt in 2008 due to lenient financing without maintaining adequate capital (*Lehman Brothers Annual Report*, 2007). Therefore, additional improvements were required to the Basel II Regulation to prevent another crisis. This resulted in a review of Basel II by the Basel Committee on Banking Supervision (2010a) and the enforcement of the Basel III Regulation in November 2010.

The focal point of the Basel III Regulation is to cater to three critical areas of the banking sector: capital adequacy, liquidity, and systemic risk. First, in terms of capital adequacy, the objective is to boost the capital level of banks while simultaneously increasing the quality of this capital. The minimum risk-based capital ratio remains 8 percent of risk-weighted assets (RWAs), comprised of at least 6 percent Tier 1 capital of which 4.5 percent must be common equity tier 1 (CET1) and 1.5 percent of additional equity. The other 2 percent of Tier 2 capital could come from other capital, as specified under the Tier 2 category, which is meant to provide ongoing loss absorption. In addition to this 8 percent minimum, Basel III introduced a 2.5 percent capital conservation buffer to be met entirely with CET1, making the total minimum capital requirement equal to 10.5 percent in normal times. The minimum 8 percent is not replaced rather it is enhanced through higher CET1 quality and the additional buffer. Moreover, the regulators may activate a countercyclical capital buffer (CCyB) (from 0 percent to 2.5 percent of RWAs in CET1) in times of high growth, which functions as

an absorption of any possible losses due to the increased credit growth during upturns that could create a credit bubble. The Basel Committee on Banking Supervision (2010b) asserts that the role of the countercyclical capital buffer is to provide banks with an additional cushion to safeguard against any potential credit losses when excess credit growth is deemed to be exacerbating the economic activity. These countercyclical capital buffers can also be consumed during downturns when losses materialize, so that banks can provide financing easily without fear of breaching the mandated regulatory capital requirements. Equally, the countercyclical capital buffer is intended to increase a bank's ability to absorb loss, especially when the economy weakens. The higher the capital level, the stronger the bank and, consequently, the higher public confidence gets.

Second, in terms of liquidity in banking institutions, the Basel III Regulation proposes new two liquidity standards: the liquidity coverage ratio (LCR) and the net stable funding ratio (NSFR). The LCR ensures that banks hold high-quality liquid assets to withstand any financial shocks so they can meet their overall net cash outflows over a 30-day period. In essence, Basel III mandates banks to act as if experiencing a 30-day crisis, and banks must maintain a minimum level of quickly accessible liquid assets to offset the cash outflow (Bank for International Settlements, 2018a). On the other hand, the NSFR seeks to promote long-term bank resilience by ensuring that bank activities are funded through stable sources of financing (Bank for International Settlements, 2018b). According to Wandhöfer (2014), the NSFR is a requirement created to reduce the financing risk that banks may face as a result of asset and liability maturity mismatches.

Thirdly, to address the systemic risk issue in banking institutions, a leverage ratio is made compulsory for banks to maintain. This ratio is calculated using Tier 1 capital over total exposure, and it must be more than 3 percent. The function of this ratio is to prevent excessive on- and off-balance sheet leverage in the banking sector. A higher leverage ratio must be maintained, especially by systematically important financial institutions.

Overall, all the High-Income countries have implemented the Basel III Regulation, while most of the Middle-Income countries have implemented Basel III. The exceptions are Maldives, Jordan, and Nigeria, which still implement Basel II. Table 1.4 summarizes the current Basel Regulations implemented in High-Income and

Middle-Income countries, as well as the minimum capital ratio set by the respective central banks.

Table 1.4
Basel Regulations Adoption in High-Income and Middle-Income Countries with the Minimum Capital set by the Central Banks

	List of Countries	Basel I	Basel II	Basel III	Minimum Capital Ratio (%)
High-Income Countries	Bahrain			✓	12
	Brunei			✓	10
	Kuwait			✓	13
	Oman			✓	13.5
	Qatar			✓	10
	Saudi Arabia			✓	12.5
	United Arab Emirates			✓	13
Upper Middle-Income Countries	Indonesia			✓	24
	Kazakhstan			✓	8
	Malaysia			✓	8
	Maldives		✓		12
Lower Middle-Income Countries	Bangladesh			✓	10
	Jordan		✓		12
	Lebanon			✓	N/A
	Nigeria		✓		10
	Pakistan			✓	11.5
	Palestine			✓	10.5
	Philippines			✓	10
	Senegal			✓	11.5
	Sri Lanka			✓	12.5
	Tajikistan		✓		12
	Tunisia		✓		8
	Zambia			✓	10

Note: N/A refers to not available. The minimum capital ratio is set by the central bank of each country.
Sources: Basel Committee on Banking Supervision (BCBS) and Islamic Financial Services Board (IFSB).

1.2.4.2 Islamic Financial Services Board-2 (IFSB-2)

Despite the worldwide adoption of the Basel Regulations, they did not meet the structures and characteristics of Islamic financial institutions that offer Shariah-compliant products and services. This is because the risk profiles of Islamic banks may differ due to the different business models and corporate governance of these banks. In this sense, a new capital adequacy framework introduced by the Islamic Financial Services Board (IFSB) caters for the capital adequacy framework of Islamic banks, particularly appropriate capital allocation. The IFSB is an international standards organization that develops global standards and guidelines for the Islamic financial services industry so that it remains stable and sound in the long run (Islamic Finance

Services Board, 2025). Hence, in light of the Basel Regulations, the IFSB released a new version of the capital adequacy regulation, known as IFSB-2, in 2005. The Islamic Financial Services Board (2005) addressed the capital adequacy ratio in IFSB-2 in order to meet the unique features of institutions that offer Islamic financial products and services. Several improvements were made to the allocation of capital adequacy ratios for these financial institutions. Eight percent regulatory capital must still be maintained by all Islamic financial institutions. Like the Basel Regulations, IFSB-2 mandated that the 8 percent required capital needs to comprise 6 percent of Tier 1 capital and 2 percent of Tier 2 capital. Within the Tier 1 capital, 4.5 percent must come from common equity and 1.5 percent must come from additional capital. Tier 2 capital, on the other hand, must comprise any Shariah-compliant instruments and other reserves within the Tier 2 specifications. Tier 1 capital functions to absorb losses when banks are solvent, while Tier 2 capital protects depositors and creditors when banks are less solvent. The only difference between IFSB-2 and the Basel Regulations is that IFSB-2 clearly states that the Profit-Sharing Investment Account (PSIA) must be included in the denominator calculation for total risk-weighted assets when measured for the capital adequacy ratio of an Islamic financial institution.

1.3 Problem Statement

The core element of banking institutions that helps banks survive not only during normal times but even in times of crises is capital regulation. Adequate capital ensures that banks can continue operating by absorbing financial shocks. This is evident in the collapse of Lehman Brothers in 2008, which illustrates the consequences of inadequate capital. Before its bankruptcy, Lehman Brothers, a leading US investment bank, had $639 billion in assets and $613 billion in debts, reflecting high leverage and low capital (*Lehman Brothers Annual Report*, 2007; Wiggins et al., 2019). As a result, Lehman Brothers had insufficient capital to absorb the massive losses incurred from their investment in mortgage-backed securities and collateralized debt obligations, which were tied to the subprime mortgage crisis in 2007. The collapse of Lehman Brothers highlights the dangers of excessive leverage and an inadequate capital level in financial institutions. It underscores the need for stricter regulatory oversight and higher capital requirements to ensure that banks can withstand unexpected financial shocks

and protect the broader financial system from systemic risks. Correspondingly, the Basel Regulations, particularly Basel II, were revised to ensure more enhanced and high-quality bank capital would be maintained by banks, leading to the introduction of Basel III in November 2010. Although bank failures are rarely seen today, there are still documented cases of such failures. For example, in 2023, five bank failures were reported by the Federal Deposit Insurance Corporation (FDIC). The failure of these five banks started with the collapse of two large financial institutions in the United States, the Silicon Valley Bank (Santa Clara) on March 10 and Signature Bank (New York) on March 12 (Federal Deposit Insurance Corporation, 2023). According to Board of Governors of the Federal Reserve System (2023), Silicon Valley Bank (SVB) faced a massive loss of $42 billion in deposits in one day after the parent company announcing major losses and a capital raise. This announcement frightened customers, leading to another $100 billion in withdrawal requests for the following day, which is far more than the bank could cover. Unable to meet these unexpected withdrawal demands, regulators closed the bank on March 10, 2023. Likewise, despite of strong capital position, Signature Bank collapsed after a sudden run on uninsured deposits, combined with interest-rate losses and poor risk controls, leaving the bank unable to meet withdrawals and forced regulators to close it. Subsequently, these collapses led to the failures of three more banks: First Republic Bank (San Francisco), Heartland Tri-State Bank (Elkhart), and Citizens Bank of Sac City (Sac City). In 2024, only one bank failure had been documented by late April, that of Republic First Bank (Philadelphia) (Benninger & Aldrich, 2024). Therefore, banks need to ensure adequate capital level is maintain always to absorb unexpected future losses that may lead to bank failure (Cardot-Martin et al., 2021; Korbi & Bougatef, 2017).

In certain countries, regulators may relax or tighten the capital adequacy ratio of banks depending on the economic situation. This is to ensure a continuous flow of money in the market and keep the economy sustainable. For instance, in 2020, the Central Bank of Oman loosened the capital adequacy ratio requirement from 13.5 percent to 12.25 percent due to the COVID-19 pandemic (KPMG, 2021). Meanwhile, in 2023, the European Central Bank tightened the capital requirement ratios of all European Union countries, with a slight increase of the minimum capital requirement to 15.5 percent, up from 15.1 percent in 2022 (European Central Bank, 2023). The call for tight monetary policy was due to Russia's war against Ukraine and conflict in the

Middle East, which had caused the Euro to drop in value, leading to high inflation in the eurozone. However, Nguyen et al. (2019) question whether banks minimize risk and boost the capital buffer in response to stricter capital regulation. The capital buffer refers to the amount of reserve that banks set aside as a cushion against unforeseen calamities that may threaten banking stability. During economic booms, a decrease in the capital level of banks is expected as banks are motivated to provide more financing due to the improved borrower credit rating. For example, in 2022, as the economy recovered from the impact of the COVID-19 pandemic, a reduction in the capital buffer of banks in Jordan was reported. The capital adequacy ratio of Jordan banks dropped from 18.0 percent in 2021 to 17.3 percent in 2022 (Central Bank of Jordan, 2022). However, studies also reveal the opposite occurs, whereby banks increase the capital buffer during economic booms in order for it to be consumed during economic downturns (Toh & Zhang, 2022; Torres-García et al., 2020). An example for this is the United Arab Emirates banks sustaining a high capital ratio of 17.4 percent in 2022, up from 17.1 percent in 2021 (Central Bank of the United Arab Emirates, 2022). During economic downturns, banks tend to increase the capital level to absorb unexpected loan losses. For instance, when the COVID-19 pandemic occurred in 2020, a high capital adequacy ratio was reportedly sustained by banks in Egypt. The capital ratio of Egyptian banks increased from 17.7 percent in 2019 to 20.1 percent in 2020 (Central Bank of Egypt, 2020). Meanwhile, banks in Bahrain reduced the capital ratios to 18.6 percent in 2020, down from 19.4 percent in 2019, despite the COVID-19 pandemic (Central Bank of Bahrain, 2020). This indicates that economic fluctuations may influence the capital level of banks (Berger & Demirgüç-Kunt, 2021; Nam et al., 2022). Consequently, stricter capital regulation can address this issue.

Indirectly, this underscores the importance for banks to maintain cost-effectiveness in their operations to maximize returns and increase or decrease the capital level. From a theoretical standpoint, risk absorption hypothesis posits that broader diversification lowers the bank's overall risk, thereby banks face reduced pressure to hold high capital reserves. However, empirical study by Adem (2023) reveals that increase in diversification may leads to high capital holding due to the strong cost management. This is true as Do Van (2021) proves that high efficient banks demonstrate better credit risk monitoring which resulted to good risk mitigation and strong profitability. Meanwhile, low efficient banks may struggle with the growing instability

risk arising from their poorer cost management, leading to reduce earnings (Majeed, 2021). This means that high efficient banks can leverage from diversification activities to build capital, while low efficient banks may face challenges in accumulating capital and may weaken their financial stability. This suggests the possibility that cost efficiency can interact in the relationship between bank diversification and bank capital level. Efficiency gains can strengthen the ability of diversified banks to operate with lower capital ratios, as streamlined operations reduce internal frictions and help sustain wider investment activities. In this sense, more efficient institutions are better positioned to support broader investment strategies without relying on large capital buffers. Additionally, highly diversified banks may realise cost savings from lower risk exposures, which can enhance their retained earnings and further ease pressure on capital requirements (Chazi et al., 2024). Hussien et al. (2019) argue that increased diversification may drive banks to raise capital buffers when higher returns come with additional risk, highlighting that the combined effects of efficiency and diversification can either enhance their capital or achieve capital savings.

In addition, previous findings reveal that Islamic banks demonstrate greater resilience in times of crises compared to conventional banks. This demonstrates that Islamic banks have good asset quality and stronger capitalization ratios in relation to conventional banks (Saeed et al., 2020). This is because Islamic banks need to operate under Shariah law; therefore, when facing a limited availability of Shariah-compliant liquidity instruments, Islamic banks maintain high capital instead. Consistently, a high capital ratio is maintained by Islamic banks compared to conventional banks (El-Ansary et al., 2019; Suripto et al., 2023). Yet Alandejani et al. (2017) find the opposite, whereby Islamic banks are more prone to risk than conventional banks, despite being highly capitalized. The authors assert that the profit and loss sharing contracts (PLS) practiced by Islamic banks carry greater risk and yield lower profits compared to debt-based contracts. This is because the risk associated with PLS contracts is shared between the bank and the customers, which can influence the risk-weighted assets used in the capital adequacy ratio calculation. As a result, debt-based financing is predominantly used by Islamic banks in reality because of the lower risk (Daher et al., 2015; Mahmood & Rahman, 2017). Hence, it is worth to compare the capital level of Islamic and conventional banks.

Moreover, the capital level of banks in High-Income and Middle-Income countries vary for several reasons, such as the regulatory framework, structure of the financial sector, and economic and business environments (Hunjra et al., 2020; Louhichi & Boujelbene, 2017; Turguttopbas, 2018). Evidently, lending and borrowing in the Middle East and North African region go smoothly and efficiently because people are more inclined to uphold financial obligations in countries with good regulatory environments (Alraheb et al., 2019). Therefore, higher capital ratios are documented as being maintained by banks in High-Income countries in 2022, such as Bahrain (19.5 percent) and Oman (19.7 percent), to absorb any unforeseen risks associated with excessive financing activities. In contrast, Middle-Income countries like Pakistan (17.0 percent) and Jordan (17.3 percent) held relatively lower capital ratios in 2022, partly because banks in Middle-Income countries are struggling to uphold adequate capital due to the difficulty of accessing to less developed capital markets (Bitar et al., 2018; Yin, 2021). This proves that banks in High-Income countries are highly capitalized compared to banks in Middle-Income countries.

The motivation behind this study is the need to investigate the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries. The study contributes by proposing cost efficiency as an interaction variable between bank diversification and capital level. Therefore, the study tries to discover how the relationships between bank diversification and the capital decision of banks are influenced by cost efficiency. This would benefit regulators by allowing improvements to existing bank capital policies in order to alleviate the repercussions of bank failures and maintain the resilience of the financial sector. This study is also significant for both Islamic and conventional banks in HIMI countries, which can strategize their capital level by leveraging diversification activities depending on their level of cost efficiency.

1.4 Research Objectives

The primary objective of this study is to investigate the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries. In detail, the research objectives are as follows:

i) To compare the determinants of the capital decision between Islamic and conventional banks.
ii) To examine if there is a significant difference in the capital level between bank specialization (Islamic and conventional banks) in High-Income and Middle-Income countries.
iii) To compare the determinants of the capital decision of banks between High-Income and Middle-Income countries.
iv) To examine if there is a significant difference in the capital level of banks between different country groups (High-Income and Middle-Income countries).
v) To investigate if there is a significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries.
vi) To analyze the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of Islamic and conventional banks.
vii) To analyze the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of banks in High-Income and Middle-Income countries.

1.5 Research Questions

The study seeks to address the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries. The specific research questions of this study are as follows:

i) How does the capital decision of Islamic and conventional banks differ in terms of the determinants?
ii) Is there any significant difference in the capital level between bank specialization (Islamic and conventional banks) in High-Income and Middle-Income countries?
iii) How does the capital decision of banks in High-Income and Middle-Income countries differ in terms of the determinants?
iv) Is there any significant difference in the capital level of banks between different country groups (High-Income and Middle-Income countries)?

v) Is there any significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries?
vi) How does the interaction effect of cost efficiency influence the relationship between bank diversification and the capital level of Islamic and conventional banks?
vii) How does the interaction effect of cost efficiency influence the relationship between bank diversification and the capital level of banks in High-Income and Middle-Income countries?

1.6 Purpose of the Study

This study is conducted to investigate the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries. This research is important because banks' capital level determine their ability to remain solvent and stable while performing their core functions of taking deposits and providing loans. Inadequate capital holding can lead to bank runs and systemic failures. Moreover, the failure of one bank, particularly bigger bank can cause a domino effect that would bring the failure of another banks. For that reason, it is important to investigate the capital decision of banks to ensure a well-functioning and sound banking system.

1.7 Scope of the Study

The scope of this study is to investigate the capital decision of Islamic and conventional banks in High-Income and Middle-Income (HIMI) countries. The study focuses exclusively on HIMI countries where Islamic and conventional banks coexist. Accordingly, the total number of countries with a dual banking system and a dual regulatory framework is 23. To ensure that the Islamic banks is considered systematically important in a particular country, the study includes only those country that have more than 15 percent market share of Islamic banking assets in its total domestic banking sector (Islamic Financial Services Board, 2025). This leave only 11 countries that fit the sampling criteria. Due to Islamic banking data unavailability in the Fitch Ratings PRO database, the study excludes Djibouti from the sample too. As a

result, the data sample of this study covers only 10 countries, comprising six High-Income and four Middle-Income countries. The study takes into account only commercial banks in the data sample that fit the definition of accepting deposits and granting financing to businesses and individuals (International Monetary Fund, 2019). The total number of observations utilized in this study is 2,072, which were collected annually from 1995 to 2024. The secondary data are primarily sourced from the Fitch Ratings PRO database and the International Monetary Fund.

1.8 Significance of the Study

The beneficiaries of this research study are policymakers, both Islamic and conventional banks, as well as researchers. This study would be of great interest to these parties in terms of the findings on bank capital regulation, which offer new knowledge and enable prompt corrective action by banks.

1.8.1 Significance for Policymakers

This study is significant to regulators revising policies related to the capital decision of banks in operating different economic environments and with different regulatory frameworks. Simultaneously, this policy development can specifically cater for the capital decision of Islamic banks operating in a unique banking framework, compared to conventional banks. These results can act as a benchmark and as guidelines for regulators in High-Income and Middle-Income countries, who can then address the potential drivers influencing the capital decision of both Islamic and conventional banks. The findings might also assist regulators in formulating comprehensive Shariah-compliant capital regulation guidelines for Islamic banks, while also being tailored to the diverse economic and business environments of different countries.

1.8.2 Significance for Banks

The study also assists Islamic and conventional banks in managing capital level effectively and efficiently. This is because both types of banks can anticipate factors that may negatively impact bank capital and take early precautions to manage and

control the problem. While the two types of banks operate differently, both can take the actions needed to avoid bankruptcy or liquidation. Indirectly, this helps both types of banks to continue operating for long periods while competing healthily in an intense market. The outcomes of this study enable Islamic and conventional banks to strategize and manage the capital level accordingly and in alignment with their specific operational and regulatory environments.

1.8.3 Significance for Researchers

This study also provides researchers with an important opportunity to gain a deeper understanding of the determinants of the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries, based on the interaction of cost efficiency on the relationship between bank diversification and the capital level. Researchers may gain important insights on new variables that may threaten the capital decision of these two types of banks in High-Income and Middle-Income countries.

1.9 Definition of Key Terms

This section lists key terms that may be unfamiliar to those reading the study. The inclusion of these definitions can help readers better understand the points delivered in the study. Table 1.5 provides the definitions of the key term.

Table 1.5
Definitions of Key Term

Key Term	Definition
Capital adequacy ratio (CAR)	The CAR is a metric used to assess the stability of a banking institution. The ratio is computed using total regulatory capital (Tier 1 and Tier 2) over total risk-weighted assets.
Capital level (CAP)	The capital level refers to the target capital ratio that is maintained by a bank.
Capital buffer	The capital buffer is a reserve that banks put aside for use should any unforeseen calamities occur. The buffer refers to the difference between the bank's targeted capital ratio and the minimum capital ratio set by the central bank.
Internal ratings-based (IRB) approach	The IRB approach is a bank's internal calculation to estimate the level of bank credit risk.
Liquidity coverage ratio (LCR)	The LCR ratio promotes a bank's resilience of viability in the short-term, specifically 30 days of stress.
Net stable funding ratio (NSFR)	The NSFR ratio ensures a bank's survivability in the long run by encouraging the use of stable funding sources for any bank activities.
Tier 1 capital	Tier 1 capital is going concern capital intended to ensure that the bank can still operate without putting the public funds at risk. Common equity Tier 1 and additional Tier 1 are the two components of Tier 1 capital.
Tier 2 capital	Tier 2 capital is gone concern capital intended to ensure banks can absorb losses while confronting financial distress. Tier 2 capital consists of supplementary capital that is not included in Tier 1 capital.

1.10 Summary

This chapter describes the function that the bank capital level plays in the banking sector. Then, the chapter gives an overview of banking institutions before embarking on detailed coverage of the key differences between the banking systems of two country groups: High-Income and Middle-Income countries. The procyclicality and

countercyclicality behaviors regarding capital adequacy ratios in different economic phases are also fully explained in this chapter to assist readers in understanding the study better. This chapter also emphasizes the regulatory framework for bank capital by providing an extensive discussion of the Basel regulations and Islamic Financial Services Board-2 (IFSB-2) standards. Following this are the research objectives and research questions of the study, which are structured in accordance with the research topic. A list of the definitions of key terms is also provided in Chapter 1 to assist readers in understanding the study better. In the remaining parts of this study, Chapter 2 presents a comprehensive discussion of the dependent, independent, and interaction variables, which are reviewed based on previous literature. Relevant theories related to the capital decision of banks are discussed in Chapter 2. The hypotheses development is also outlined in Chapter 2, grounded in an extensive review of prior literature. The measurement of each variable employed in this study is determined in Chapter 2, drawing upon established measurements identified in the literature. This is followed by Chapter 3, which fully explains the blueprint of the study; this consists of the research design, data collection process, and method identification. Chapter 3 also presents the established research framework and the relevant diagnostic test employed. Next, Chapter 4 thoroughly analyzes the statistical findings of the study, based on the testing and regression used. Chapter 5 explicitly discusses the findings by addressing each research objective outlined in Chapter 1. The findings are discussed via critical interpretation and supported by prior literature or statistical evidence. Finally, Chapter 6 lays out the limitations of the study and concludes with a summary of the findings. Several recommendations derived from these findings are provided to indicate policy implications and future research directions.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

Chapter 2 covers the definition of each explanatory variable and capital level, together with the proxies used to measure the variables. This chapter details the necessity for banks to maintain adequate capital level, highlighting the role of bank capital in preventing new episodes of banking crises. Based on prior literature, four relevant theories related to the capital decision of banks are discussed. These theories are the risk absorption hypothesis, trade-off theory, 'Too Big to Fail' theory, and signaling theory. Additionally, the relationship between the proposed explanatory variables and the capital level is discussed by synthesizing the findings from previous studies. The chapter also discusses cost efficiency as a possible interaction variable that may influence the direct relationship between bank diversification and the capital level. Lastly, a summary of this chapter is provided at the end.

2.2 The Significance of Having an Adequate Capital Level in Banking Institutions

Since the Global Financial Crisis hit financial institutions worldwide, regulators have taken major initiatives to ensure the long-term survival and stability of banks. Therefore, maintaining a higher or adequate bank capital level is necessary to ensure the soundness of banking institutions. A higher capital level implies that banks have a larger capital buffer, which increases the risk absorption capability, and vice versa. The bank capital level is considered one of the significant steps that is incorporated into and regulated in the banking sector. Thus, the bank capital level is one of the important elements used to assess the healthiness of a bank. Consequently, greater stress is placed by the central bank on the relevancy of the capital adequacy ratio (CAR) in banking institutions. The Basel Committee on Banking Supervision (2020) underscores two main objectives of the CAR: firstly, to ensure banks can sustain losses during difficult times without the capital level falling below the minimum, and secondly, to preserve

the flow of credit to the real economy, particularly during downturns, by providing financing to creditworthy borrowers.

The bank capital level is primarily measured using the equity to total asset ratio, according to most previous literature (Boukhatem & Djelassi, 2020; Bui et al., 2021; Novokmet, 2021). Some studies use total regulatory capital over risk-weighted assets, in which regulatory capital refers to the combination of Tier 1 and Tier 2 capital (Gharaibeh, 2023; Gupta & Kashiramka, 2020; Obadire et al., 2023). To proxy the capital level, some studies use the difference between the actual bank capital ratio and the minimum regulatory capital ratio mandated by the central bank (Moudud-Ul-Huq, 2019; Noreen et al., 2016), while others use the actual bank capital ratio minus the minimum of 8 percent capital ratio (Vu & Turnell, 2015; Zhu & Chen, 2016).

Numerous reasons have been discovered as the underlying driving force behind the actual motivation for banks to maintain an adequate capital level. These reasons include aiming to avoid a penalty cost by meeting the minimum capital ratio, seeking protection against economic instability, and aiming to indicate a high market value (Michail, 2021; Raberto et al., 2019). Banks might also keep capital in excess of that mandated by the central bank. Data reported by KPMG (2021) illustrate that in 2020, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates had capital adequacy ratios greater than the minimum level of 8 percent and even higher than the level mandated by regulators. This led to the discovery of many theories on the capital decision of banks.

Hence, an 8 percent minimum capital adequacy ratio (CAR) is recommended by the Basel Committee on Banking Supervision to safeguard depositors and promote stability and efficiency in the financial system. This capital adequacy ratio plays a critical role in ensuring that banks maintain sufficient capital buffers to absorb unexpected shocks. Moreover, it also fosters sound risk management practices and enhances public confidence in the banking sector, making it essential for banks to prioritize maintaining a strong CAR to mitigate financial shocks and maintain overall financial stability. Al-Sari (2025) asserts that enhanced stability and efficiency in banks would correspondingly help reduce the rate of bank failures. Meanwhile, the systemic risk posed by larger banks can be reduced and limit the impact of procyclicality behavior on the capital level during a recession. Accordingly, more financing activities may be provided by banks during downturns, which can aid in the recovery and

expansion of the economy. Ultimately, the equity to total asset ratio is used in this study to measure the capital level of banks.

2.3 Theoretical Review

The relevant bank capital theories discussed in this study are the risk absorption hypothesis, trade-off theory, 'Too Big to Fail' theory, and signaling theory, despite the availability of other bank capitalization theories.

2.3.1 Risk Absorption Hypothesis

The risk absorption hypothesis stipulates a positive relationship between risk taking among banks and the capital level. Berger and DeYoung (1997) agree that high capital ratios act as a safety net in handling the risks arising from the aggressive financing activities of banks. Akhtar et al. (2019) opine that banks with a high liquidity level are encouraged to grant more financing compared to banks that are less liquid. This is because creating more financing by funding illiquid assets with liquid liabilities means a greater risk to illiquidity. Therefore, a high capital level is required to absorb the risk and expand the bank's risk-bearing capacity. Bhattacharya and Thakor (1993) assert that more credit creation activities are executed by banks with more capital since a greater risk absorption capacity is displayed by a higher capital level. For this reason, an increase in financing growth by banks should be followed by an increase in their capital level, and vice versa. This behavior might cause banks to hold less capital with which to issue more financing, making the banks less stable due to a weaker ability to absorb risk. In such situations, according to the risk absorption hypothesis, high capital is required to help banks manage the risks linked to increased financing activity. On the other hand, banks that provide less financing tend to hold lower capital. This is because these banks expect fewer risks since the financing activities decrease, thus reducing the need for high capital, in accordance with the risk absorption hypothesis.

2.3.2 Trade-Off Theory

The trade-off theory posits that banks adjust their capital level by balancing the advantage of increased financial stability against the downside of reduced profitability (Baxter, 1967). Specifically, higher capital level increase a bank's survivability against possible loan losses, but they may also lead to lower returns and reduced cost efficiency due to more profit being retained to inject capital. Kuhn (2006) suggests that an increased capital level may enhance the stability of banks but, at the same time, potentially reduce profitability. Similarly, as diversification improves stability, banks may be encouraged to undertake riskier behavior due to the reduction in perceived risk. Evidently, larger Jordanian commercial banks are found to trade-off their capital by using funds for profitable investments (Alzoubi et al., 2022). However, according to Yinusa (2017), the trade-off theory assumes that banks operate with a target capital ratio and gradually adjust toward this ratio over time. The author further explains that the speed of adjustment depends on the costs, which may be influenced by aspects such as regulatory constraints and market conditions. This reflects how banks retain a balance between financial stability and profitability. Abbas and Masood (2020) reveal that during crises periods, commercial banks in the United States adjust their capital ratios primarily through retained earnings, which limits their operational capacity and results in reduced returns.

2.3.3 'Too Big to Fail' Theory

The 'Too Big to Fail' (TBTF) theory postulates that larger banks tend to take high risks with lower capital holdings. Keeley (1990) highlights that a deposit insurance scheme would lead to the moral hazard of TBTF, particularly for larger banks. For this reason, larger banks are not hesitant about engaging in high-risk activities with a low capital level. Knowing they are too big and that their failure would cause a systemic risk to the economy reduces the incentive for larger banks to act prudently. This leads to more risk-taking and lower capital holdings because of the implicit government guarantees in times of difficulty, which lead to them being bailed out to prevent a financial crisis. In contrast, smaller banks maintain a high capital level at all times, regardless of their risk level. This is because smaller banks gain no benefit from the

TBTF theory, so a high capital level helps to increase their stability and capacity to absorb unexpected shocks. Bellia et al. (2022) claim that banks that are considered TBTF gain a competitive advantage over favorable funding costs as their debt is considered implicitly guaranteed by the government. Meanwhile, smaller banks do not benefit from the perception that they are TBTF.

2.3.4 Signaling Theory

Hughes and Mester (1998) postulate that banks may hold higher capital level to signal their financial strength to external stakeholders. This means banks adjust their capital ratios as a means to signal their financial health over operating cost efficiency. The signaling effect of higher capital level becomes particularly crucial during economic downturns as it helps enhance market confidence and bank stability. This corroborates the findings of Berger et al. (2022) that a higher capital level enhances a bank's resilience to economic shocks and reduces the likelihood of insolvency, although it leads to lower returns and cost efficiency. For this reason, most studies reveal that banks increase their capital ratios during crises periods to signal stability to depositors, investors, and regulators while maintaining confidence in their solvency.

2.4 Causative Factors for Bank Capitalization

The capital level of banks can be affected by many factors, which may be bank-specific variables and/or macroeconomic variables. Among the internal banking sectors that could affect the capital decision of banks, this study chooses credit risk, liquidity risk, profitability, bank diversification, bank growth, bank size, and cost efficiency. Past literature also proves that macroeconomic factors influence the capital decision of banks. Thus, economy is also included as a potential external variable to investigate the direct relationship between the economy and bank capital level.

2.4.1 Credit Risk

Banking institutions are often exposed to various risks that can jeopardize the stability and viability of the banks because dealing with money is the primary business

of a bank. In both Islamic and conventional banks, credit risk is regarded as a primary risk that could lead to financial instability, given that the primary business activity of a bank is to provide financing (Basel Committee on Banking Supervision, 2000). Thus, credit risk in the banking sector is inevitable, but it can still be mitigated or minimized. Credit risk can be defined as the degree of loss suffered by a creditor because of a debtor's incapacity to meet their obligations. In essence, credit risk is considered the risk of borrowers failing to repay as promised. Therefore, credit risk usually arises from financing activities that banks provide to people, firms, and other banks or financial institutions.

Many proxies are used to measure the level of credit risk inherent in the business activities of a banking institution. Some studies use risk-weighted assets to total assets to capture the different categories of asset risk in banking institutions (Aktas et al., 2015; Lin, 2020). Other studies use non-performing loans to gross loans as a proxy for credit risk (Alves et al., 2023; Bui et al., 2021). Other literatures use impaired loans to gross loans (Benbouzid et al., 2022) or loan loss provision to total assets (Chaibi & Ftiti, 2015). However, loan loss allowances to gross loans are widely used in the literature for measuring the credit risk of banks (Abbas & Ali, 2022; Sobarsyah et al., 2020).

In normal scenarios, the credit risk and capital level of Islamic and conventional banks increase simultaneously, resulting in a positive significant relationship. This is because higher uncertainty is associated with banks that grant more financing. Therefore, coherent with the increased credit risk level, banks naturally also increase the capital level. Studies by El-Ansary et al. (2019) found that conventional banks in the MENA region are exposed to high financing risk, hence the holding of higher capital. Boubaker et al. (2023) also discovered a positive relationship between the credit risk and capital of Islamic banks in 23 Muslim countries. The evidence presented suggests that banks increase their capital to safeguard against the downside of excessive financing risk behaviors, in accordance with the risk absorption hypothesis. A greater capital level displays a high risk tolerance, providing more of a buffer to absorb potential losses and leading to a minimal chance of bank failure. Furthermore, the motivation to lend more is because banks are motivated to chase higher profits to raise capital. This aligns with most prior studies, which indicate that banks generally prefer to raise capital through retained earnings (Etudaiye-Muhtar & Abdul-Baki, 2021; Nam et al., 2022; Smaoui, Salah, et al., 2020).

Nevertheless, many past studies document a negative relationship between the credit risk and capital level of Islamic and conventional banks (Moudud-Ul-Huq et al., 2022; Toh & Zhang, 2022). When banks offer more financing, the banks become more vulnerable to credit risk. This is because to provide more financing, banks need to surrender the incentive of holding higher capital. Consequently, this increases a bank's riskiness when borrowers default, especially in times of economic decline. As a result, the capital level diminishes as capital is utilized to absorb losses and prevent banks from becoming insolvent. S.-W. Wu et al. (2022) reveal that strong growth in a bank's financing activities causes many bad loans. This is because banks reduce their credit standard requirements to provide more financing, which causes the banks to be lenient in the loan screening process (Le et al., 2022; Naili & Lahrichi, 2022). This results in many credit grants to low-quality borrowers, which ultimately increases the asset portfolio risks of banks and leads to a reduction in the capital level. Improper financing provided by banks leads to a decline in the credit quality of the banks. More capital is required to defend banks against higher risk-weighted assets, in line with the risk absorption hypothesis.

Toumi (2020) supports the negative association between credit risk and capital level by highlighting a key Islamic ethical principle, which is that money must be traceable and backed by real tangible assets. This means that most financing by Islamic banks, particularly non-profit and loss sharing (PLS) contracts, are safe and secure as they are backed by real assets. Indirectly, these collateralized assets enable Islamic banks to manage risk better and lower the risk of bankruptcy. Considering that the financing activities of Islamic banks predominantly come from non-PLS financing, also known as debt-based financing (Hussain et al., 2015; Mahmood & Rahman, 2017), this gives Islamic banks the confidence to operate with a low capital level despite engaging in extensive financing activities. This also suggests that Islamic banks have good asset quality due to being asset-backed. El-Ansary et al. (2019) empirically prove that Islamic banks do not improve their capital level despite an increased credit risk due to having better asset quality.

On the other hand, Alqahtani and Mayes (2018) claim that the excessive financing behavior of GCC Islamic banks is driven by profit and loss sharing (PLS) contracts, leading to banks experiencing moral hazard issues and undertaking less market discipline. The PLS mechanism make Islamic banks exhibit high risk tolerance

even with lower capital, which makes these banks less exposed to changes in asset levels. PLS contracts also require no collateral for Islamic banks to mitigate the credit risk, which reflects how Islamic banks hold good-quality assets. Thus, there is a low probability of a default risk (Bourkhis & Nabi, 2013; Daher et al., 2015). Moreover, Islamic banks are more willing to take major risks since PLS contracts do not compel these banks to guarantee a client's capital or rate of return (Beck et al., 2013). This is supported by several other studies, which claim that the PLS mechanism helps protect Islamic banks from adverse economic conditions (Abedifar et al., 2013; Hasan & Dridi, 2011; Khediri et al., 2015).

Unlike Alqahtani and Mayes (2018), Shahari and Rahman (2021) argue that Islamic banks are more exposed to credit risk than conventional banks, which contradicts the claim that PLS financing reduces the credit risk of Islamic banks. The authors assert that PLS contracts carry more risk due to their non-collateral nature, as well as the unfixed returns based on actual market performance. Along similar lines, Sobarsyah et al. (2020) assert that the lack of collateral in PLS financing activities creates adverse selection problems for Islamic banks, which then experience difficulties in managing their credit risk level. Therefore, Islamic banks hold higher capital to absorb any unexpected risk associated with PLS financing activities, resulting in a positive relationship between credit risk and capital level. Evidently, a positive relationship between the credit risk and capital level of Islamic banks in the MENA and SEA regions is documented by (Bitar et al., 2018; Mateev et al., 2021).

In the view of all the prior studies, High-Income countries have a lower credit risk than Middle-Income countries. Vithessonthi (2023) uncover how banks in High-Income countries are equipped with better risk management techniques, which lead to lower non-performing loans to total loans, relative to banks in Middle-Income countries. Tran et al. (2022) posit that banks with a higher credit risk also exhibit good capital holdings because of better regulatory supervision, which reduces the incentives of banks to take unnecessary risks. A study by Tölö and Virén (2021) reveals that most bad loans from the financing activities of European banks are absorbed by the banks' capital. This proves that banks in High-Income countries maintain high capital ratios and, therefore, can absorb credit risk better and lower the probability of facing capital risk.

Overall, many studies find a positive relationship between credit risk and capital level. As banks expand financing and face greater uncertainty, the banks boost their

capital to absorb potential losses consistent with the risk absorption hypothesis. This is documented for conventional banks in MENA and for Islamic banks across multiple Muslim countries (Bitar et al., 2018; Boubaker et al., 2023; El-Ansary et al., 2019; Mateev et al., 2021). On the other side, a negative relationship emerges when rapid loan growth erodes screening standards, elevates non-performing exposures, and forces capital to be drawn down to cover losses (Le et al., 2022; Moudud-Ul-Huq et al., 2022; Naili & Lahrichi, 2022; Toh & Zhang, 2022; S.-W. Wu et al., 2022). The institutional features specific to Islamic banking further strengthen the negative relationship. Prior studies reveal that asset-backed structures and collateralisation can mitigate default risk and reduce the need for higher capital (El-Ansary et al., 2019; Toumi, 2020). This is because PLS contracts can either enhance resilience by sharing risk (Abedifar et al., 2013; Hasan & Dridi, 2011; Khediri et al., 2015) or heighten credit risk via moral hazard and weaker market discipline (Alqahtani & Mayes, 2018; Sobarsyah et al., 2020), prompting higher capital buffers. Cross-country differences also matter where, High-Income countries generally display lower credit risk and stronger risk management, with capital serving as an effective absorber of loan losses. In contrast, Middle-Income countries face higher credit risk and weaker protection with lower holding of capital (Tölö & Virén, 2021; Tran et al., 2022; Vithessonthi, 2023).

Hence, credit risk is included as an independent variable because of the conflicting relationship between the credit risk and capital level of Islamic and conventional banks in High-Income and Middle-Income countries. The study chooses the ratio of loan loss allowances to gross loans as the proxy for credit risk. The following hypothesis refer to the credit risk and capital level.

$H1_0$: There is no significant relationship between credit risk and capital level.

$H1_A$: There is a significant relationship between credit risk and capital level.

2.4.2 Liquidity Risk

Apart from credit risk, another type of risk faced by banking institutions, whether Islamic or conventional banks, is the liquidity risk (Rhanoui & Belkhoutout, 2019). Bank liquidity symbolizes the degree of solvency of a bank. The ability of banks to satisfy short-term obligations increases with a higher level of liquidity, which then boosts the trust of investors and depositors in making deposits. Liquidity risk occurs

when banks have a lower liquidity level, thus making the banks highly likely to fail to meet their short-term liabilities. A greater liquidity ratio suggests that a bank is highly liquid and so unlikely to encounter liquidity risk. Total liquid assets to total assets is one of the proxies frequently used to represent the liquidity risk of a bank (Moudud-Ul-Huq, 2021; Noreen et al., 2016). Other studies employ liquid assets to deposits and short-term funding as a proxy for bank liquidity risk (Amran & Ahmad, 2021; Bitar et al., 2018; Smaoui, Salah, et al., 2020).

The literature reveals an ambiguous relationship between the liquidity risk and capital level of Islamic and conventional banks. First, this risk may be positively related with the capital level of banks. In this regard, banks with a lower risk of insolvency choose to hold lower capital adequacy ratios. This scenario is likely to occur because, according to Etudaiye-Muhtar and Abdul-Baki (2021), highly liquid assets can serve as a buffer against bank runs instead of having a high capital level. When facing uncertainty, retaining more liquid assets can be utilized to absorb loan losses or possible reductions in the value of banking assets (Berger et al., 2022; Nam et al., 2022). Hence, banks may opt for greater liquidity ratios to manage the liquidity risk instead of holding a higher capital ratio that is expensive to raise, especially during economic downturns. Furthermore, Smaoui, Salah, et al. (2020) point out that highly liquid banks are less susceptible to the information asymmetry problem. A reduced informational asymmetry issue allows banks to raise money quickly at a lower interest rate. To be specific, during uncertain times, selling liquid assets enables banks to raise capital easily whenever risks emerge (Belkhir et al., 2016; Shim, 2013; Stolz & Wedow, 2011). Such scenarios imply that banks with more liquid assets but lower capital are readily capable of raising capital to mitigate the liquidity risk issues that arise during challenging times. Concurrently, banks with a greater liquidity level have a larger appetite to create more liquidity without worrying considerably about capital risks. Being liquid may help increase a bank's reputation as a higher liquidity ratio indicates the bank has a greater ability to meet short-term obligations (Nam et al., 2022). Overall, these points imply that banks prefer to keep high amounts of liquidity to manage the liquidity risk over the capital ratio.

Even so, Bitar et al. (2020) argue that banks with a strong liquidity position can be interpreted as engaging in poor liquidity management. This is because banks with higher confidence in a liquidity reserve are deemed risky as they may forego investment

in profitable assets to hold onto more liquid assets. Consistent with this, Le et al. (2022) who revealed a negative relationship between the liquidity risk and capital level of banks due to the reduced investment in profitable projects. Consequently, banks find it harder to induce capital from profits. From a different viewpoint, Antoun et al. (2021) reveal that banks facing a higher liquidity risk hold more capital in order to meet their financial obligations. The increase in liquidity risk often stems from excessive financing activities by banks, which can lead to a surge in bad loans, especially if the payoff response of borrowers decreases during a recession. As documented by Al-Khazali and Mirzaei (2017), an unexpected increase in non-performing loans strains a bank's cash flow, making the banks face difficulty in meeting the customer withdrawal demand. Due to this, a higher capital level helps banks to mitigate this risk of illiquidity and protect against bank failure, supporting the risk absorption hypothesis.

Nonetheless, for Islamic banks, the positive association between the liquidity risk and capital level seems to be driven by a lack of financial development. A low level of liquidity can be a reason for bank failure. Therefore, a high level of liquidity is preferable due to the lack of a secondary market for Islamic banks to raise funds and manage their liquidity (Bitar, Madiès, et al., 2017; Chazi et al., 2024). As a result, despite being highly capitalized, Islamic banks also hold more liquidity to protect against their inadequate Shariah Islamic liquidity infrastructure. A comparative study across 28 dual banking countries by Bitar et al. (2018) discovered that less-advanced financial development causes the raising of equity and debt to be expensive for Islamic banks, owing to informational and transactional costs. Higher holdings of liquid assets are thus preferable for Islamic banks to counter the expense of raising capital and debt. A similar finding by Boukhatem and Djelassi (2020) supports the view that Islamic banks, relative to conventional banks, are better positioned in terms of both liquidity level and capital level in Saudi Arabia, reflecting the lower liquidity risk in Islamic banks.

This result contradicts the findings of Dao and Nguyen (2020), who reveal a negative relationship between liquidity risk and capital level. Banks with a lower liquidity risk may hold higher capital because a lower liquidity risk implies banks have high amounts of liquidity. Banks in a strong financial position are encouraged to lend more financing to gain extra profits. These extra earnings are used by the banks to boost the capital level. As documented by most prior studies, banks with a higher level of

liquidity can leverage economies of scale by extending more credit and funding additional investment activities (Beccalli et al., 2015; Wang & Luo, 2020). Consequently, a higher capital reserve is put aside by banks to absorb any unexpected losses that may threaten bank stability, which is consistent with the risk absorption hypothesis.

In view of the discussion above, prior studies clearly indicate that the liquidity risk and capital level of banks are mainly positively related, regardless of whether the country is High-Income or Middle-Income. Creating liquidity is essential for increasing the money supply and boosting economic growth for both types of countries. Therefore, banks naturally hold higher capital to manage the liquidity risk because insufficient liquidity can lead to collapse. This positive relationship is supported by various scholars (Bilal et al., 2024; Eltweri et al., 2024; Wójcik-Mazur, 2015). However, a negative relationship between liquidity risk and capital level of banks in High-Income and Middle-Income countries is also possible (Abbas et al., 2019; Dao & Nguyen, 2020). As banks are motivated to grant more financing, the banks are exposed to higher liquidity risks as the liquidity level of the banks dries up. A high amount of capital reserve is used as a cushion against any unexpected loan losses or shocks that could threaten banking stability.

The relationship between banks' liquidity risk and capital level depends on how well the bank manages its cash flows and its access to stable funding. Prior studies find that when banks face higher liquidity risk, meaning the banks might struggle to meet withdrawals or funding needs (Al-Khazali & Mirzaei, 2017; Antoun et al., 2021; Ghosh, 2016). Subsequently, the banks tend to hold more capital as a safety buffer to build confidence and reduce the chance of failure in accordance with the risk absorption hypothesis. Empirically, prior studies also document a trade-off whereby an increase in credit creation is accompanied by a reduced in the capital level, as banks reallocate resources toward financing activities over capital accumulation (Beccalli et al., 2015; Dao & Nguyen, 2020). This means that the relationship between liquidity risk and capital varies based on how stable their funding sources are, the tools they use to manage cash shortages, and how strong the regulatory environment is in ensuring they hold enough capital for emergencies. Unlike conventional banks, Islamic banks face restricted access to Shariah-compliant liquidity instruments which may influence their capital strategies (Bitar et al., 2018; Bitar, Madiès, et al., 2017). In High-Income

countries, banks usually have stronger liquidity management tools and better access to funding markets, allowing them to maintain healthier capital positions (Bilal et al., 2024; Eltweri et al., 2024). Meanwhile, banks in Middle-Income countries often face more liquidity pressure and weaker buffers due to less developed financial market (Abbas et al., 2019; Dao & Nguyen, 2020).

In conclusion, the inclusion of liquidity risk in the study aims to achieve a deeper understanding of the relationship between the liquidity risk and capital level of banks in High-Income and Middle-Income countries. The total of liquid assets to deposits and short-term funding is selected as the proxy to measure the liquidity risk of banks. The hypotheses below refer to the liquidity risk and capital level:

$H2_0$: There is no significant relationship between liquidity risk and capital level.

$H2_A$: There is a significant relationship between liquidity risk and capital level.

2.4.3 Profitability

Generating profits is necessary to ensure the long-term sustainability of banking institutions. Therefore, the more profitable a bank, the more successful and sustainable they are in this highly intense market. Studies normally use return on assets (ROA) to measure bank profits (Sanyaolu et al., 2020; Ünvan, 2020). Other studies use return on equity (ROE) to reflect the profitability of banks (Lin, 2020; Toh & Zhang, 2022). Moreover, a study by Kishibayeva et al. (2023) uses the net interest margin to measure the profitability of banks, whereas several studies use the ratio of earnings before interest and tax (operating profit) to total assets as a measurement for bank profitability (Abbas et al., 2021; Lee & Hsieh, 2013; Shim, 2013).

Most prior studies established a positive significant relationship between the profitability and capital level of Islamic and conventional banks. This is because banks typically prefer to use retained earnings to increase the capital level, primarily because issuing capital through external financing is costly, given the presence of information asymmetry and agency problems (Etudaiye-Muhtar & Abdul-Baki, 2021). Strong evidence has frequently indicated that a bank earning high profits subsequently has a higher sustained capital level, which applies for both Islamic and conventional banks (Bitar & Tarazi, 2019; Mahdi & Abbes, 2018a). In an analysis of the capital decision of Islamic banks, Bitar et al. (2018) state that more-profitable Islamic banks are better

capitalized than less-profitable Islamic banks. The authors pinpoint that in a country with less-established financial markets, Islamic banks are more prone to issues of information asymmetry and transaction costs since these banks can only raise funds from Shariah-compliant sources. Therefore, Islamic banks with more earnings are able to inject capital more easily than less-profitable Islamic banks.

Furthermore, highly profitable banks are expected to face lower financial distress due to the high capital level (Abiodun et al., 2020; Charitou, 2019; Das & Rout, 2020). In the event of any financial crises, profits may simply be utilized to grow capital, defend banks from liquidation, and send favorable information to the market regarding their net worth (Etudaiye-Muhtar et al., 2017; Lin, 2020). Hence, profits become a prominent source for banks to raise their capital level, resulting in a positive correlation between profitability and capital level. Higher capital ratios serve as insurance that shields profitable banks against unanticipated calamities, supporting the risk absorption hypothesis. As claimed by Ali et al. (2016), banks can boost their continuity in the market by creating a sustainable income. Conversely, Hewaidy (2018) claims that profitability is not a determinant of capital decision for Kuwait banks, although a positive association between bank profitability and capital level is found.

Toh and Zhang (2022) claimed that profitable banks might lend freely, even to less creditworthy customers, in return for higher profits by charging high financing rates. This behavior leads to a negative association between profitability and capital level. Banks need to trade-off their capital in order to extend more financing in pursuit of additional income. Such imprudent financing activities cause a reduction in the capital level of banks. Aydemir et al. (2024) support this view by claiming that high profitability is positively correlated with elevated levels of risk in both Islamic and conventional banks. This means highly profitable banks erode their capital more to create more financing. In such scenarios, banks are advised to maintain more capital to increase their buffer and risk absorption capacity, in accordance with the risk absorption hypothesis. Likewise, Moudud-Ul-Huq (2019) reveal that less-profitable banks are encouraged to maintain higher capital buffers because of the challenges of accessing resources and investing in technology, which expose these banks to high risk. A conservative strategy in terms of financing activities is preferable for less-profitable banks. A high capital level safeguards against unexpected loan losses, leading to a reduction in the financing activities of these banks (Naili & Lahrichi, 2022).

Some studies find that the opposite applies, with Berger and Sedunov (2017) anticipating that banks with better profitability have lower capital ratios since high profit is associated with lower funding costs. Indirectly, this supports the view that having a lower capital ratio despite higher earnings helps lower a bank's overall risk. Therefore, capital ratios are not an issue for profitable banks because higher revenues indicate better control over expenses and risks (González et al., 2019; Klein & Weill, 2022). Greater efforts to screen and monitor borrowers are introduced by profitable banks when granting financing, which reduce the overall risk for these banks. Certainly, banks with high charter values are more cautious when involved in high financing activities because the banks stand to lose more profits (Xu et al., 2019). As a result, the risk of confronting hardship is less likely to affect highly profitable banks, allowing the banks to maintain a lower capital level. Sadalia et al. (2017) opine that banks choose to distribute profits to shareholders through dividend payments rather than use retained earnings to improve the capital level, which results in a negative relationship between profitability and capital level. This behavior is driven by the market perception that banks are perceived more favorably in the capital markets when they can pay out dividends. Thus, more investors are attracted to invest, which subsequently gives banks more cash availability. The funds received are then used by banks to conduct business activities and generate profits. Although the authors fail to significantly support the negative relationship, Brasliņš and Arefjevs (2014) propose that banks prefer to pay dividends to shareholders using the bank profits, even during a downturn, because doing otherwise sends a negative signal to the market. This behavior leads to an inverse relationship between bank profitability and the capital level, albeit one that is insignificant.

In fact, whether examining High-Income or Middle-Income countries, most studies agree that increased profitability allows banks to improve the capital through retained earnings. Supporting this relationship, Andrle et al. (2019) document that most emerging European banks use retained earnings to hold more capital, even retaining capital above the requirement set by the Basel Regulations and the central bank. Similar evidence is found in 73 banks in Asian developing countries, where an increase in the profit margins of the banks would improve the capital level through retained earnings (Hunjra et al., 2020).

Most literatures report a positive relationship, consistent with the signaling theory for profitability and capital level of Islamic and conventional. Banks tend to retain earnings to build capital because external equity is costly under information asymmetry and agency problems. Higher profits therefore translate into more capital ratios and lower distress risk (Bitar & Tarazi, 2019; Etudaiye-Muhtar & Abdul-Baki, 2021; Mahdi & Abbes, 2018a). Conversely, less profitable banks may adopt conservative financing activities and hold higher capital buffers to protect against shocks (Aydemir et al., 2024; Moudud-Ul-Huq, 2019; Naili & Lahrichi, 2022; Sadalia et al., 2017; Toh & Zhang, 2022). For Islamic banks, institutional features does play a role where, asset-backed structures can either ease capital needs or constraints on funding sources (Bitar et al., 2018). Cross-country evidence from both High-Income and Middle-Income countries generally supports the uses of retained earnings as the main drivers of capital build-up, especially where markets are less developed and external issuance is comparatively costly (Andrle et al., 2019; Hunjra et al., 2020).

Subsequently, profitability is included in this study to examine the relationship between profitability and bank capital level, since earnings are deemed to support a bank's viability to survive in the market for a long time. Operating profits to average total assets is used as a proxy for profitability. The null and alternate hypothesis are created as follows:

$H3_0$: There is no significant relationship between profitability and capital level.

$H3_A$: There is a significant relationship between profitability and capital level.

2.4.4 Bank Diversification

Bank diversification refers to the strategy employed by banks to spread investments, operations, and risk across different asset classes and business activities. This approach aims to reduce the overall risk and enhance the stability and profitability of the bank. Knowing that investing all funds in a single place is deemed risky for any banking institution, diversification is one of the strategies utilized by banking institutions to mitigate the bank risk. A well-diversified bank stands to gain various advantages, such as economies of scale, a reduced bank risk level, and heightened competitiveness among financial institutions. Previous studies use a ratio of non-interest income to total operating income when measuring bank diversification (Antoun

et al., 2021; Chowdhury et al., 2024; Tongurai & Vithessonthi, 2020). Instead, Anginer et al. (2018) use the ratio of non-interest income to total assets to measure this diversification. The Herfindahl Hirschman index is also used in the literature for measuring bank diversification (Adesina & Mwamba, 2018; Curi et al., 2015).

A mainly negative association is portrayed between bank diversification and the capital level of Islamic and conventional banks. This is because highly diversified banks are proven to have a low risk of bankruptcy and, therefore, less need for capital ratios (Chazi et al., 2024). Multiple revenues serve as an effective hedge for banks against unexpected risks that may arise from banking activities. Clearly, commercial banks in five ASEAN countries with a variety of revenue sources demonstrated good capital adjustment with better stability during downturn periods (Do Van, 2021). A bank's overall risk is reduced when this is diversified, particularly during times of crises. This is because investing in non-interest income sources enables banks to achieve a more stable asset portfolio, resulting in reduced volatility and more consistent profits (Adem, 2023; Taylor, 2022). Nevertheless, banks with more diversification in non-interest income are more stable during crises compared to banks that undertake more financing activities. Saadaoui and Mokdadi (2022) reveal that U.S. bank holding companies are better protected during crises by diversifying their revenue streams. As a result, banks are less prone to losses in times of financial instability, leading to lower capital holdings. Kim (2020) makes a similar point by authenticating that diversification is helpful in improving the stability of banks in OECD countries in times of crises but not during normal times.

Diversification also enables banks to simultaneously manage risk and maximize returns without relying on larger capital buffers, resulting in great cost efficiency and capital savings (Antoun et al., 2021; Ovi et al., 2020). In this context, banks can chase extra profits without upholding much capital, as diversification helps to spread the risk across various asset portfolios. This reduces the need to hold higher capital. Even so, diversification appears to benefit larger banks more, primarily due to economies of scale, while it may not hold the same advantages for smaller banks. This is understandable, given that economies of scale grant banks more accessible entry to capital markets, making this one of the major reasons for diversification (Bitar et al., 2020; de-Ramon et al., 2021).

Contrary to previous studies, Lepetit et al. (2008) authenticate a positive relationship between bank diversification and the capital level of banks in 15 European commercial banks. The authors stress that diversification is helpful in improving bank stability in normal times but not during crises due to the increased risk of revenue volatility. This is because non-interest sources like trading and investment activities are often sensitive to the markets, making them highly volatile. For this reason, revenues from non-interest income may be unpredictable, which could lead to potential losses, especially during economic downturns. This could result in a heightened overall risk for banks. Based on the risk absorption hypothesis, a higher capital level is required to absorb elevated risk level, resulting in a positive correlation between bank diversification and capital level. Alam et al. (2019) and Alam (2014) argue that banks with greater dependence on non-interest activities demonstrate a higher bank risk compared to banks that primarily engage in financing activities. Consistent with studies by Zhang et al. (2016), U.S. bank holding companies that shift to non-interest activities experience a higher bank risk level.

In fact, conventional banks diversify their banking activities more than Islamic banks (Qian & Velayutham, 2017; Sobol et al., 2023), perhaps because the former have a long history and are well-established in the market. This gives conventional banks easy access to capital markets and greater diversification opportunities. As a result, banks with more diversified income streams are often less risky, so they hold lower capital. In contrast, Islamic banks are still in the phase of growth and expansion. Jubilee et al. (2021) contend that Islamic banks still have a relatively low presence in most countries compared to conventional banks, which hold a dominant position in the financial sector due to having a larger market share and market penetration in most countries. Hence, Islamic banks find it difficult to access capital markets and diversify their assets. Less diversification by Islamic banks could also be due to the Shariah principle prohibiting participation in, for example, interest-based transactions, gambling, and excessive speculation (Alqahtani & Mayes, 2018).

A large body of studies reports a negative relationship, arguing that diversified banks face lower bankruptcy risk and more stable earnings streams. This enables the banks to operate with lower capital ratios because revenue diversification provides a natural hedge against shocks (Adem, 2023; Chazi et al., 2024; Do Van, 2021). Diversification into non-interest income—particularly for large banks with economies

of scale helps improve stability during crises and reduces the need for capital buffers (Kim, 2020; Saadaoui & Mokdadi, 2022). However, another stream of research identifies a positive relationship, suggesting that greater reliance on non-interest activities can increase earnings volatility and overall risk, especially during downturns. Thereby, requiring higher capital to absorb potential losses in line with the risk absorption hypothesis (Alam, 2014; Lepetit et al., 2008; Zhang et al., 2016). Institutional differences play a role in this relationship whereby, conventional banks with deeper market penetration and broader access to capital markets, diversify more extensively and thus often hold lower capital. Whereas Islamic banks face constraints due to Shariah principles and limited market presence, reducing their diversification capacity and increasing dependence on traditional financing activities (Jubilee et al., 2021; Qian & Velayutham, 2017; Sobol et al., 2023).

In conclusion, based on prior studies, bank diversification is included as one potential variable that may influence the bank capital level in a negative or a positive way. In this study, bank diversification is proxied using the ratio of non-interest income over total operating income. The null and alternate hypothesis for bank diversification are as follows:

$H4_0$: There is no significant relationship between bank diversification and capital level.

$H4_A$: There is a significant relationship between bank diversification and capital level.

2.4.5 Bank Size

Bank size is one of the internal factors that significantly influences the behavior of banking institutions in carrying out business operations. As confirmed by Zheng and Moudud-Ul-Huq (2017), bank size has a substantial impact on the risk-taking and capital of banks. Therefore, risk-taking is closely related to the size of banks but it may affect the capital of banks differently. Normally, the size of a bank is reflected in their total assets, whereby an increase in total assets implies an increase in the bank size, and vice versa. However, many studies adopt the natural logarithm of total assets as a proxy for bank size to reduce the gap between larger and smaller values (Antoun et al., 2021; Keqa, 2021; Linh et al., 2019; Maatoug et al., 2019). Meanwhile, several studies also

measure the size of banks using dummy variables to capture changes in bank size across different quartiles of the national size distribution (García-Suaza et al., 2012; Valencia & Bolaños, 2018).

As established in many studies, the bank size is negatively related with the capital level of Islamic and conventional banks. This is exceptionally true as larger banks gain a greater competitive advantage relative to smaller banks in terms of market share and cost efficiencies. Indirectly, these benefits give larger banks the privileges of accessing capital markets easily and diversifying their asset portfolios (Ahmad et al., 2022; Baik et al., 2022). Thus, a lower exposure to risk is anticipated for larger banks, which allows these banks to reduce the capital ratio and seize profitable business prospects. Indeed, larger banks can leverage their scale to access capital markets and diversify their asset portfolios, thereby reducing the need to hold higher levels of capital (Bogale, 2020; Ünvan, 2020). Bremus and Ludolph (2021) reveal that larger banks tend to be more diversified in countries with well-developed and extensive banking systems compared to countries with less-developed systems. Bitar et al. (2018) found that larger Islamic banks in MENA and SEA countries have easy access to developing Shariah-compliant debt instruments and investment accounts owing to the diversification, economies of scale, and broad access to capital markets that these banks utilize. Furthermore, larger banks benefit from cheaper funding costs due to the benefits of economies of scale (Alraheb et al., 2019; Sadalia et al., 2017). Many studies have verified the negative relationship between bank size and the capital level of banks (Alzoubi et al., 2022; Montagnoli et al., 2021; Sutrisno et al., 2023).

Wu et al. (2021) highlighted how the advanced lending technologies adopted by larger banks enable better risk assessment and the maintenance of lower capital ratios. Supporting this relationship, Toh and Zhang (2022) posit that the effective loan screening and monitoring procedures of larger commercial banks in Southeast Asian countries help reduce the informational asymmetry problem. This enhances the loan quality and leads to the holding of lower capital adequacy ratios. Therefore, larger banks maintain lower capital level since fewer loan losses are expected owing to the strict financing standards applied to low-quality borrowers. Collectively, these studies support the notion that larger banks demonstrate effective risk management practices owing to their proper loan screening and monitoring methods, lessening the possibility of encountering danger. Thus, larger banks are less dependent on capital buffers as

insurance against shocks but still resilient to negative impacts (Naili & Lahrichi, 2020; Vu & Turnell, 2015). The risk management of larger banks is also credited to the greater experience and superior reputation of these banks in the market relative to smaller banks. Thus, larger banks have the advantage of being able to retain lower capital ratios despite taking high risks (Abedifar et al., 2013; Beck et al., 2013).

In contrast, smaller banks need a large capital buffer as the banks are highly likely to encounter adverse shocks. This corroborates the findings of Wang and Luo (2020), which evidence an adverse negative impact on smaller banks in MENA countries due to the increased credit risk driven by oil price fluctuations. Drawing upon the risk absorption hypothesis, larger capital is sustained by smaller banks to cope with the growth in non-performing loan ratios, which increases the capability of small banks to absorb unexpected loan losses. Chazi et al. (2024) claim that the high capital holdings of smaller banks are due to unsophisticated risk management techniques, which expose the banks to high risks. The less-efficient process of screening and monitoring borrowers by smaller banks weakens the ability to mitigate insolvency risk and so retain additional capital. This aligns with the findings of Ali et al. (2023) related to 15 dual banking economies, where small Islamic banks are riskier and, therefore, less financially stable than small conventional banks due to having inefficient credit control systems. This is also proven by the higher capital ratios in smaller Indian banks due to the inability to invest in sophisticated risk control management systems because of limited resources (Sharifi et al., 2016). Besides that, the limited diversification by smaller banks in terms of asset portfolios makes them susceptible to risk, thus inducing a higher capital buffer (Bitar et al., 2020; Mohanty & Mahakud, 2021).

However, many previous scholars believe that larger banks are over-reliant on government support when facing financial hardship (Bellia et al., 2022; Bitar & Tarazi, 2019). Grounded in the 'Too Big To Fail' theory, in the event of bankruptcy, larger banks are bailed out by the government due to the systemic risk their failure poses to the entire economy. Moudud-Ul-Huq et al. (2022) validate that reliance on government securities increases the chances of survival for larger banks while taking on greater risk with a lower capital ratio. Consequently, these larger banks become more inclined to undertake high-risk activities because of the belief that they are 'Too Big To Fail', in addition to the fact that their high diversification means they have a lower risk of failure. Antoun et al. (2021) make a similar point, whereby large banks from South-Eastern

European countries engage in excessive risk-taking based on the presumption they will receive government protection when facing unexpected shocks. A higher desire among larger banks to increase risk despite having a lower capital ratio may threaten banking stability, particularly in times of crises.

Conversely, some studies have found the opposite results. The Japanese banking sector demonstrates that not all large banks embrace the 'Too Big To Fail' phenomenon (Lin, 2020). According to the author, larger banks have the advantage of being able to enhance the capital bases, allowing easy capital market entry to raise funds and boost capital. This implies that larger banks with high-risk profiles boost their capital level to better absorb financial distress, leading to a positive significant relationship between bank size and capital level. Mahdi and Abbes (2018b) support the view that larger conventional banks in the MENA region operate with higher level of risk and capital. The authors emphasize that with greater access to capital markets, larger banks can secure more funds easily, enabling these banks to maintain higher level of capital.

Additionally, a positive relationship between the two variables may also be because of bank charter value. According to Zhang and Jiang (2018), this factor could act as a self-control mechanism to limit moral hazard behaviors among larger banks. A high charter value denotes that banks encounter greater future earnings losses, especially when recessions occur. Thereupon, banks are driven to operate prudently by retaining a larger capital buffer or engaging in proper financing activities to avoid bank failure, which could result in a greater loss of future revenues. In line with findings obtained by Shim (2013), a high bank charter value prevents larger banks from taking on excessive risk that could harm the stability of the banks. Nonetheless, Buyuksalvarci and Abdioglu (2011) argue that the bank charter value may not effectively limit the risky behavior of larger banks due to the intense competition in the banking industry. Banks normally face profitability pressure when competing in a fierce banking sector environment. In return, banks are persuaded to become involved in riskier activities to preserve their market position and profitability. This leads to a moral hazard issue as larger banks take high risks with lower capital, based on the ‘Too Big To Fail’ theory.

However, when comparing larger Islamic and conventional banks, prior research indicates that the latter tend to hold lower capital than Islamic banks (Basher et al., 2017; Bitar, Madiès, et al., 2017). This reflects the financial position of conventional banks, which is more precarious due to high risk-taking. The increased

risk is partly due to the longer market presence of conventional banks, whereas Islamic banks are relatively young and still in a growth phase. Consequently, larger conventional banks often maintain a lower capital level, as these banks are presumed to have more resources to implement advanced risk management systems, gain high diversification opportunities, and receive implicit government support in times of difficulty. Despite that, smaller Islamic banks are deemed more stable than larger Islamic banks, reflecting good capitalization (Ibrahim & Rizvi, 2017). This is simply because small banks often have high exposure to risk, making the banks vulnerable to market fluctuations and causing the banks to hold adequate capital buffers. Ali et al. (2023) claim that small Islamic banks are riskier than small conventional banks due to their lack of asset portfolio diversification.

In sum, extensive literature finds that larger banks typically enjoy economies of scale, cheaper funding, superior screening and monitoring technologies, and broader access to capital markets and diversification opportunities (Ahmad et al., 2022; Baik et al., 2022; Toh & Zhang, 2022). All of these advantages enable large banks to operate with lower capital ratios without necessarily compromising resilience. Such advantages tend to be more pronounced in a well-developed financial systems such as High-Income countries, raising the moral hazard issues. Grounded by 'Too-Big-to-Fail' phenomenon, large banks take greater risk while maintaining lower capital due to implicit government support (Bellia et al., 2022; Moudud-Ul-Huq et al., 2022). Conversely, smaller banks face narrower funding options, weaker risk-management infrastructures, and limited diversification. Consequently, these banks tend to hold higher capital buffers as insurance against shocks (Bitar et al., 2020; Chazi et al., 2024; Mohanty & Mahakud, 2021). It is further documented that larger conventional banks often hold less capital than similarly large Islamic banks due to longer market presence and broader diversification (Bremus & Ludolph, 2021).

Bank size is included as a potential variable that can influence the bank capital level. In this study, the natural logarithm of total assets is used to measure the size of banks. The null and alternate hypothesis for bank size are as follows:

$H7_0$: There is no significant relationship between bank size and capital level.

$H7_A$: There is a significant relationship between bank size and capital level.

2.4.6 Bank Growth

A bank grows by imparting more liquidity creation into the economy while generating profits. Continuous loan growth is necessary to boost a country's economy. Given that financing operations are daily and continual activities, financing activities by banks help to spur economic growth. Banks indirectly promote economic expansion by providing financing. Nonetheless, rapid financing growth leads to higher loan losses that could shatter the stability of banks. In this sense, the economy may not function without banks, but it could be paralyzed if credit is unavailable. Bank growth can be measured by the annual asset growth rate (Bitar, Hassan, et al., 2016; Maatoug et al., 2019), annual loan growth rate (Abbas, Ali, et al., 2020; Moudud-Ul-Huq et al., 2022; Toh & Zhang, 2022), and annual growth rate of deposits (Cucinelli, 2016; Ibrahim & Rizvi, 2018).

As banks grow, the need for funds also grows, so a negative relationship between bank growth and capital level is anticipated in most literature. Myers (1977) states that an expansion of banks would push banks to extend more financing, thus thinning the capital reserve. This means banks must trade-off their capital to provide more financing and grow. Deposits serve as the main source of funding for banks because the financing is less costly (Linh et al., 2019; Mili et al., 2017). Therefore, the possibility of risk is often higher. Notably, when chasing higher loan growth, banks frequently struggle to uphold specific credit standards. In tandem with inappropriate credit standards, the likelihood increases of banks granting financing, even to borrowers with lower credit scores (Beck et al., 2022; Naili & Lahrichi, 2020). As Huizinga and Laeven (2019) point out, bank officers may have ulterior motives for increasing credit because the compensation is generally based on the volume of financing given rather than the quality of the credit extended. Indeed, there is extensive proof that credit standards degrade during economic expansions (Le et al., 2022; Repullo & Suarez, 2013; Vu & Turnell, 2015). To prevent insolvency, the capital diminishes as it is used by banks to absorb the increased level of risk when a bank grows.

On the positive side, as a bank grows and expands, the bank can benefit from economies of scale. This enables easy market entry and allows banks to diversify their asset portfolios to minimize the risk while increasing profits (Ibrahim & Rizvi, 2018; Tasya et al., 2022). This enables banks to uphold lower capital level despite an increase

in financing growth, leading to a negative relationship between bank growth and capital level. Evidently, conventional banks experience far faster growth than Islamic banks due to the ability to provide a wide range of financial services that can cater to the needs of all customers, regardless of their religious beliefs (Alam et al., 2017; Ghosh, 2023). This allows conventional banks to diversify their portfolios when accessing larger pools of financing, enabling lower capital to be sustained compared to that of Islamic banks. This benefits larger banks more since the systemic risk to the whole financial system posed by their failure warrants government bailouts if things go wrong. This creates the issue of moral hazard problems among bigger banks. Bitar, Saad, et al. (2016) assert that when a bank grows, profits increase whilst the risk decreases. This indicates that growth enables banks to increase their investment in credit risk control, which may reduce potential credit defaults and boost bank profitability. In exchange, this allows large banks to pursue riskier investment and financing activities for higher returns while retaining lower capital ratios (Bhowmik & Sarker, 2021; S.-W. Wu et al., 2022). Ergo, the greater the volume of deposits, the more banks can diversify to grow and extend their business operations while incurring lower risks and realizing profits at the same time.

From the perspective of Islamic banks, the negative relationship between bank growth and capital level is because capital is used to absorb any realization of asset losses in order to maintain the bank's survivability. Maharani (2017) unveils how financing activity is predominant among Islamic banks, considering the fact that these banks cannot engage in activities that are speculative and contrary to Shariah law. In consequence, bank capital level decline due to imprudent bank financing behavior, despite an increase in the credit risk level. Hence, a negative relationship exists between bank growth and the capital level of Islamic banks because the capital is used to compensate for sudden or unexpected risks in the banking activities. Prior studies support this negative correlation, particularly in Islamic banks, due to the business model of the banks and the constraints of Shariah law (Khaki & Sangmi, 2011; Nawaz et al., 2023).

Conversely, Wu et al. (2020) contend that loan growth is a major factor that increases the overall risk of banks. This means that the more a bank grows by granting financing, the higher the credit risk, forcing banks to maintain a strong capital cushion. Based on the risk absorption hypothesis, banks with a high capital level are more secure,

having a high capability to absorb risk. Abbas and Ali (2022) found that an increase in loan growth leads to a higher credit risk among Islamic banks, prompting the banks to hold more capital to absorb potential loan losses. Similarly, Alqahtani et al. (2017) reveal that Islamic banks keep larger capital reserves even while increasing their financing activities. Thus, the higher loan growth in Islamic banks reflects the higher capital level of these banks. Indirectly, Islamic banks are becoming sturdier in accommodating unexpected financial shocks. As highlighted by recent literature, bank capital helps compensate depositors in the case of losses caused by the increased financing activity of banks (Bedayo et al., 2020; Linh et al., 2019).

Overall, the empirical literature shows that the relationship between bank growth and capital levels is mainly negative. As expanding banks typically extend more financing and rely heavily on deposits as a low-cost funding source, this result to thinner capital buffers and heightens risk-taking incentives (Linh et al., 2019; Mili et al., 2017; Myers, 1977). Rapid loan growth often coincides with weakened credit standards and increased lending to lower-quality borrowers, leading to higher credit risk and the erosion of capital as losses are absorbed (Beck et al., 2022; Huizinga & Laeven, 2019; Naili & Lahrichi, 2022). Despite this, these banks may still maintain lower capital due to economies of scale, diversified portfolios, and greater market access when they grow in size, particularly conventional banks (Alam et al., 2017; Ibrahim & Rizvi, 2018; Tasya et al., 2022). Nonetheless, some studies document a positive relationship, arguing that rapid loan growth increases overall bank risk and therefore compels banks especially Islamic banks to hold higher capital cushions in line with the risk absorption hypothesis (Abbas & Ali, 2022; Alqahtani et al., 2017; S.-W. Wu et al., 2022).

Irrefutably, banking sector growth always positively correlates with economic growth, implying that banks grow faster when the economy is flourishing but decline or slow when the economy is doing poorly. This means that loan growth has been pinpointed as the primary factor that may trigger a financial catastrophe. This is because most financial tragedies have been caused by periods of excessive loan growth during good times, resulting in the formation of asset price bubbles. Increases in loan growth also cause increased credit risk but a decrease in the capital level of banks. Taking this into account, bank growth is included as one of the variables that could influence the capital level of banks. Annual loan growth is used to proxy for bank growth. The hypothesis related to bank growth are as follows:

$H6_0$: There is no significant relationship between bank growth and capital level.

$H6_A$: There is a significant relationship between bank growth and capital level.

2.4.7 Cost Efficiency

Cost efficiency is imperative if banking institutions are to enhance profitability, maintain competitiveness, and allocate resources effectively. Identifying and implementing cost-saving measures can help banks improve their overall financial performance and viability in the long run. Cost efficiency becomes more paramount during periods of financial uncertainty. During such periods, the importance of achieving cost efficiency becomes particularly crucial for effective decision making. Many previous studies employ cost-to-income ratios as a metric to assess the cost efficiency of banks (Abbas, Iqbal, et al., 2020; Ghosh, 2023; Moudud-Ul-Huq, 2021). However, other proxies are available to measure this cost efficiency, such as non-interest expense to total assets (Ali et al., 2023; Gündüz & Gündüz, 2025; Yin, 2021) and operating income to operating expenditures (Bui et al., 2021).

Most literature finds a negative relationship between the cost efficiency and capital level of Islamic and conventional banks. Increasing the cost efficiency indirectly lowers the probability of borrowers defaulting, so banks have lower capital buffer holdings. Improvements in cost efficiency reflect the enhanced credit risk assessment and monitoring by banks, which helps reduce a bank's overall risks (Do Van, 2021; Manlagnit, 2015). As a result, banks are less likely to face bankruptcy and lower their capital level for other profitable financing and investment activities. Conversely, banks with poorer cost efficiency must maintain an increased capital level as a safety cushion in response to lower returns. As Nomran and Haron (2020) discovered, less cost-efficient Islamic banks uphold higher capital ratios. According to the authors, the cost inefficiencies of these banks stem from higher operating expenses, primarily because of the additional layers of governance and supervision, which lead to increased administrative costs. Consistent with the findings of Majeed (2021), the author claims that Islamic banks appear to suffer high costs in terms of promotional, marketing, and technology investment but can sustain higher asset quality despite being less cost-efficient. On that account, Islamic banks retain high capital ratios to shield against risks

that could threaten their banking stability due to their inefficient methods of managing expenses.

A comparative study on GCC countries by Alsharif (2021) reveals that large Islamic banks are less cost-efficient than smaller Islamic banks and conventional banks. Although Islamic banks are highly capitalized and highly liquid due to a lack of proper liquidity management channels, these banks still face challenges in managing their expenses efficiently. This is partly because Islamic banks hold too many liquid assets, losing the chance to invest in other projects yielding high returns because they need to manage their operating expenses (Le et al., 2022). Bitar et al. (2020) argues that having more capital and liquidity generally improves the efficiency of conventional banks to a greater extent than applies to Islamic banks. This could be reflected in the bad credit scoring and less monitoring of larger Islamic banks, which previous studies agree results in less cost efficiency (Naili & Lahrichi, 2022; Nam et al., 2022). From another perspective, Abdulrahman et al. (2023) link the lower cost efficiency in Islamic banks with the complexity of structuring Shariah-compliant financial products, which contributes to higher overhead costs and, therefore, the sustain of high capital.

However, some studies found that most of the efficient banks are becoming better-capitalized, leading to a positive relationship between the two variables. Indeed, banks exhibiting greater cost efficiency generally produce higher earnings, leading to improved capitalization. As most prior studies verify, banks prefer to increase the capital level through retained earnings due to the ease of growth and lower costs (Etudaiye-Muhtar & Abdul-Baki, 2021; Sari et al., 2018). High cost efficiency usually indicates that a bank is better at generating income by spending less to earn each unit of income. By enhancing profitability through increased efficiency, banks can provide more attractive interest rates to depositors. As banks achieve lower production costs, the banks can issue loans at acceptable and affordable rates (Lotto, 2019; Rahman et al., 2017). As a result, more efficient banks strategically offer higher interest rates on deposits while charging lower interest rates on loans to expand their market share. From another viewpoint, banks that are less cost-efficient tend to maintain smaller capital level due to the lower profits. These less-efficient banks often opt for less risky ventures to ensure the safety of the bank, owing to the reduced capital buffers, as suggested by the theory of risk absorption.

Despite this, banks with lower cost efficiency might lean toward assuming higher risks even with a reduced capital level. Miah and Sharmeen (2015) contend that less-efficient banks need additional resources to monitor and manage their existing portfolios, which indirectly raises operating expenses. Consequently, these banks may embrace higher-risk portfolios to compensate for the decline in profitability. Based on the risk absorption hypothesis, these banks might have a lower risk absorption ability when facing unforeseen catastrophes that may arise as a consequence of undertaking greater risks due to holding less capital. Ben Zeineb and Mensi (2018) emphasize that an inefficient banking sector can impede financial growth and cause an economic slowdown. Goyal et al. (2023) reveal that banking sectors in High-Income countries have lower cost-to-income ratios due to their effective borrower screening and monitoring processes. By monitoring borrowers closely, banks can reduce the ratios of non-performing loans, thus increasing profits, which can improve the capital.

Overall, the evidence indicates banks that operate more efficiently typically proxied by lower cost-to-income ratios or lower non-interest expense relative to assets tend to face fewer credit losses due to better screening and monitoring. As a result, these banks can sustain lower capital buffers while reallocating resources toward profitable financing and investment (Abbas, Iqbal, et al., 2020; Do Van, 2021; Manlagnit, 2015; Yin, 2021). Contrarily, less efficient banks particularly the Islamic banks with higher operating and governance overheads or product-structuring complexities, commonly hold higher capital ratios as a precaution against weaker earnings and elevated risk, consistent with the risk absorption hypothesis (Abdulrahman et al., 2023; Majeed, 2021; Nomran & Haron, 2020). Several empirical studies also find a positive relationship where, more efficient banks generate stronger retained earnings and thus build high capital (Etudaiye-Muhtar & Abdul-Baki, 2021; Lotto, 2019; Rahman et al., 2017; Sari et al., 2018). However, when banks operate inefficiently, the banks often chase higher returns by shifting into riskier loans or investments even with holding relatively thin capital buffers. This raises banks' vulnerability to shocks and can dampen broader sectoral growth. The effect is less pronounced in High-Income countries, given that tight supervision supports better asset quality and steadier profitability (Ben Zeineb & Mensi, 2018; Goyal et al., 2023; Miah & Sharmeen, 2015).

Cost efficiency may influence the capital level of Islamic and conventional banks in High-Income and Middle-Income countries either negatively or positively.

Therefore, cost efficiency is included as one of the bank-specific factors that may influence the capital decision of banks. Non-interest expense to total operating income is utilized to proxy for the cost efficiency of banks. The hypothesis related to cost efficiency are as follows:

$H5_0$: There is no significant relationship between cost efficiency and capital level.

$H5_A$: There is a significant relationship between cost efficiency and capital level.

2.5 Control Variable

A control variable is used to control for possible heterogeneity issues along the study timeframe or among units of study. Economy is used to control the heterogeneity problem of banking institutions in the High-Income and Middle-Income countries. Meanwhile, crises period is treated as a control variable in this study to control for potential time variations over the 30-year period of the study.

2.5.1 Economy

The economy is not constant or static, always changing once it has reached a peak or trough. Economic expansion occurs when a cycle has not yet reached its peak, and a recession is expected to follow once it has peaked. During a recession, slow economic growth is expected. Once the cycle hits the bottom, the economy will begin to flourish again until it reaches a peak, completing the economic cyclization. Many proxies are used to measure the economy, such as the annual growth rate of gross domestic product (Naili & Lahrichi, 2022; Smaoui, Mimouni, et al., 2020), GDP per capita (Anginer et al., 2021; Ashraf et al., 2020), GNI per capita (Koju et al., 2019), and the GDP deflator (Kanago, 2023; Manz, 2019; Polbin et al., 2019).

Numerous studies report that the economy is directly linked to the behavior of banks regarding the capital level. In this sense, when the economy is flourishing, banks seek to decrease the capital ratio in order to capitalize on good business opportunities. In contrast, when the economy is contracting, banks are more inclined to boost the capital level to ensure the capital ratio does not fall below the minimum capital requirement. Several studies have linked a procyclicality behavior of the economy and

the capital level of banks, signaling a negative relationship between the two variables. The reason is that during good times, asset quality improves, suggesting a lower tendency for default risk; in return, this reduces the overall credit risk. Hence, during periods of economic expansion, banks tend to engage in more financing activity by lowering the capital level, having underestimated their risk exposure (Modugu & Dempere, 2022; Nam et al., 2022). Consequently, banks cannot absorb realized non-performing loans during a deflation without curtailing the financing activity. In such times, banks are forced to enhance the capital level to absorb the increase in defaulting loans. This finding is supported by other studies, which highlight how the procyclicality behavior between the economy and the capital level is largely due to risky activities. Banks engage in these without much justification to profit from the potential business prospects that arise during prosperous times by reducing their capital (Alraheb et al., 2019; Moudud-Ul-Huq, 2019; Ovi et al., 2020).

The high cost of raising new capital during a recession also supports the concept of the procyclicality behavior between the economy and the capital level. This stems from informational asymmetry issues and agency problems during economic downturns, which make it expensive to acquire additional capital (Akinsola & Ikhide, 2018; Benbouzid et al., 2022). This is particularly true among Islamic banks because Islamic financial markets are less established, causing the problem of informational asymmetry. (Bitar et al., 2018) prove that in 28 MENA and SEA countries, raising new capital for Islamic banks tends to be expensive due to the higher information and transaction costs associated with the less-developed Islamic financial markets. Given this, banks choose to provide less funding in difficult times to curb a capital crunch and prevent the capital ratios from falling below the minimum regulatory requirements. Climate risks further add an additional channel via economy that may influence the bank capital level. Under transition risk, progress toward a low-carbon economy often necessitates higher capital buffers to absorb potential losses on carbon-intensive exposures (Alessi et al., 2024; Garcia-Villegas & Martorell, 2024). Under physical risk, banks typically increase capital following natural disasters as a precautionary measure, although severe events may instead erode capital and transmit distress across financial system (Mandel et al., 2021; Schuwer et al., 2019).

Nonetheless, other studies reveal a positive relationship between the economy and capital level, implying a countercyclical behavior. This occurs because banks prefer

to build up cheap capital during an upturn in order to mitigate the negative consequences of a credit crunch during a downturn (Klein & Turk-Ariss, 2022; Saif-Alyousfi et al., 2020). This runs parallel to the primary role of the countercyclical capital buffer outlined in Basel III. Accordingly, banks opt for lower financing activities during good times to uphold higher capital adequacy ratios. Likewise, banks draw upon high capital holdings to withstand unforeseen financial shocks during downturns without breaching the minimum required capital (Riaz et al., 2019; Turguttopbas, 2018; J. Wu et al., 2022). This is consistent with the risk absorption hypothesis, which suggests that maintaining strong capital reserves helps banks absorb unexpected loan losses and remain stable during periods of financial stress.

Furthermore, the increased capital ratios during an upturn lower the systemic risk of banks. Andrieș and Sprincean (2021) posit that the accumulation of risk usually starts to grow during booms as the amount of bank credit extensions increases dramatically. Meanwhile, banks are encouraged to hold high capital ratios in response to increased credit risk due to their aggressive financing activities while the economy is flourishing. El-Ansary et al. (2019) relate how the high capital ratios maintained by Islamic banks at all times compensate for the lack of Islamic interbank money markets and Shariah-compliant lenders of last resort. This is consistent with the findings of Mahdi and Abbes (2018a), who reveal that the higher liquidity risk in Islamic banks requires the banks to constantly hold more capital, regardless of whether times are normal or bad. The authors claim that a lack of diversity and concentration in the asset structure; Shariah issues in asset sale and securitization; and the inefficiency of the interbank market exacerbate the liquidity risk in Islamic banks.

Most prior studies document that Islamic banks exhibit a countercyclical behavior, unlike conventional banks (Albaity et al., 2022; Aysan & Ozturk, 2018; Ibrahim, 2016). This countercyclical behavior related to the capital level is linked to the high asset quality of these banks by avoiding speculative investments and focusing on asset-backed financing, which significantly reduces the risk of non-performing loans and increases bank stability (Causevic, 2018). As a result, Islamic banks tend to sustain higher capital and asset quality, which helps the banks to survive during both economic upturns and downturns. Mollah et al. (2017) contend that the conservative way of Islamic banks in handling risk, as well as profit and loss sharing with depositors, enable the banks to hold high capital. Nonetheless, a study by Maatoug et al. (2019) in the

Middle East and North African region from 2000 to 2004 finds that both Islamic and conventional banks portray a countercyclical behavior, meaning that the banks decrease their total capital ratios during economic downturns, and vice versa.

In most economic environments, banks display procyclical behavior. During good economic conditions, improving asset quality and lower perceived default risk encourage banks to reduce capital ratios and expand credit (Benbouzid et al., 2022; Modugu & Dempere, 2022; Nam et al., 2022). Meanwhile, during bad economic conditions, banks are prompt to build capital to meet regulatory minimum requirement as credit losses materialize and external equity becomes costlier under information asymmetry (Akinsola & Ikhide, 2018; Benbouzid et al., 2022). Empirical literatures also found a countercyclical behavior. Where banks accumulate higher capital in flourish times in line with the countercyclical capital buffer of the Basel III (Albaity et al., 2022; Klein & Turk-Ariss, 2022). The procyclical behavior is strongly observed in Islamic banks owing to asset-backed financing, avoidance of speculative exposures, and structural liquidity constraints that encourage persistently higher capital (Aysan & Ozturk, 2018; Ibrahim, 2016).

Thus, considering the significant influence of the economy on the capital decision of banks, economy is included as one of the independent variables. The annual GDP deflator is the measurement for economy in this study. The hypothesis related to economy are as follows:

$H8_0$: There is no significant relationship between economy and capital level.

$H8_A$: There is a significant relationship between economy and capital level.

2.5.2 Crises Periods

This study defines crises as events of economic uncertainty that can jeopardize the stability of the financial sector. Over the 30-year period, the study acknowledges a total of seven crises affecting the banking sector from 1995 to 2024. These are the Asian financial crisis, monsoon flood crisis, global financial crisis, Arab spring crisis, oil price crisis, COVID-19 crisis, and Pakistani economic crisis.

In 1997, Asian countries faced strong headwinds that negatively influenced the banking sector. The Asian financial crisis (AFC) began in Thailand due to the collapse of the Thai Baht quickly spread further across East and Southeast Asia, triggering

widespread financial instability. Banks were particularly vulnerable as non-performing loans elevated and liquidity dried up, forcing many banking institutions into bankruptcy. The International Monetary Fund (IMF) was called in to provide financial support by launching a $35 billion fund aimed at stabilizing the currencies of the three countries most severely affected by the crisis: Indonesia, Korea, and Thailand (International Monetary Fund, 2000). In response to the AFC, stricter capital adequacy ratios were implemented across ASEAN countries, following the Basel Standards, to ensure banks would be resilient to absorb future unexpected shocks (Adams, 2008).

Bangladesh was hit by a monsoon flood crisis in 1998 that caused huge damage to the country. This is because Bangladesh is one of the most highly climate-vulnerable countries in the world, being susceptible to a growing severity and frequency of climate-related events such as floods, cyclones, and other natural disasters (Dafermos, 2023). The 1998 monsoon flood had a multi-dimensional impact on the Bangladeshi economy in terms of agriculture, infrastructure, and public health. The World Bank Group (1998) reported that 1.4 million hectares of crops were destroyed, 15,927km of roads and 6,795 bridges were damaged, and over 250,000 cases of diarrhea were filed due to contaminated water. Consequently, the banking sector of Bangladesh faced operational and financial challenges throughout the situation due to the physical damage that disrupted normal banking operations.

Thirdly, the collapse of Lehman Brothers in 2008 caused major disruption to the stability of the banking industry. A financial crisis originated in the United States in 2007 before escalating into an international banking crisis, also known as the global financial crisis (GFC). As proven by Cubillas and Suárez (2018), undercapitalized banks from 17 developed and developing countries reduced credit financing extensively during the GFC. This was because raising equity is deemed to be difficult for banks during a crisis, so banks are forced to cut financing to meet the minimum regulatory capital. Bhimjee et al. (2016) discovered that a high degree of financial interconnectedness in the banking sectors of developed countries caused banks to be highly affected by the GFC, taking longer time to recover. This confirms the adverse impacts of a crisis on bank lending capacity and the relevance of holding an adequate capital ratio.

From 2011 to 2012, the Arab Spring crisis took place in Jordan and six Gulf Cooperation Council (GCC) countries. The crisis was sparked by the suicide of

Mohamed Bouazizi, a 26-year-old street vendor from Tunisia, in January 2011. He set himself on fire in protest against police harassment and government injustice. The initial uprising in Tunisia soon triggered mass protests that inspired citizens across the Arab world to organize similar movements protesting against political corruption and demanding reform (Al Jazeera, 2020). This prevented the banking sectors in the GCC countries from improving their financial performance and profitability levels during the Arab Spring, resulting in a negative impact (Jaara, 2021). In Jordan, a 3.3 percent decline in gross domestic product (GDP) occurred due to the Arab Spring (Masetti et al., 2013).

Soon after that, the global economy was once again shaken by the sharp drop in oil prices between the middle of 2014 and early 2016. The banking industries in oil exporting and importing countries were significantly impacted by this crisis. This is because shocks in oil prices affect the performance of the banking industry in terms of its capitalization, profitability, liquidity position, and management efficiency (Lee & Lee, 2019). Empirical findings obtained by Al-Khazali and Mirzaei (2017) indicate that bank revenues in the 30 largest oil exporting countries were negatively impacted by oil price shocks, whereby a notable rise in non-performing loans correlated with the drop in oil prices. Focusing only on GCC countries, Khandelwal et al. (2016) document similar findings, in which a drop in oil prices led to a rise in the percentage of the non-performing loans ratio, causing bank deposits and credit growth to decline.

Next, the world was surprised by the unexpected outbreak of COVID-19 at the end of 2019. COVID-19 was initially spotted in Wuhan, China, before it spread to the rest of the globe. Elnahass et al. (2021) reveal that the global banking industry faced challenges in terms of financial performance and stability with the sudden outbreak of COVID-19. Consistently, the COVID-19 pandemic resulted in a reduction in bank financing, which caused a decline in loan portfolio quality and a downgrading of credit ratings, so it was challenging for banks to access capital markets (Colak & Oztekin, 2021; Rizwan et al., 2022). AlHassan et al. (2022) revealed that a deterioration in asset quality may be significant for banks if the COVID-19 pandemic was prolonged, despite the employment of loan moratoriums. However, by the end of 2022, most countries had lifted their lockdowns because COVID-19 had been placed under control. The World Health Organization (2023) then announced in 2023 that COVID-19 was an ongoing health issue that no longer required an international emergency response.

After the outbreak of COVID-19, the Pakistani economic crisis occurred from 2022 until 2024. Zaidi (2025) asserts that this caused Pakistani banks cost management difficulties due to the higher taxation imposed by the government with lower deposits. The World Bank Group (2024) asserts that lower demands for loans stem from deteriorating economic conditions, causing banks to crowd out financing to the private sector while allocating more financing to the public sector.

This proves that banking sectors are negatively affected during crises periods, regardless of whether they are Islamic or conventional banks. This is because of the loan bubbles that initially accumulate during a boom, whereby the credit supply is at its highest point. This causes capital level to diminish in bad times when the bubbles explode. The decline in the capital ratios of banks is to protect banks against insolvency when non-performing loans start to materialize during a recession. Banks are more vulnerable during crises periods, so having an adequate capital level is paramount to ensure the banks are stable. Previous studies agree that maintaining adequate capital increases the probability of a bank's survival, especially during a recession, by absorbing unexpected shocks (Berger & Bouwman, 2013; Klein & Turk-Ariss, 2022; Moudud-Ul-Huq et al., 2022), based on the risk absorption hypothesis.

Similarly, banks are more fragile during economic downturns, partly due to the deterioration of asset quality. This contributes to the negative association with the capital level of banks during bad times. This happens because of the improper financing activities exercised by banks during good times. Banks tend to be reckless during periods of higher economic growth by creating more liquidity in the market. Accordingly, banks tend to be relaxed about screening borrower credit assessments in order to increase the credit supply and gain more earnings (Berger et al., 2022; Le et al., 2022). As J. Wu et al. (2022) specify, when economic growth is high, expansionary monetary policy is adopted, which reduces interest rates and lowers financing costs. Ergo, banks are encouraged to leverage their financial debt by extending more credit, which subsequently increases their liabilities and reduces their capital.

From another perspective, a positive relationship is evident, whereby banks hold high capital during crisis periods. Banks face high risks during tough times, which can impair their financial performance and make the banks more vulnerable to crises (Chazi et al., 2024; Smaoui, Mimouni, et al., 2020). Consequently, more capital injections are required to strengthen the financial position of banks and increase the risk absorption

capability of banks during such periods, supporting the risk absorption hypothesis. As highlighted by Repullo and Suarez (2013), the likelihood of defaulting in a recession is higher because of the depreciation in borrower credit ratings. As a result, banks face higher credit risk at such times, forcing additional capital injection. The extra capital acts as a cushion to absorb the greater unexpected risk and maintain bank stability during the economic downturn.

Surprisingly, a plethora of prior studies reveal that Islamic banks have demonstrated resilience in times of crises. This is because Islamic banks always hold high capitalization to avoid any risks that can threaten the stability of the banks. In a similar vein, El-Ansary et al. (2019) highlight that high capital ratios are held by Islamic banks to compensate for the lack of Islamic interbank money markets and Shariah-compliant lenders of last resort. Fakhfekh et al. (2016) agree, stating that Islamic banks portray better asset quality and capitalization, making the banks more resilient during volatile market situations. The high capital level of Islamic banks during crises relative to normal times is supported by many studies (Bilgin et al., 2021; Maatoug et al., 2019; Smaoui, Salah, et al., 2020).

Furthermore, the findings of Akkas and Al Samman (2022) reveal that Islamic banks performed better during the COVID-19 pandemic due to the risk-sharing concept of Islamic financial institutions. This allows Islamic banks to be less risky with lower financial and operational leverage, making the banks highly capable of dealing with crises effectively. As Ahmed et al. (2022) clarify, the Islamic banking system promotes profit management and moderation over high-risk ventures, causing the credit risk in Islamic banks to decrease. As Suripto et al. (2023) documented, Islamic banks in the Association of Southeast Asian Nations were more resistant than conventional banks during the COVID-19 pandemic, with better rates of return and liquidity levels. Similarly, a study conducted by Maatoug et al. (2019) on Islamic and conventional banks in the Middle East and North African region from 2000 to 2014 found that crises periods are insignificant for Islamic banks but not for conventional banks. This demonstrates that Islamic banks are stronger in withstanding crises compared to conventional banks.

Nevertheless, in the post-crises phase, conventional banks appear more stable than Islamic banks (Alqahtani et al., 2017; Chazi et al., 2024; Sghaier et al., 2016). The unlimited and wider range of financial activities of conventional banks allows the banks

to recover losses far more quickly after a crisis. Meanwhile, Islamic banks face difficulties in managing liquidity because of the less developed capital market problems that limit the fundraising resources of the banks (Bitar et al., 2018; Yin, 2021). Moreover, the rapid recovery of conventional banks from financial crises can be attributed to effective credit control, which enhances the ability of the banks to anticipate and manage risks, facilitating recovery. This corroborates findings obtained by El-Chaarani et al. (2024), which suggest that conventional banks were less exposed to credit risk, relative to Islamic banks, during COVID-19. The authors contend that conventional banks are better-positioned in terms of financial performance and liquidity, which enables the banks to manage financial risk effectively during crises.

The nature of a bank's business is to provide financing, which exposes banks to many risks and forces banks to maintain a strong capital cushion to reduce the risk of failure, especially in a recession (Wu et al., 2020). Hence, this study considers crises period as a dummy to investigate the changes in the capital level of banks between crises and non-crisis periods. The following hypothesis are proposed in relation to crises periods:

$H9_0$: There is no significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries.

$H9_A$: There is a significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries.

2.6 Dummies of Bank Specialization and Country Group

Given the worldwide financial uncertainties, there is considerable interest in the capital level held by banks globally. The Islamic finance sector is expanding rapidly, unleashing the potential of Islamic banking as a viable alternative system to conventional banking. Therefore, many studies are actively investigating Islamic and conventional banks in order to compare both types of banking institutions. Considering that the banking systems of High-Income and Middle-Income countries vary, the determinants of capital level in both groups of countries, as well as those of Islamic and conventional banks, may be differently affected.

This is proven empirically in a study by Mili et al. (2017), focusing on foreign bank subsidiaries in developed and developing countries. The capital adequacy ratios of foreign bank subsidiaries are not affected by the same explanatory variables. Alternatively, by focusing only on the Middle East and North African (MENA) region, Maatoug et al. (2019) discovered that size, asset risk, loan growth, regulatory pressure, and business cycles are the key predictors of capital level for Islamic and conventional banks in MENA countries, based on the period 2000 to 2014. El-Ansary et al. (2019) identify a significant difference between the banking systems in terms of the determinants of the capital adequacy ratio. The authors conclude that the determinants of this ratio for Islamic banks in MENA countries are size, operational efficiency, and economic growth, whereas profitability, credit risk, and portfolio risk are the determinants of the capital level for conventional banks. Nevertheless, a study by Bitar et al. (2018) discovered that profitability, size, liquidity, and asset tangibility are the determinants of capital adequacy ratios in Islamic banks. The study examined 100 Islamic banks across 28 MENA and SEA countries from 1999 to 2013.

Looking from a different angle, Moudud-Ul-Huq (2019) reveal that banks in BRICS countries are differently affected in terms of their bank capitalization. According to the author, size and asset growth are the determinants of banks' capital decision in BRICS countries; however, risk, cost efficiency, and government securities are only significant to certain banks in these countries. A procyclicality behavior of the capital level is apparent in Brazilian, Russian, Indian, and Chinese banks, while South African banks act countercyclically. In addition, Valencia and Bolaños (2018) took the initiative to examine the determinants of the capital level at a global scale by using a sample of 3,461 banks from 79 countries (25 developed and 54 developing countries), spanning the period 2001 to 2013. The authors found that on average, banks globally display procyclical capital level behavior, with size, profitability, and GDP being the main factors that influence banks' capital decision.

Meanwhile, Hewaidy (2018) focuses only on Kuwaiti banks, documenting that size, asset quality, management quantity, and liquidity are the strong determinants of the capital level for banks in Kuwait. Surprisingly, the capital level of Kuwait banks shows no evidence of being affected by profitability. Meanwhile, by focusing only on Indonesian Islamic banks, Abusharba (2013) reveal that profitability, liquidity, and asset quality influence the capital level of these banks. The author discloses that deposit

structure and operational efficiency play no role in the capital decision of Indonesian Islamic banks. Bogale (2020) focuses on Ethiopian private commercial banks, discovering that size, return on equity, and loan-to-asset ratios are negatively related to the capital decision of banks, while return on assets and loan loss provision are positively related.

A study by Osei (2016) reveals that the capital adequacy ratios of Ghanaian banks are unaffected by macroeconomic factors but react to bank-specific factors like credit risk, bank performance, bank deposit ratio, and bank size. The study period spanned 2000 to 2012. Similarly, Abiodun et al. (2020) found that the capital adequacy ratio of Nigerian banks is not influenced by macroeconomic factors; however, it is influenced by profitability, loan to total assets, non-performing loans, and size. Profitability and loan to total assets positively influence the capital of Nigerian banks, while non-performing loans and size are inversely correlated. Thoa and Anh (2017) state that the capital determinants of Vietnamese banks are the net interest margin, liquidity, loan loss reserve, and loans. The authors, however, find no evidence of the relationship between size, leverage, and capital adequacy ratios among Vietnamese banks.

Overall, prior evidence demonstrates that the determinants of bank capital level vary substantially across bank specialization (Islamic banks versus conventional banks) and country group (High-Income countries versus Middle-Income countries). This reflects that differences in institutional characteristics, market structure, and regulatory dept play a role in the capital decision of banks. Comparative cross-country analyses consistently show that banks do not respond uniformly to the same explanatory variables (Mili et al., 2017; Moudud-Ul-Huq, 2019). Regional studies reveal that in the MENA region, Islamic banks' capitalization is shaped primarily by size, operational efficiency, and economic growth, whereas conventional banks respond more strongly to profitability and credit risks (El-Ansary et al., 2019; Maatoug et al., 2019). Broader evidence from 79 countries similarly shows that global banks exhibit procyclical capital behavior, with size, profitability, and GDP emerging as robust determinants (Valencia & Bolaños, 2018). At the country level, findings diverge even further in which Kuwaiti, Indonesian, Ethiopian, Ghanaian, Nigerian, and Vietnamese banks each exhibit distinct capital determinants (Abiodun et al., 2020; Abusharba, 2013; Bogale, 2020; Hewaidy, 2018; Osei, 2016; Thoa & Anh, 2017). The literature therefore indicates that the

determinants of bank capital are not universal rather, it is shaped by institutional characteristics and different income group level.

By using bank specialization as a dummy variable, the researcher compares the determinants of the capital decision of Islamic and conventional banks in both groups of countries. In addition, prior literature reveals the possibility of different determinants of the capital decision of banks in High-Income and Middle-Income countries. In this scenario, the country group was used as a dummy variable to distinguish between the two groups of countries, namely High-Income and Middle-Income countries, without discriminating between Islamic and conventional banks. Therefore, the null and alternate hypotheses related to bank specialization form hypothesis ten, and the same hypotheses for the country group form hypothesis eleven:

$H10_0$: There is no significant difference in the capital level between Islamic and conventional banks in both groups of countries.

$H10_A$: There is a significant difference in the capital level between Islamic and conventional banks in both groups of countries.

$H11_0$: There is no significant difference in the capital level of banks between High-Income and Middle-Income countries, regardless of the type of bank.

$H11_A$: There is a significant difference in the capital level of banks between High-Income and Middle-Income countries, regardless of the type of bank.

2.7 Interaction Variable

Bank capital decision may respond to the effects of the interacting variable in addition to the direct relationship indicated by internal and external factors. Ergo, the study takes into account cost efficiency as the interaction variable that may affect the relationship between bank diversification and capital level.

2.7.1 Cost Efficiency

Bank diversification plays a significant role in the capital decision of banks, given that diversified banks are able to minimize risk while maximizing profit. Numerous studies establish a negative link between the direct relationship of bank

diversification to the capital level. However, based on prior literature, this relationship may vary depending on the level of cost efficiency.

Cost efficiency may positively interact the relationship between bank diversification and the capital level. This is because strong cost management through enhanced monitoring and better credit risk control allows banks to boost the capital from their improved profitability (Goyal et al., 2023). In contrast, low efficient banks may decrease their capital level due to the elevated financial risk exposure that stems from poor cost control and resource management, resulting in a decline in profitability (Chen et al., 2025). Therefore, less capital is sustained by low efficient banks due to the lower profits. However, banks may improve their profits by optimizing their asset portfolio diversification to reduce risk exposure while enhancing profitability. By strategically allocating profits to more diversification activities, banks can further strengthen their income, resulting in an improved capital ratio. As validated by Adem (2023), the diversification approach reduces overall bank risk while improving a bank's profitability from the various income streams. Furthermore, this implies that high efficient banks may effectively allocate their resources to generate more stable earnings through diversification, which support capital accumulation.

From another perspective, the interaction effects on the relationship between bank diversification and capital level may be negatively moderated by cost efficiency. High profitability reflects an ability to handle operating costs, which results in efficient banks relying less on a high capital buffer (Do Van, 2021). Meanwhile, Nam et al. (2022) assert that low efficient banks are often burdened by high operating costs, thus causing a decline in profits that limits their ability to build and maintain adequate capital level. Inefficient cost control weakens their financial resilience, making low cost-efficient banks vulnerable to crises. Therefore, by diversifying their income into non-financing activities, banks can increase or decrease their capital, depending on whether the bank is high cost-efficient or low cost-efficient (Zouaoui & Zoghlami, 2023).

Based on the arguments above, it can be concluded that the diversification approach can be both beneficial and harmful, depending on the level of cost efficiency. High cost-efficient banks tend to leverage diversification more effectively because strong cost control, superior monitoring, and better credit-risk management improve profitability, enabling these banks to accumulate capital even as they diversify their income streams (Goyal et al., 2023). Conversely, low cost-efficient banks are burdened

by high operating expenses and weaker resource management leading to decline profits (Chen et al., 2025; Nam et al., 2022). Thereby, limiting their ability to maintain adequate capital buffers. Diversification can help a bank build a stronger capital base because it spreads risk and can boost earnings (Adem, 2023). But how much it helps depends on cost efficiency. If a bank runs efficiently by keeping costs under control and managing risks well, the banks may rely less on capital buffers because its profits are steady and risks are lower (Do Van, 2021). By contrast, a less cost-efficient bank might try to diversify to reduce risk but still struggle to grow its capital because of the high costs that reduced their profits. In short, diversification does not benefit every bank in the same way. Whether diversification increases or decreases the bank capital level depends on how efficiently the bank manages its costs.

Therefore, cost efficiency is treated as an interaction variable in the relationship between bank diversification and capital level. The hypothesis related to cost efficiency as an interaction variable are shown below:

$H12_0$: There is no interaction effect of cost efficiency on the relationship between bank diversification and capital level.

$H12_A$: There is an interaction effect of cost efficiency on the relationship between bank diversification and capital level.

2.8 Summary

The findings from past empirical literature on the relationship between potential explanatory variables and capital level are synthesized in this chapter, which includes detailed explanations of the theories used in this study. The proxies for each variable are also identified in this chapter. The null and alternate hypothesis for the explanatory variables and interaction variable in regard to the capital level are constructed, based on a review of the relevant literature.

CHAPTER 3
RESEARCH METHODOLOGY

3.1 Introduction

This chapter starts by focusing on the theoretical framework of the study before moving on to the research hypotheses. The selected measurement for each explanatory variable, interaction variable, and the capital level is also presented in this chapter. Then, the chapter outlines the research design of the study, which includes the unit of analysis, the types of data, the data collection, and the sources used to gather the data. In addition, Chapter 3 explains the types of preliminary analysis conducted before regressing the data sample. The relevant diagnostic testing performed for the static panel model and dynamic panel model is extensively discussed. This assists researchers in detecting any issues with the data collection so that the study yields findings that are valid, reliable, and free of bias. The regression of the basic model and interaction model are also discussed in this chapter. The analysis and discussion of the results are presented in Chapters 4 and 5, respectively, to substantiate the study hypotheses and answer the research questions. Lastly, a short summary of Chapter 3 is provided.

3.2 Theoretical Framework

Initially, the study begins with the basic model that consists of static panel data and dynamic panel data before moving on to the interaction models. A total of five distinct models form the basic static and dynamic models, namely Model A (Full Sample), Model B (Islamic Banks), Model C (Conventional Banks), Model D (High-Income Countries), and Model E (Middle-Income Countries). The same applies to the interaction model, which consists of both static and dynamic panel data. Like the basic model, the interaction model has five models. Figure 3.1 presents the proposed assessment of the capital level used in the study.

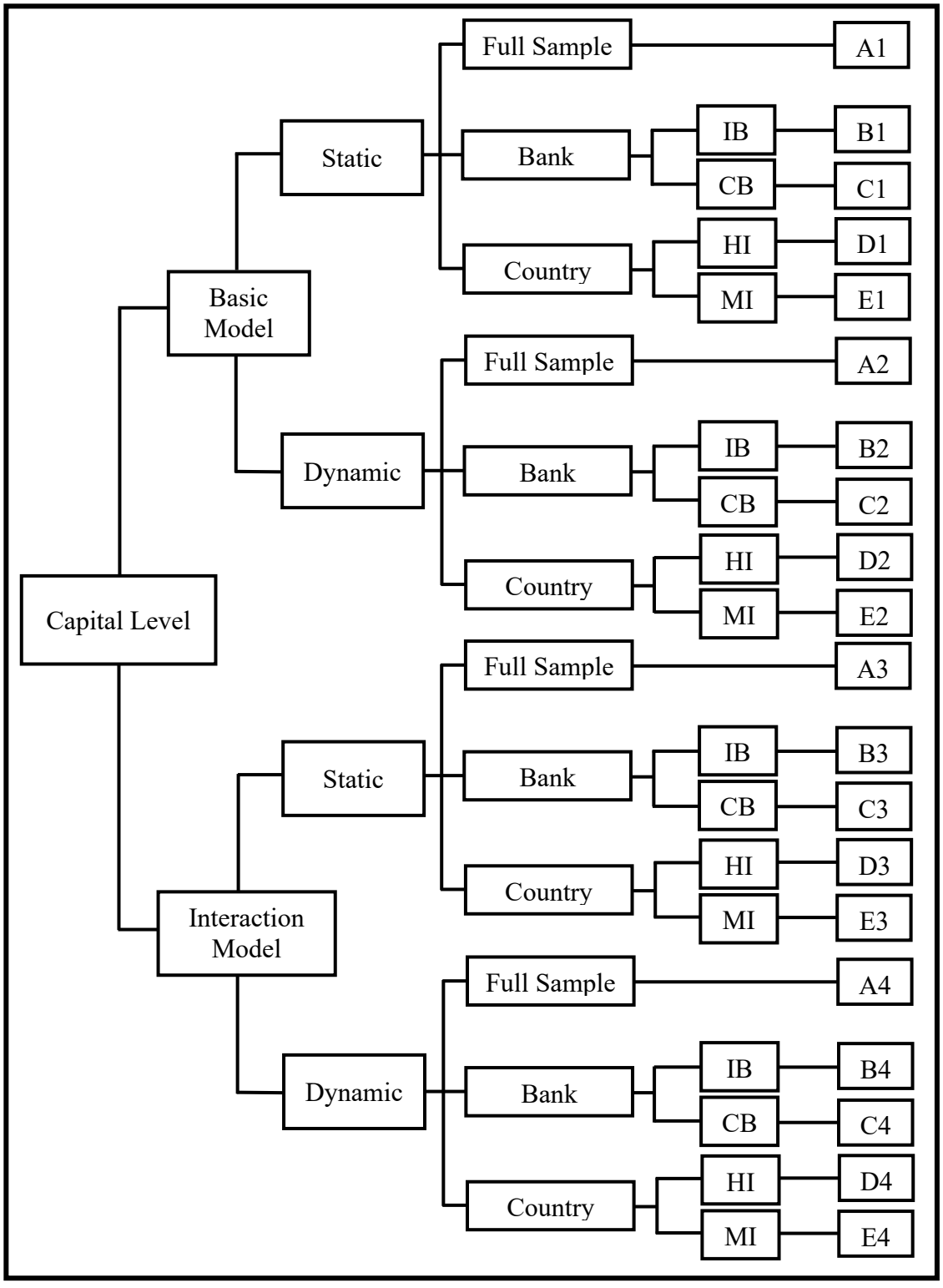

Figure 3.1 Proposed Assessment of Capital Level

Notes: IB refers to Islamic Banks, CB refers to Conventional Banks, HI refers to High-Income countries, and MI refers to Middle-Income countries. A1, A2, A3, and A4 refer to Model A (Full Sample), B1, B2, B3, and B4 represent Model B (Islamic Banks), C1, C2, C3, and C4 stand for Model C (Conventional Banks), D1, D2, D3, and D4 reflect Model D (High-Income countries), E1, E2, E3, and E4 denote Model E (Middle-Income countries).

Based on Figure 3.1 above, the study starts with a preliminary analysis of the basic model before continuing with the interaction model. The basic model functions as the baseline model in this study and is designed to investigate the direct relationship between the proposed independent variables and the capital level. This step ensures that the direct relationships between the independent variables and the capital level are clearly established before introducing the interaction variable. Establishing the direct relationship between the independent variables and the dependent variable helps provide a clear understanding of their direct relationship before interpreting the interaction effects. This is considered a critical step to ensure that the interpretability of the interaction model is supported by prior empirical findings and the theoretical framework (Andersson et al., 2014). Following the establishment of the direct relationship, the interaction model is employed to analyze the interaction effect of cost efficiency on the relationship between bank diversification and the capital level. In the preliminary analysis, to determine whether to employ a static or dynamic model, an endogeneity test is executed beforehand. In the absence of endogeneity, using a static model is considered the most appropriate approach. However, when endogeneity is detected, a dynamic model is more suitable to obtain consistent and unbiased results. In the final estimation, the basic model serves as a benchmark to facilitate the analysis of the interaction model. Ultimately, the study analyzes only the results from the interaction model, either static (A3, B3, C3, D4, E3) or dynamic (A4, B4, C4, D4, E4), depending on whether or not there is an endogeneity issue in the data sample. The full sample (A1, A2, A3, A4) is analyzed by pooling the data of Islamic and conventional banks in the High-Income and Middle-Income countries. The full sample is then divided by bank (B1, C1, B2, C2, B3, C3, B4, C4) and by country (D1 E1, D2, E2, D3, E3, D4, E4) to account for the institutional differences of Islamic and conventional banks, as well as the heterogeneity arising from cross-country variations between High-Income and Middle-Income countries.

Accordingly, a total of twelve (12) research frameworks is developed to meet the research objectives of the study. The research frameworks include both the basic and interaction models. Figure 3.2 represents the basic research framework of the full sample (A1) for the static panel data. Figure 3.3 depicts the basic research framework for both Islamic (B1) and conventional banks (C1) for the static panel data, while Figure

3.4 shows the basic research framework for the two groups of countries, High-Income (D1) and Middle-Income countries (E1), for the static panel data.

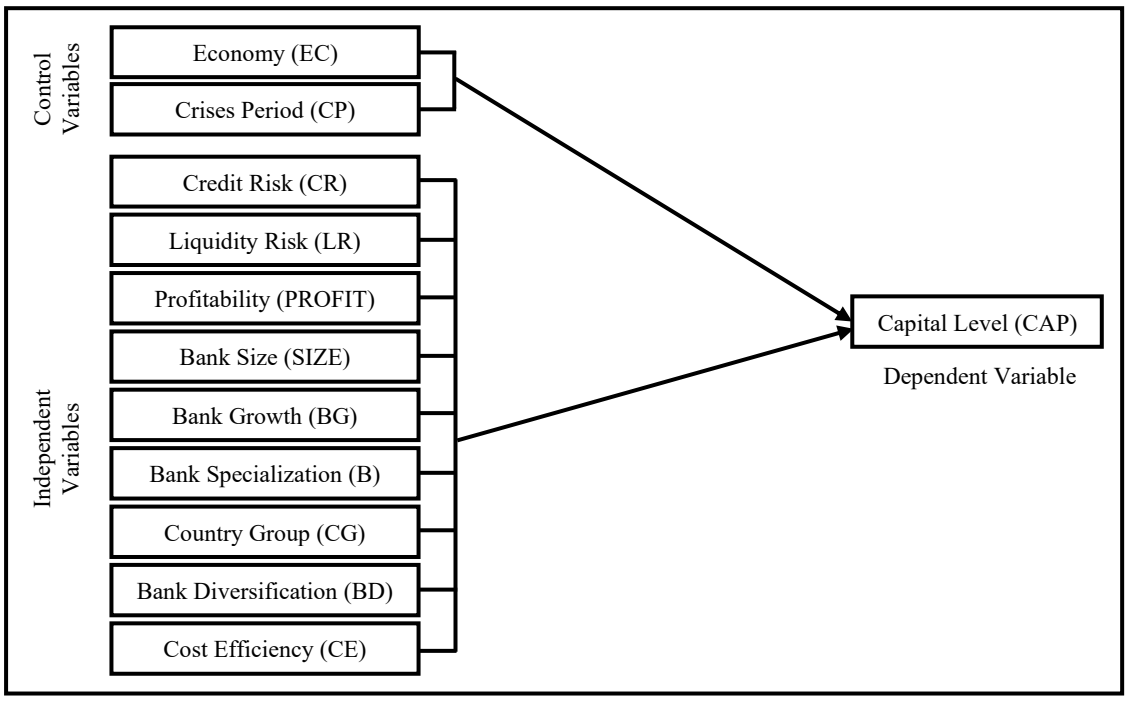

Figure 3.2 Research Framework of Basic Model for Full Sample (A1) using Static Panel Data

In the A1 model, all the independent variables, including the dummies and control variables, are included, but the interaction variable is not. This is to test the basic model to understand the direct relationship between the explanatory variables and the capital level before proceeding with the interaction model.

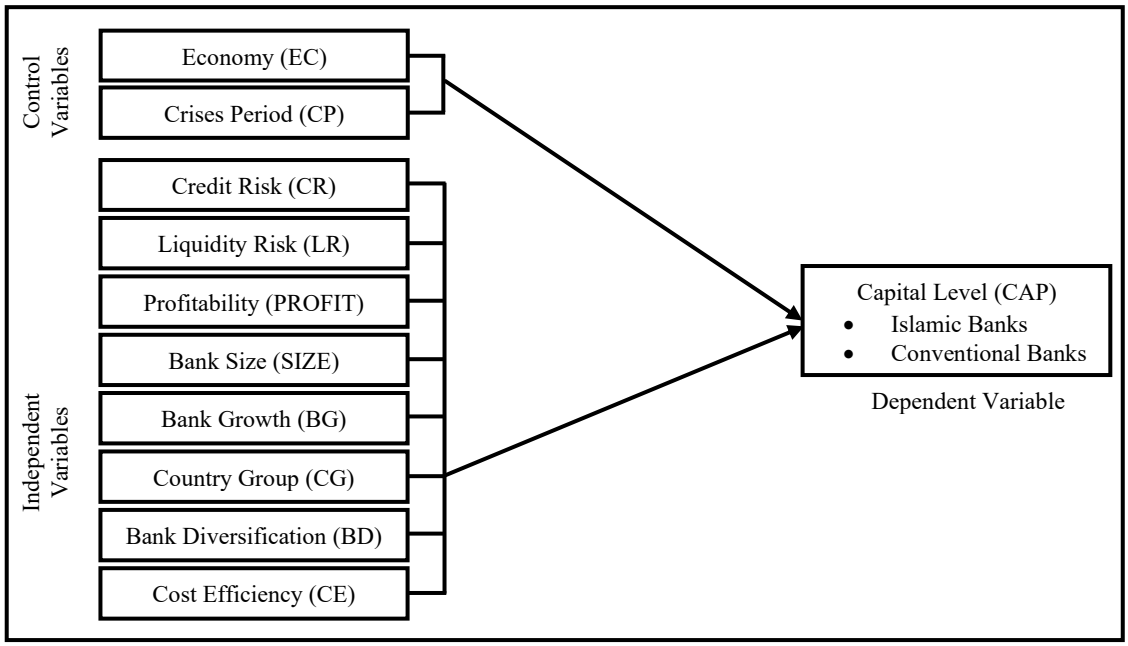

Figure 3.3 Research Framework of Basic Model for Islamic Banks (B1) and Conventional Banks (C1) using Static Panel Data

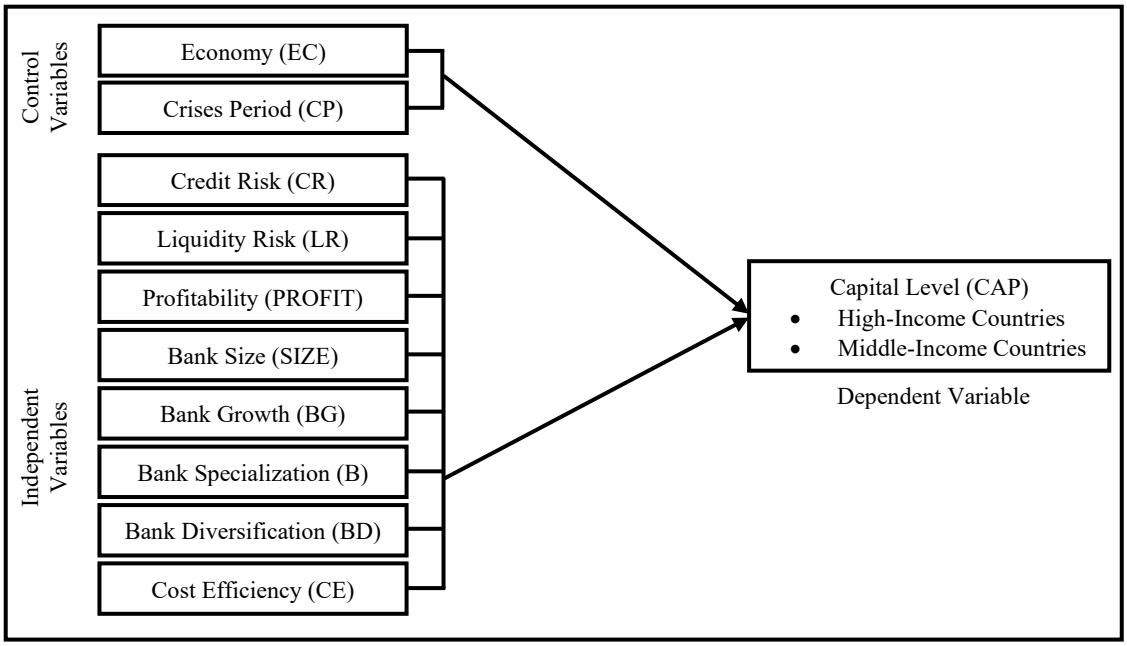

Figure 3.4 Research Framework of Basic Model for High-Income Countries (D1) and Middle-Income Countries (E1) using Static Panel Data

For models B1 and C1, the bank specialization variable is excluded in the basic model because the sample is distinguished into Islamic or conventional banks, regardless of whether the banks are in High-Income or Middle-Income countries. As a result, same equations are portrayed for models B1 and C1. Meanwhile, for models D1 and E1, the country group variable is excluded from the basic model because the sample is divided into High-Income or Middle-Income countries, regardless of whether it refers to Islamic or conventional banks, resulting in an identical equation for both models.

Then, the research framework of the basic model using dynamic panel data is illustrated in Figure 3.5 for the full sample (A2), Figure 3.6 for Islamic (B2) and conventional banks (C2), and Figure 3.7 for High-Income (D2) and Middle-Income countries (E2).

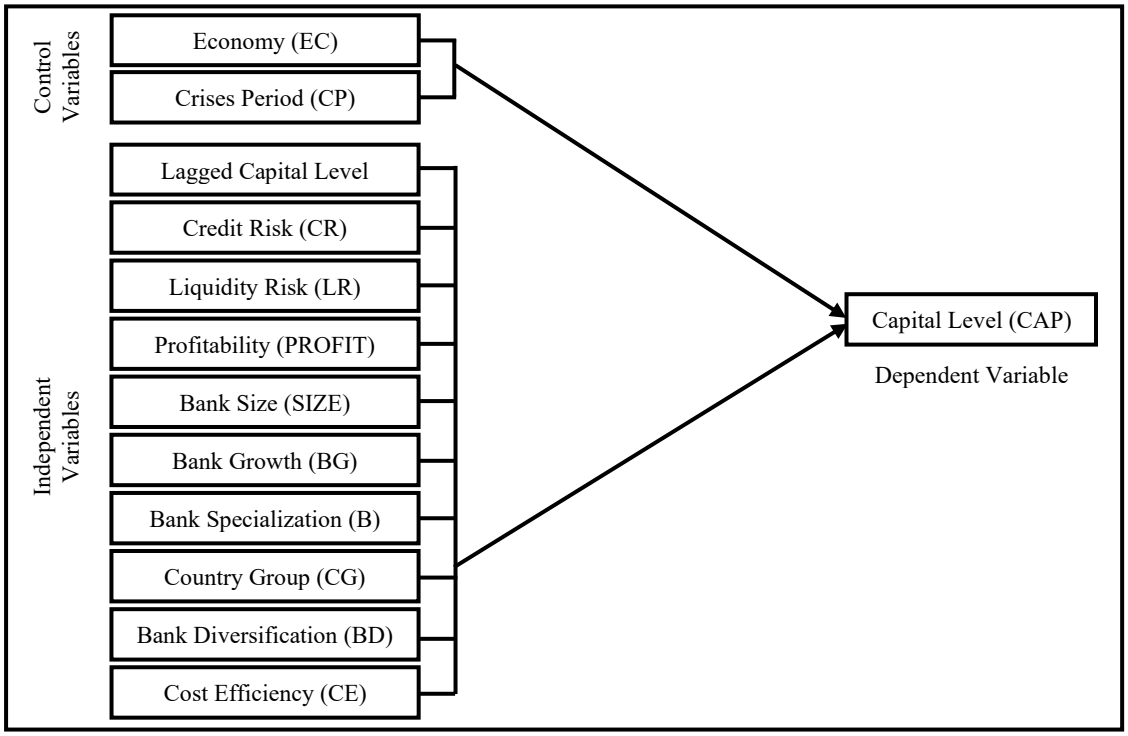

Figure 3.5 Research Framework of Basic Model for Full Sample (A2) using Dynamic Panel Data

The A2 model includes all the independent variables, including the dummies and control variables, but it excludes the interaction variable, similar to the A1 model. However, the A2 model incorporates the lagged capital level in the framework due to the nature of dynamic panel data.

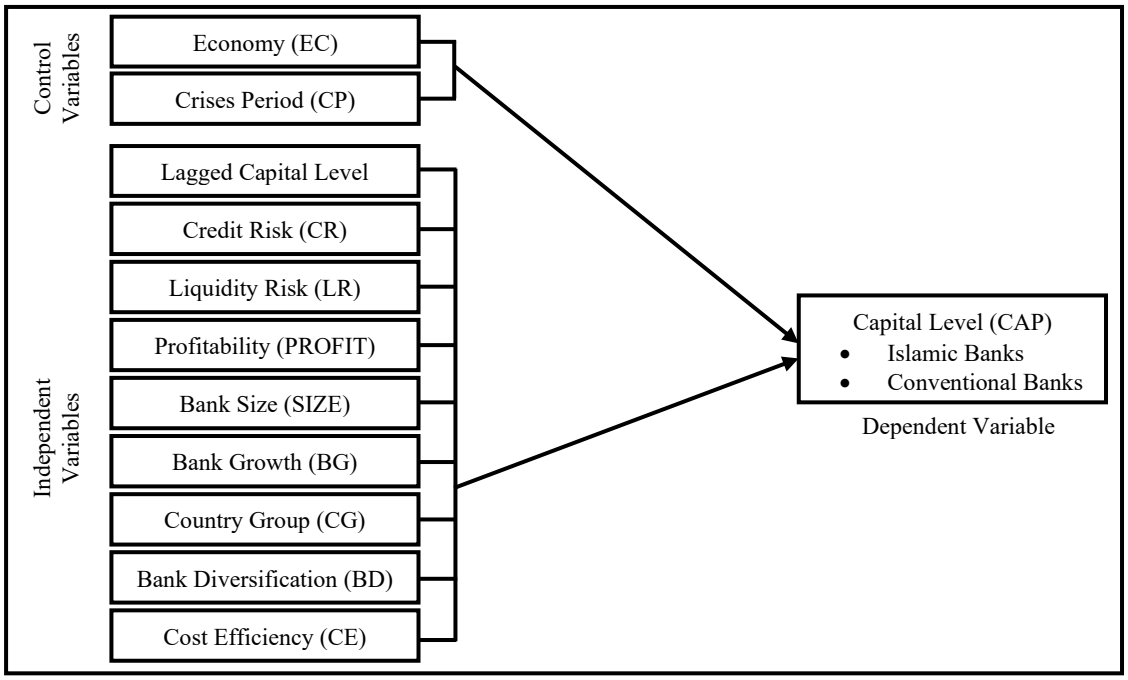

Figure 3.6 Research Framework of Basic Model for Islamic Banks (B2) and Conventional Banks (C2) using Dynamic Panel Model

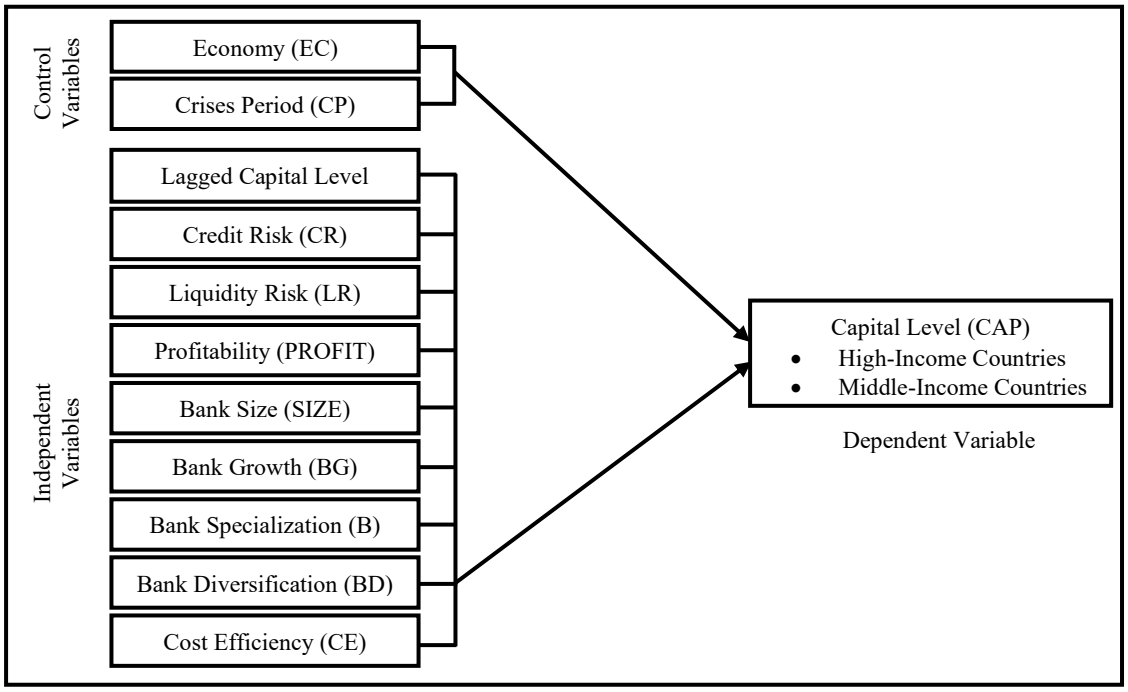

Figure 3.7 Research Framework of Basic Model for High-Income Countries (D2) and Middle-Income Countries (E2) using Dynamic Panel Data

For models B2, C2, D2, and E2, the same applies as with B1, C1, D1, and E1 but with the lagged capital level added due to the dynamic nature of panel data. Hence, the equations for B2 and C2 are identical, which also applies for D2 and E2.

After executing the preliminary analysis of basic model, the interaction model is designed, which proposes cost efficiency as an interaction variable in the relationship between bank diversification and capital level. The research framework of the interaction model using the static panel data is presented as Figure 3.8 for the full sample (A3), Figure 3.9 for both Islamic (B3) and conventional banks (C3), and Figure 3.10 for the High-Income (D3) and Middle-Income countries (E3).

Unlike the A1 model, by using the static panel data, the A3 model includes cost efficiency as an interaction variable in the relationship between bank diversification and the capital level. The A3 model enables the observation of potential changes in the direct relationship between the explanatory variable and the capital level after adding the interaction with cost efficiency, in comparison to the basic model involving static panel data.

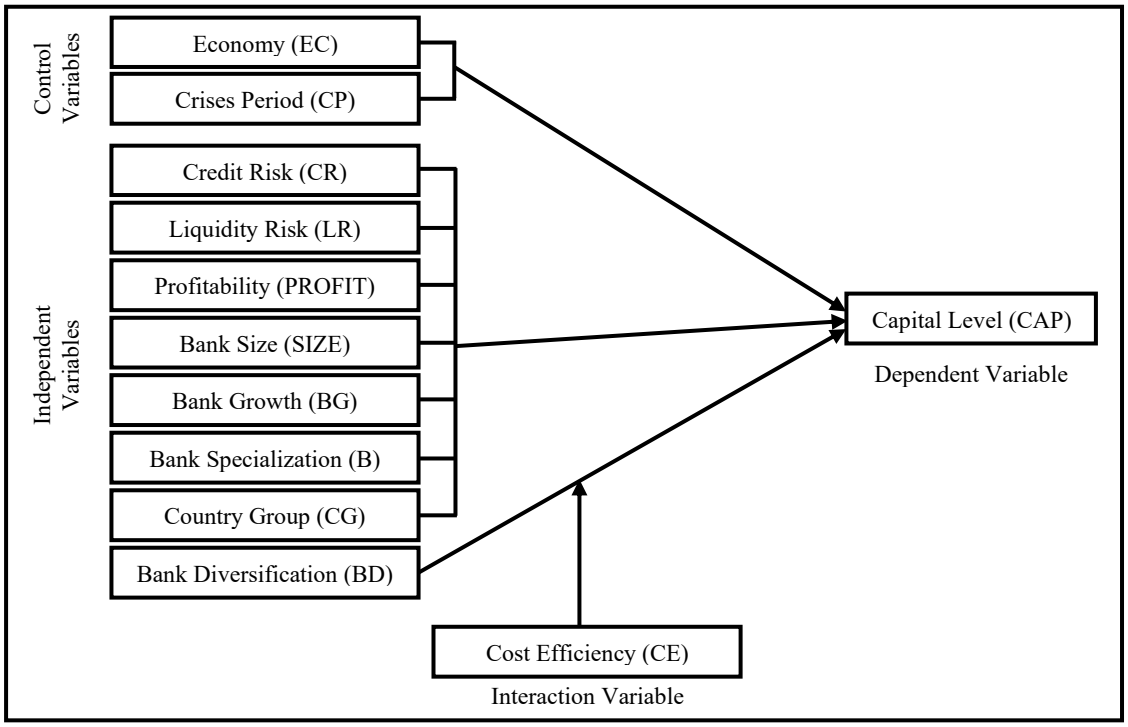

Figure 3.8 Research Framework of Interaction Model for Full Sample (A3) using Static Panel Data

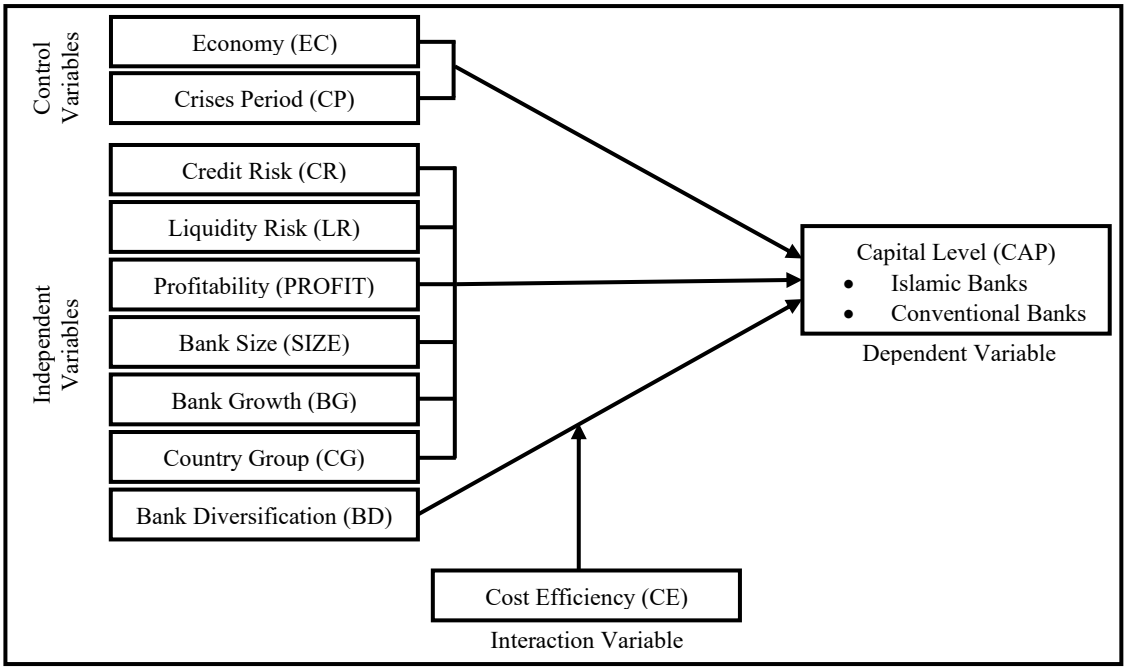

Figure 3.9 Research Framework of Interaction Model for Islamic Banks (B3) and Conventional Banks (C3) using Static Panel Data

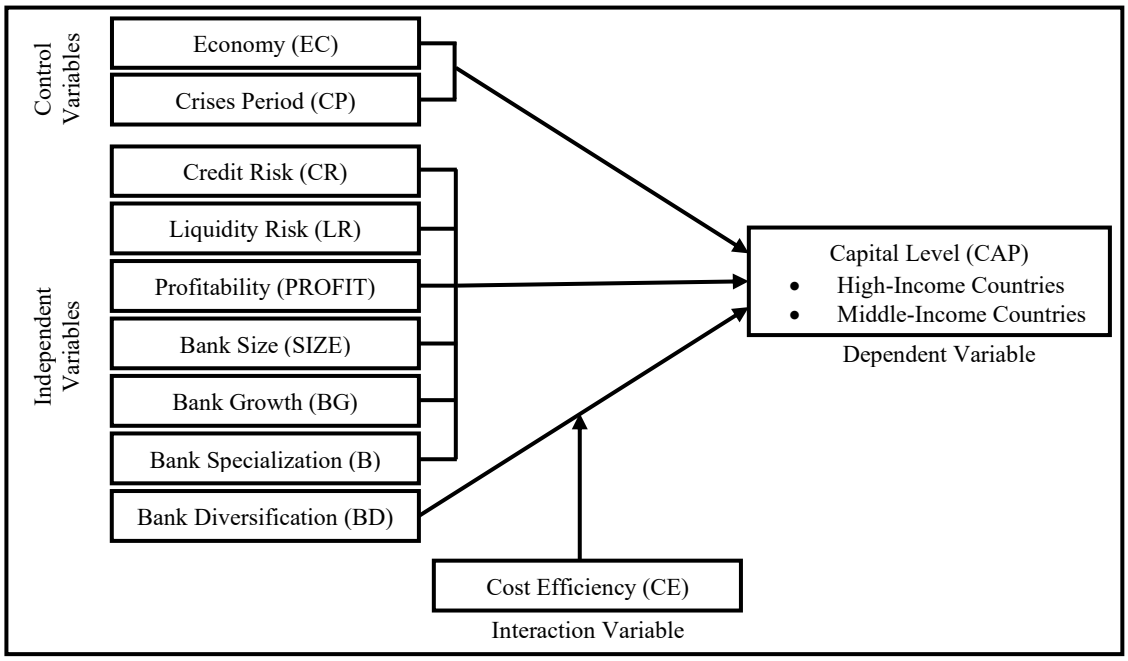

Figure 3.10 Research Framework of Interaction Model for High-Income Countries (D3) and Middle-Income Countries (E3) using Static Panel Data

The same applies to the B3 and C3 models, whereby the sample is divided into Islamic and conventional banks, irrespective of whether the banks are in High-Income countries or Middle-Income countries. For the D3 and E3 models, the sample is divided into High-Income or Middle-Income countries, regardless of whether the banks are Islamic or conventional. As a result, B3 and C3 share the same equation, while the equation for D3 is the same as for E3. Afterwards, the interaction model is executed using the dynamic panel data. Using these data, the research framework of the interaction model for the full sample (A4) is shown in Figure 3.11. Figure 3.12 depicts the research framework of the interaction model for Islamic (B4) and conventional banks (C4). The research framework of the interaction model for High-Income (D4) and Middle-Income countries (E4) using the dynamic panel data is displayed in Figure 3.13.

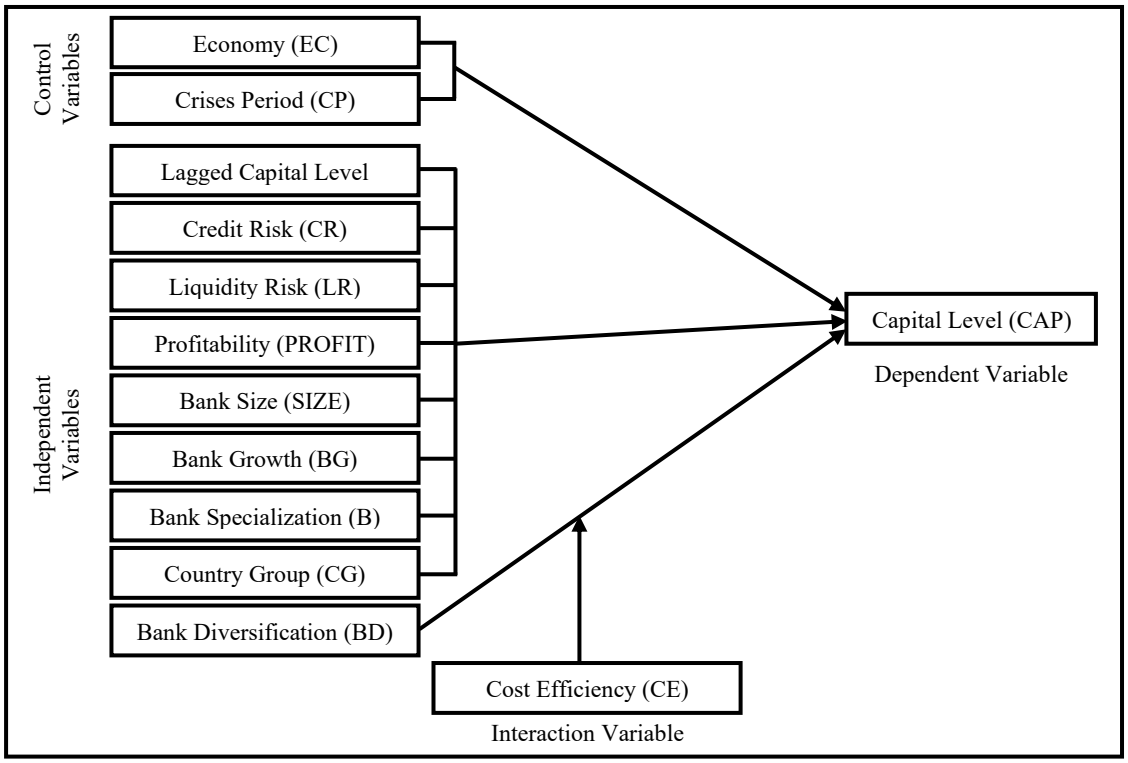

Figure 3.11 Research Framework of Interaction Model for Full Sample (A4) using Dynamic Panel Data

Considering the nature of dynamic panel data, lagged capital level is included in model A4 alongside all the explanatory variables, dummies, control variables, and interaction variable. Model A4 is intended to answer research objectives one to seven. Research objectives one and three are to identify the determinants of capital decision between bank specialization and between the two groups of countries, respectively, before proceeding with the comparison of banks and countries. Research objective two is to investigate the significant difference in the capital level between Islamic and conventional banks, whereas research objective four is to investigate the significant difference in the capital level of banks between High-Income and Middle-Income countries. Research objective five is to investigate whether there is a significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries. Research objective six is to examine the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of Islamic and conventional banks. Meanwhile, research objective seven is to examine the interaction effect of cost

efficiency on the relationship between bank diversification and the capital level of banks in High-Income and Middle-Income countries.

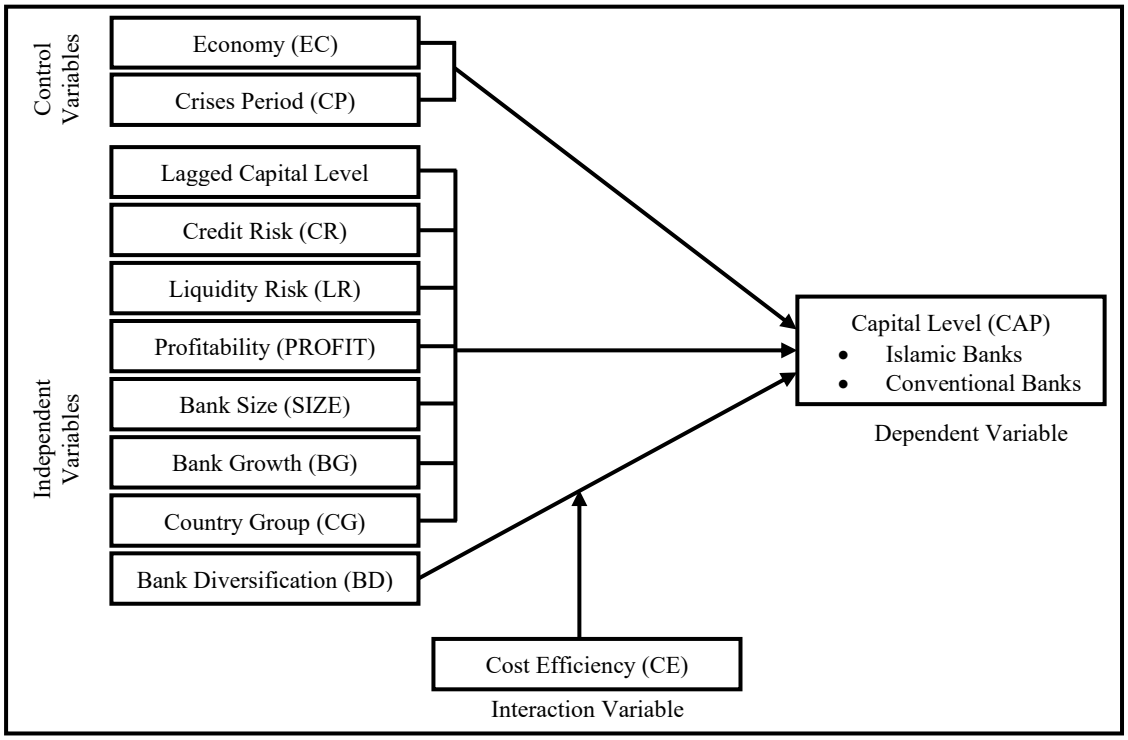

Figure 3.12 Research Framework of Interaction Model for Islamic Banks (B4) and Conventional Banks (C4) using Dynamic Panel Data

The B4 and C4 models exclude the bank specialization variable as the sample is divided into Islamic and conventional banks, regardless of whether the banks are in High-Income or Middle-Income countries. As a result, both B4 and C4 have similar equations. Research objectives one, two, five, and six are designed to be answered using models B4 and C4. Research objective one is to investigate and compare the determinants of the capital decision of Islamic and conventional banks. Research objective two is to investigate the significant difference between the capital level of Islamic and conventional banks. Research objective five is to investigate the significant difference in the capital level during crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries. Lastly, research objective six is to examine the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of both types of banks.

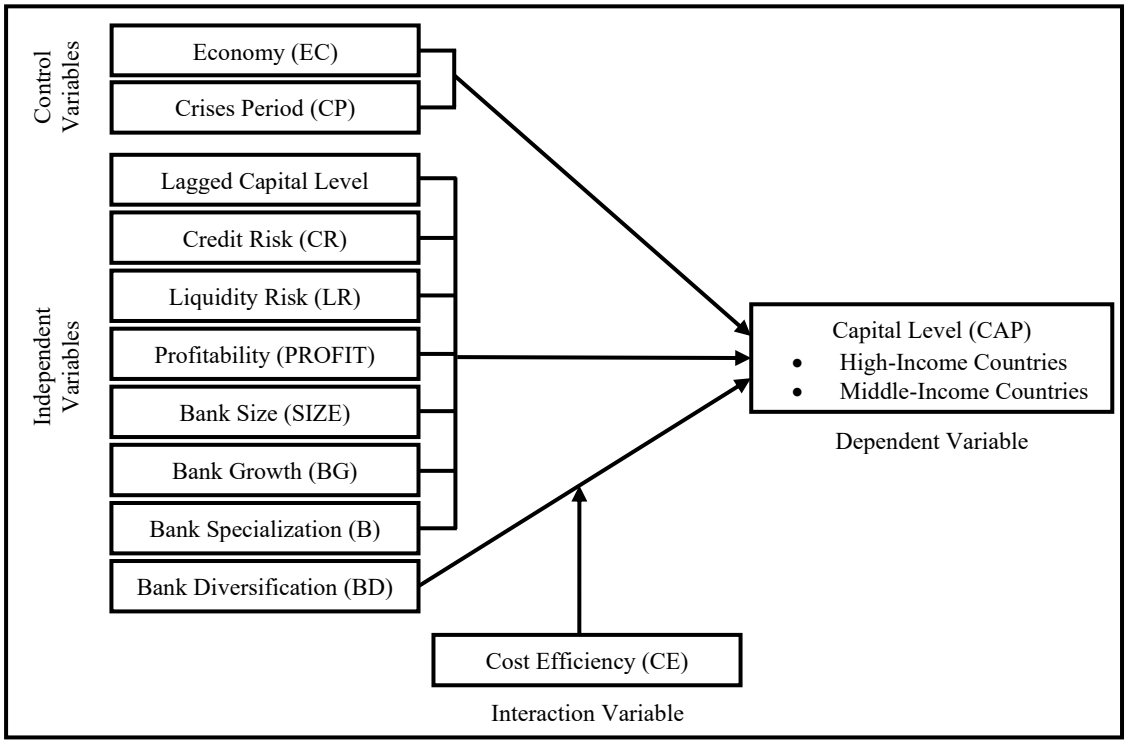

Figure 3.13 Research Framework of Interaction Model for Developed Countries (D4) and Developing Countries (E4) using Dynamic Panel Data

For models D4 and E4, the country group variable is excluded because the sample is split into High-Income and Middle-Income countries, regardless of whether the banks are Islamic or conventional. This results in a similar equation for both models D4 and E4. Models D4 and E4 are designed to answer research objectives three, four, five, and six. Research objective three is to identify and compare the determinants of the capital decision of banks in High-Income and Middle-Income countries. Research objective four is to investigate the significant difference between the capital level of banks in High-Income and Middle-Income countries. Research objective five is to investigate whether there is a significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in High-Income and Middle-Income countries. Research objective six is to examine the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of banks in both groups of countries.

3.3 Equation Development of Static and Dynamic Panel Data

Subsequently, the study develops a total of twenty (20) equations for both the basic and interaction models. The five models in this study comprise those for the full sample (Model A), Islamic banks (Model B), conventional banks (Model C), High-Income countries (Model D) and Middle-Income countries (Model E). Each model consists of four econometric equations representing the basic model using static panel data and dynamic panel data, along with the interaction model using both types of data. The equations are formulated as listed below:

Model A: Full Sample

A1: Basic Model (Static Panel Data)

$$CAP_{it} = \alpha_0 + \alpha_1 EC_{it} + \alpha_2 CP_{it} + \alpha_3 CR_{it} + \alpha_4 LR_{it} + \alpha_5 PROFIT_{it} + \alpha_6 SIZE_{it} + \alpha_7 BG_{it} + \alpha_8 B_{it} + \alpha_9 CG_{it} + \alpha_{10} BD_{it} + \alpha_{11} CE_{it} + \epsilon_{it} \quad (3.1)$$

A2: Basic Model (Dynamic Panel Data)

$$CAP_{it} = \beta_0 + \beta_1 EC_{it} + \beta_2 CP_{it} + \beta_3 CAP_{it-1} + \beta_4 CR_{it} + \beta_5 LR_{it} + \beta_6 PROFIT_{it} + \beta_7 SIZE_{it} + \beta_8 BG_{it} + \beta_9 B_{it} + \beta_{10} CG_{it} + \beta_{11} BD_{it} + \beta_{12} CE_{it} + \epsilon_{it} \quad (3.2)$$

A3: Interaction Model (Static Panel Data)

$$CAP_{it} = \gamma_0 + \gamma_1 EC_{it} + \gamma_2 CP_{it} + \gamma_3 CR_{it} + \gamma_4 LR_{it} + \gamma_5 PROFIT_{it} + \gamma_6 SIZE_{it} + \gamma_7 BG_{it} + \gamma_8 B_{it} + \gamma_9 CG_{it} + \gamma_{10} BD_{it} + \gamma_{11} CE_{it} + \gamma_{12}(BD_{it} * CE_{it}) + \epsilon_{it} \quad (3.3)$$

A4: Interaction Model (Dynamic Panel Data)

$$CAP_{it} = \delta_0 + \delta_1 EC_{it} + \delta_2 CP_{it} + \delta_3 CAP_{it-1} + \delta_4 CR_{it} + \delta_5 LR_{it} + \delta_6 PROFIT_{it} + \delta_7 SIZE_{it} + \delta_8 BG_{it} + \delta_9 B_{it} + \delta_{10} CG_{it} + \delta_{11} BD_{it} + \delta_{12} CE_{it} + \delta_{13}(BD_{it} * CE_{it}) + \epsilon_{it} \quad (3.4)$$

Model B: Islamic Banks

B1: Basic Model (Static Panel Data)

$$CAP_{it} = \lambda_0 + \lambda_1 EC_{it} + \lambda_2 CP_{it} + \lambda_3 CR_{it} + \lambda_4 LR_{it} + \lambda_5 PROFIT_{it} + \lambda_6 SIZE_{it} + \lambda_7 BG_{it} + \lambda_8 CG_{it} + \lambda_9 BD_{it} + \lambda_{10} CE_{it} + \mu_{it} \quad (3.5)$$

B2: Basic Model (Dynamic Panel Data)

$$CAP_{it} = \nu_0 + \nu_1 EC_{it} + \nu_2 CP_{it} + \nu_3 CAP_{it-1} + \nu_4 CR_{it} + \nu_5 LR_{it} + \nu_6 PROFIT_{it} + \nu_7 SIZE_{it} + \nu_8 BG_{it} + \nu_9 CG_{it} + \nu_{10} BD_{it} + \nu_{11} CE_{it} + \mu_{it} \quad (3.6)$$

B3: Interaction Model (Static Panel Data)

$$CAP_{it} = \rho_0 + \rho_1 EC_{it} + \rho_2 CP_{it} + \rho_3 CR_{it} + \rho_4 LR_{it} + \rho_5 PROFIT_{it} + \rho_6 SIZE_{it} + \rho_7 BG_{it} + \rho_8 CG_{it} + \rho_9 BD_{it} + \rho_{10} CE_{it} + \rho_{11}(BD_{it} * CE_{it}) + \mu_{it} \quad (3.7)$$

B4: Interaction Model (Dynamic Panel Data)

$$CAP_{it} = \sigma_0 + \sigma_1 EC_{it} + \sigma_2 LR_{it} + \sigma_3 CAP_{it-1} + \sigma_4 CR_{it} + \sigma_5 LR_{it} + \sigma_6 PROFIT_{it} + \sigma_7 SIZE_{it} + \sigma_8 BG_{it} + \sigma_9 CG_{it} + \sigma_{10} BD_{it} + \sigma_{11} CE_{it} + \sigma_{12}(BD_{it} * CE_{it}) + \mu_{it} \quad (3.8)$$

Model C: Conventional Banks

C1: Basic Model (Static Panel Data)

$$CAP_{it} = \tau_0 + \tau_1 EC_{it} + \tau_2 CP_{it} + \tau_3 CR_{it} + + \tau_4 LR_{it} + \tau_5 PROFIT_{it} + \tau_6 SIZE_{it} + \tau_7 BG_{it} + \tau_8 CG_{it} + \tau_9 BD_{it} + \tau_{10} CE_{it} + \vartheta_{it} \quad (3.9)$$

C2: Basic Model (Dynamic Panel Data)

$$CAP_{it} = \varsigma_0 + \varsigma_1 EC_{it} + \varsigma_2 CP_{it} + \varsigma_3 CAP_{it-1} + \varsigma_4 CR_{it} + \varsigma_5 LR_{it} + \varsigma_6 PROFIT_{it} + \varsigma_7 SIZE_{it} + \varsigma_8 BG_{it} + \varsigma_9 CG_{it} + \varsigma_{10} BD_{it} + \varsigma_{11} CE_{it} + \vartheta_{it} \quad (3.10)$$

C3: Interaction Model (Static Panel Data)

$$CAP_{it} = \varphi_0 + \varphi_1 EC_{it} + \varphi_2 CP_{it} + \varphi_3 CR_{it} + \varphi_4 LR_{it} + \varphi_5 PROFIT_{it} + \varphi_6 SIZE_{it} + \varphi_7 BG_{it} + \varphi_8 CG_{it} + \varphi_9 BD_{it} + \varphi_{10} CE_{it} + \varphi_{11}(BD_{it} * CE_{it}) + \vartheta_{it} \quad (3.11)$$

C4: Interaction Model (Dynamic Panel Data)

$$CAP_{it} = \kappa_0 + \kappa_1 EC_{it} + \kappa_2 CP_{it} + \kappa_3 CAP_{it-1} + \kappa_4 CR_{it} + + \kappa_5 LR_{it} + \kappa_6 PROFIT_{it} + \kappa_7 SIZE_{it} + \kappa_8 BG_{it} + \kappa_9 CG_{it} + \kappa_{10} BD_{it} + \kappa_{11} CE_{it} + \kappa_{12}(BD_{it} * CE_{it}) + \vartheta_{it} \quad (3.12)$$

Model D: High-Income Countries

D1: Basic Model (Static Panel Data)

$$CAP_{it} = \chi_0 + \chi_1 EC_{it} + \chi_2 CP_{it} + \chi_3 CR_{it} + \chi_4 LR_{it} + \chi_5 PROFIT_{it} + \chi_6 SIZE_{it} + \chi_7 BG_{it} + \chi_8 B_{it} + \chi_9 BD_{it} + \chi_{10} CE_{it} + \upsilon_{it} \quad (3.13)$$

D2: Basic Model (Dynamic Panel Data)

$$CAP_{it} = \pi_0 + \pi_1 EC_{it} + \pi_2 CP_{it} + \pi_3 CAP_{it-1} + \pi_4 CR_{it} + \pi_5 LR_{it} + \pi_6 PROFIT_{it} + \pi_7 SIZE_{it} + \pi_8 BG_{it} + \pi_9 B_{it} + \pi_{10} BD_{it} + \pi_{11} CE_{it} + \upsilon_{it} \quad (3.14)$$

D3: Interaction Model (Static Panel Data)

$$CAP_{it} = \omega_0 + \omega_1 EC_{it} + \omega_2 CP_{it} + \omega_3 CR_{it} + \omega_4 LR_{it} + \omega_5 PROFIT_{it} + \omega_6 SIZE_{it} + \omega_7 BG_{it} + \omega_8 B_{it} + \omega_9 BD_{it} + \omega_{10} CE_{it} + \omega_{11}(BD_{it} * CE_{it}) + \upsilon_{it} \quad (3.15)$$

D4: Interaction Model (Dynamic Panel Data)

$$CAP_{it} = \psi_0 + \psi_1 EC_{it} + \psi_2 CP_{it} + \psi_3 CAP_{it-1} + \psi_4 CR_{it} + \psi_5 LR_{it} + \psi_6 PROFIT_{it} + \psi_7 SIZE_{it} + \psi_8 BG_{it} + \psi_9 B_{it} + \psi_{10} BD_{it} + \psi_{11} CE_{it} + \psi_{12}(BD_{it} * CE_{it}) + \upsilon_{it} \quad (3.16)$$

Model E: Middle-Income Countries

E1: Basic Model (Static Panel Data)

$$CAP_{it} = \xi_0 + \xi_1 EC_{it} + \xi_2 CP_{it} + \xi_3 CR_{it} + \xi_4 LR_{it} + \xi_5 PROFIT_{it} + \xi_6 SIZE_{it} + \xi_7 BG_{it} + \xi_8 B_{it} + \xi_9 BD_{it} + \xi_{10} CE_{it} + \eta_{it} \quad (3.17)$$

E2: Basic Model (Dynamic Panel Data)

$$CAP_{it} = \theta_0 + \theta_1 EC_{it} + \theta_2 CP_{it} + \theta_3 CAP_{it-1} + \theta_4 CR_{it} + \theta_5 LR_{it} + \theta_6 PROFIT_{it} + \theta_7 SIZE_{it} + \theta_8 BG_{it} + \theta_9 B_{it} + \theta_{10} BD_{it} + \theta_{11} CE_{it} + \eta_{it} \quad (3.18)$$

E3: Interaction Model (Static Panel Data)

$$CAP_{it} = \phi_0 + \phi_1 EC_{it} + \phi_2 CP_{it} + \phi_3 CR_{it} + \phi_4 LR_{it} + \phi_5 PROFIT_{it} + \phi_6 SIZE_{it} + \phi_7 BG_{it} + \phi_8 B_{it} + \phi_9 BD_{it} + \phi_{10} CE_{it} + \phi_{11}(BD_{it} * CE_{it}) + \eta_{it} \quad (3.19)$$

E4: Interaction Model (Dynamic Panel Data)

$$CAP_{it} = \zeta_0 + \zeta_1 EC_{it} + \zeta_2 CP_{it} + \zeta_3 CAP_{it-1} + \zeta_4 CR_{it} + \zeta_5 LR_{it} + \zeta_6 PROFIT_{it} + \zeta_7 SIZE_{it} + \zeta_8 BG_{it} + \zeta_9 B_{it} + \zeta_{10} BD_{it} + \zeta_{11} CE_{it} + \zeta_{12}(BD_{it} * CE_{it}) + \eta_{it} \quad (3.20)$$

Where:

CAP = Capital level

CR = Credit risk

LR = Liquidity risk

PROFIT = Profitability

SIZE = Bank size

BG = Bank growth

B = Bank specialization

CG = Country group

BD = Bank diversification

CE = Cost efficiency

EC = Economy

CP = Crises period

$\epsilon, \mu, \vartheta, \upsilon, \eta$ = Error term

$\alpha_0, \beta_0, \gamma_0, \delta_0, \lambda_0, \nu_0, \rho_0, \sigma_0, \tau_0, \varsigma_0, \varphi_0, \kappa_0, \chi_0, \pi_0, \omega_0, \psi_0, \xi_0, \theta_0, \phi_0, \zeta_0$ = Constant

$\alpha_n, \beta_n, \gamma_n, \delta_n, \lambda_n, \nu_n, \rho_n, \sigma_n, \tau_n, \varsigma_n, \varphi_n, \kappa_n, n, \pi_n, \omega_n, \psi_n, \xi_n, \theta_n, \phi_n, \zeta_n$ = Coefficient

i = Islamic and conventional banks in High-Income and Middle-Income countries

t = 1995, 1996, 1997 … 2024

it-1 = Lagged one

3.4 Hypotheses of the Study

Based on the research framework of this study, a total of twelve hypotheses are developed accordingly. Table 3.1 lists the research hypotheses:

Table 3.1
Hypotheses for All Five Models

Hypotheses	**Types of Models**				
	Model A (Full Sample)	**Model B (Islamic Banks)**	**Model C (Conventional Banks)**	**Model D (High-Income Countries)**	**Model E (Middle-Income Countries)**
Hypothesis 1: Credit Risk	$H1_A$: There is a significant relationship between credit risk and capital level.				
Hypothesis 2: Liquidity Risk	$H2_A$: There is a significant relationship between liquidity risk and capital level.				
Hypothesis 3: Profitability	$H3_A$: There is a significant relationship between profitability and capital level.				
Hypothesis 4: Bank Diversification	$H4_A$: There is a significant relationship between bank diversification and capital level.				
Hypothesis 5: Bank Size	$H5_A$: There is a significant relationship between bank size and capital level.				
Hypothesis 6: Bank Growth	$H6_A$: There is a significant relationship between bank growth and capital level.				
Hypothesis 7: Cost Efficiency	$H7_A$: There is a significant relationship between cost efficiency and capital level.				
Hypothesis 8: Economy	$H8_A$: There is a significant relationship between economy and capital level.				
Hypothesis 9: Crises Periods	$H9_A$: There is a significant difference in the capital level during crises and non-crisis period of Islamic and conventional banks in both groups of countries.				
Hypothesis 10: Bank Specialization	$H10_A$: There is a significant difference in the capital level between Islamic banks and conventional banks.			$H10_A$: There is a significant difference in the capital level between Islamic and conventional banks in High-Income countries.	$H10_A$: There is a significant difference in the capital level between Islamic and conventional banks in Middle-Income countries.
Hypothesis 11: Country Group	$H11_A$: There is a significant difference in the capital level of banks between High-Income and Middle-Income countries.	$H11_A$: There is a significant difference in the capital level of banks between High-Income and Middle-Income countries for Islamic banks.	$H11_A$: There is a significant difference in the capital level of banks between High-Income and Middle-Income countries for conventional banks.		
Hypothesis 12: Bank Diversification*Cost Efficiency	$H12_A$: There is an interaction effect of cost efficiency on the relationship between bank diversification and capital level.				

Based on Table 3.1, research objectives one and three intend to answer hypotheses 1 to 8. Research objective one uses Model A of the pooled sample, which comprises both Islamic and conventional banks, to investigate the determinants of the capital decision of Islamic and conventional banks. Additionally, to compare the determinants of the capital decision of Islamic and conventional banks, the research objective uses Models B and C. To address research objective three, Model A (the pooled sample) is also used to investigate the determinants of the capital decision of banks in High-Income and Middle-Income countries. Meanwhile, Models D and E are used to compare the determinants of the capital decision of banks in the two groups of countries. The comparisons are based on the findings related to the research hypotheses for each variable in the models. Research objective two investigates whether there is a significant difference between the capital level of Islamic and conventional banks to answer hypothesis 10 using Models A, D, and E. Meanwhile, research objective four investigates whether there is a significant difference between the capital level of banks in High-Income and Middle-Income countries, aiming to answer hypothesis 11 by using Models A, B, and C. Research objective five intends to answer hypothesis 9 by evaluating whether there is a significant difference in the capital level between crises and non-crisis periods of Islamic and conventional banks in High-Income and Middle-Income countries. This research objective is achieved using Models A, B, C, D, and E. Lastly, research objectives six and seven aim to answer hypothesis 12, whereby research objective six examines the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of both types of banks using Models A, B, and C. Meanwhile, research objective seven examines the interaction effect of cost efficiency on the relationship between bank diversification and the capital level of High-Income and Middle-Income countries using Models A, D, and E. Table 3.2 summarizes summary of hypotheses according to research objectives and models.

Table 3.2
Summary of Hypotheses according to Research Objectives and Models

Hypotheses	Research Objectives	Models
$H1_A$: There is a significant relationship between credit risk and capital level. $H2_A$: There is a significant relationship between liquidity risk and capital level. $H3_A$: There is a significant relationship between profitability and capital level. $H4_A$: There is a significant relationship between bank diversification and capital level. $H5_A$: There is a significant relationship between bank size and capital level. $H6_A$: There is a significant relationship between bank growth and capital level. $H7_A$: There is a significant relationship between cost efficiency and capital level. $H8_A$: There is a significant relationship between economy and capital level.	RO1 and RO3	Model A to Model E
$H9_A$: There is a significant difference in the capital level between crises and non-crisis period of Islamic and conventional banks in both groups of countries	RO5	Model A to Model E
$H10_A$: There is a significant difference in the capital level between Islamic and conventional banks.	RO2	Model A, Model D and Model E
$H11_A$: There is a significant difference in the capital level of banks between High-Income and Middle-Income countries.	RO4	Model A, Model B and Model C
$H12_A$: There is an interaction effect of cost efficiency on the relationship between bank diversification and capital level.	RO6 and RO7	Model A to Model E

3.5 Measurement of Variables

Table 3.3 lists the measurements of the variables used in this study. The study hypothesizes that credit risk, liquidity risk, profitability, bank diversification, bank size, bank growth, bank specialization, country group, economy, crises period, and cost efficiency are possible drivers for the capital level, which is the dependent variable. Based on the table below, equity to total assets is the measurement for the capital level of banks, given in percentages.

Table 3.3
The Measurements of Variables Used in this Study

	Notation	Proxy	References
Dependent Variable			
Capital Level	CAP	Equity to total assets (%)	Ali et al. (2023)
Independent Variables			
Credit Risk	CR	Loan loss allowances to gross loans (%)	Sobarsyah et al. (2020)
Liquidity Risk*	LR	Liquid assets to deposits and short-term funding (%)	Amran and Ahmad (2021)
Profitability	PROFIT	Operating profit to average total assets (%)	Abbas et al. (2021)
Bank Diversification	BD	Non-interest income to total operating income (%)	Chowdhury et al. (2024)
Bank Size	SIZE	Natural logarithm of total assets (%)	Obadire et al. (2023)
Bank Growth	BG	Growth of gross loans (%)	Toh and Zhang (2022)
Bank Specialization	B	1 for Islamic banks and 0 otherwise	Chazi et al. (2024)
Country Group	CG	1 for High-Income countries and 0 for Middle-Income countries	Klein and Turk-Ariss (2022)
Control Variables			
Economy	EC	Current price GDP to constant price GDP (%)	Kanago (2023)
Crises Period	CP	1 is crisis period and 0 is non-crisis period	Adem (2023)
Interaction Variable			
Cost Efficiency*	CE	Non-interest expenses to average total assets (%)	Yin (2021)

Note: * refers to variable with inverse proxy.

As the proxy for credit risk, the percentage of loan loss allowances to gross loans is used. To assess liquidity risk, the liquid assets to deposits and short-term funding is selected, expressed as a percentage. This ratio is inversely related, which means an increase in liquid assets to deposits and short-term funding indicates a lower liquidity risk and vice versa. Bank profitability is calculated using the percentage of operating profit to average total assets. The ratio of non-interest income to total operating income is employed as a proxy for bank diversification, given in percentages. Bank size is measured using the natural logarithm of total assets. The growth of gross loans is measured as a percentage to gauge a bank's growth. For the dummy of bank specialization, the number one is coded as Islamic banks and zero is coded as conventional banks. For the country group, the number one represents High-Income countries and zero represents Middle-Income countries.

The study considers the heterogeneity problem that may arise due to time variations and cross-country studies. For that reason, crises period is used to control for the 30-year time frame, and the economy variable is used to control the heterogeneity problems due to the use of cross-country studies. For crises period, the number one reflects the crises in 1997, 1998, 2007, 2008, 2009, 2011, 2012, 2014, 2015, 2016, 2020, 2021, 2022, 2023, and 2024. A total of seven crises are identified in this study over the 30-year timeframe. These are the Asian financial crisis, monsoon flood crisis, global financial crisis, Arab spring crisis, oil crisis, COVID-19 crisis, and Pakistani economic crisis. Table 3.4 presents the seven crises in chronological order. In terms of the economy, the Gross Domestic Products (GDP) deflator is used to control inflation over the period in High-Income and Middle-Income countries. The GDP deflator is an index calculated by dividing the current price Gross Domestic Product (GDP) to constant price GDP. The GDP deflator data are derived using the base year from a specific year chosen as the reference point for that country.

Table 3.4
List of Crises over the Years

Crises	Year	Sample Countries Affected
Asian financial crisis	1997-1998	Brunei and Malaysia
Monsoon flood	1998	Bangladesh
Global financial crisis	2007-2009	All ten countries
Arab spring crisis	2011-2012	Bahrain, Kuwait, Qatar, Saudia Arabia, United Arab Emirates, and Jordan
Oil crisis	2014-2016	Bahrain, Kuwait, Qatar, Saudia Arabia, and United Arab Emirates
COVID-19 crisis	2020-2022	All ten countries
Pakistani economic crisis	2022-2024	Pakistan

Cost efficiency is treated as both an interaction variable and an independent variable in this study. According to Brambor et al. (2006), to capture the direct effects of an interaction variable with a dependent variable, the interaction variable must be treated as an independent variable in the estimation process. Failure to do so results in biased and inconsistent estimates. This occurs because the effects of the interaction variable may be incorrectly attributed to other variables in the model, leading to omitted variable bias. The interaction variable of cost efficiency is measured using an inverse proxy of non-interest expenses to average total assets, which is calculated in percentages. A higher ratio of non-interest expenses to average total assets reflects low cost efficiency, and vice versa.

3.6 Research Design

The study is intended to investigate the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries. Ergo, by focusing only on commercial banks, banking institutions are the unit of analysis, with Islamic and conventional banks in both groups of countries forming the study sample. Furthermore, the study setting is considered longitudinal because the study involves multiple Islamic and conventional banks in High-Income and Middle-Income countries over a period of years. The application of panel data gives more robust statistical inference and more accurate estimation because of the larger pool of observations that provides richer information, more variability, and more degrees of freedom (Hsiao, 2006). It is evident in banking literature for instance, Yusgiantoro et al. (2019) analyze 558 commercial banks across 84 countries reveals that regulatory capital levels interact significantly with liquidity creation and financial stability. Likewise, research by the Federal Reserve Board uses static panel regressions to explain cross-country variations in capital regulation stringency (Kara, 2016). These examples demonstrate that panel data methods are essential in banking research because it allows scholars to capture the multifaceted nature of bank activities, regulatory impacts, and performance outcomes with improved reliability and empirical depth.

3.7 Data Collection and Sources

In this study, a total of 23 countries are identified as having a dual banking system, whereby both Islamic and conventional banks coexist, and a dual regulatory framework in force for both types of banking system. Following that, the inclusion criteria used in this study are as follows: (i) the Islamic banking share in a country is more than 15 percent of the total banking assets, and (ii) data availability in the Fitch Ratings PRO database. According to the Islamic Financial Services Board (2025), a country's Islamic banking sector is considered systemically important if Islamic banking assets account for at least more than 15 percent of the total assets in the domestic banking sector. Initially, Islamic banks operated as a small institution with limited market share thereby making their systemic impact negligible. As the Islamic finance industry expanded across many jurisdictions in both in size and economic

relevance, the need arose for a standardized benchmark to signal when Islamic banking activities warrant enhanced regulatory attention (Islamic Financial Services Board, 2025). Thus, upon checking, the IFSB introduced and consistently use 15 percent threshold as a benchmark to guide regulators in identifying jurisdictions where Islamic banking sector has grown to a scale where its performance and risks could have significant implications for the broader financial system (Islamic Financial Services Board, 2013, 2025). Subsequently, the study sample is narrowed to 11 countries from the initial 23 that meet the first criterion regarding the proportion of Islamic banking share. Oman, Mauritania, and Palestine are removed because Islamic banking total assets there do not have at least a 15% market share. From the 11 countries, the study retains 10, with Djibouti removed due to the unavailability of Islamic banking data in the Fitch Ratings PRO database. As a result, 10 countries satisfy both inclusion criteria. Figure 3.14 illustrates the sampling procedure.

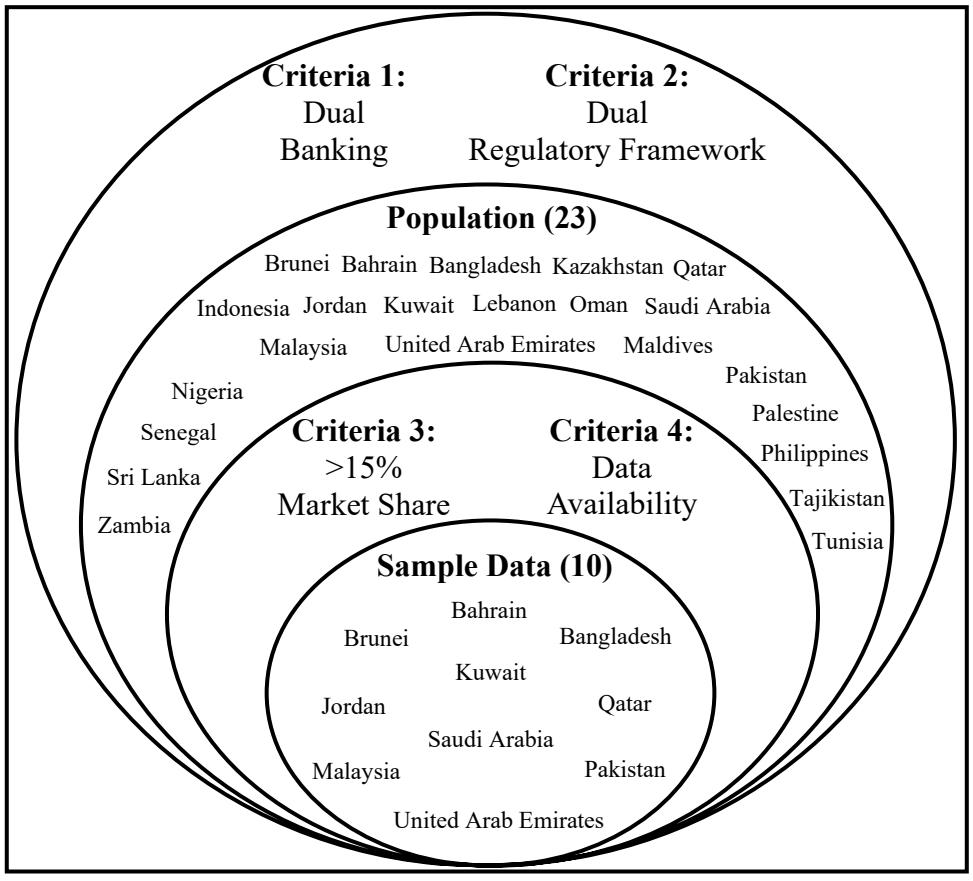

Figure 3.14 Sampling Procedure

The study further categorizes the 10 countries into High-Income or Middle-Income countries, following the World Bank Group classification based on the income level of gross national income (GNI) per capita. Six countries (Bahrain, Brunei, Kuwait,

Qatar, Saudi Arabia, and United Arab Emirates) are identified as High-Income countries, and the remainder (Bangladesh, Jordan, Malaysia, and Pakistan) are deemed Middle-Income countries. This results in a total of 130 observations for the Islamic and conventional banks in the ten High-Income and Middle-Income (HIMI) countries. As this study relies solely on secondary data from publicly accessible and lawful sources, ethical approval is not required (refer to Appendices 1). Yearly data are assembled from 1995 to 2024, obtained from the Fitch Ratings PRO database, with the International Monetary Fund providing the GDP deflator data.

Figure 3.15 illustrates the structure of the data collection for this study. Based on Figure 3.15, the panel data are taken from a sample of 130 Islamic and conventional banks in both country groups over the 30-year period. In the HIMI countries, there are 45 Islamic banks and 85 conventional banks (refer to Appendices 2 and 3). The Islamic and conventional banks in the High-Income and Middle-Income countries consist of 42 banks and 88 banks, respectively. Table 3.5 summarizes the data sample used in this study.

Table 3.5
Summary of Data Sample

	High-Income Countries	Middle-Income Countries	Total
Islamic Banks	20	25	45
Conventional Banks	22	63	85
Total	42	88	130

Additionally, a total of three dummies are included, consisting of crises period, bank specialization, and country group. The estimation of crises period is done by pooling both samples of Islamic and conventional banks in the High-Income and Middle-Income countries. Meanwhile, for the bank specialization and country group dummies, the estimation is done separately from the full sample (Model A) for each individual Islamic banks (Model B), individual conventional banks (Model C), individual High-Income countries (Model D), and individual Middle-Income countries (Model E).

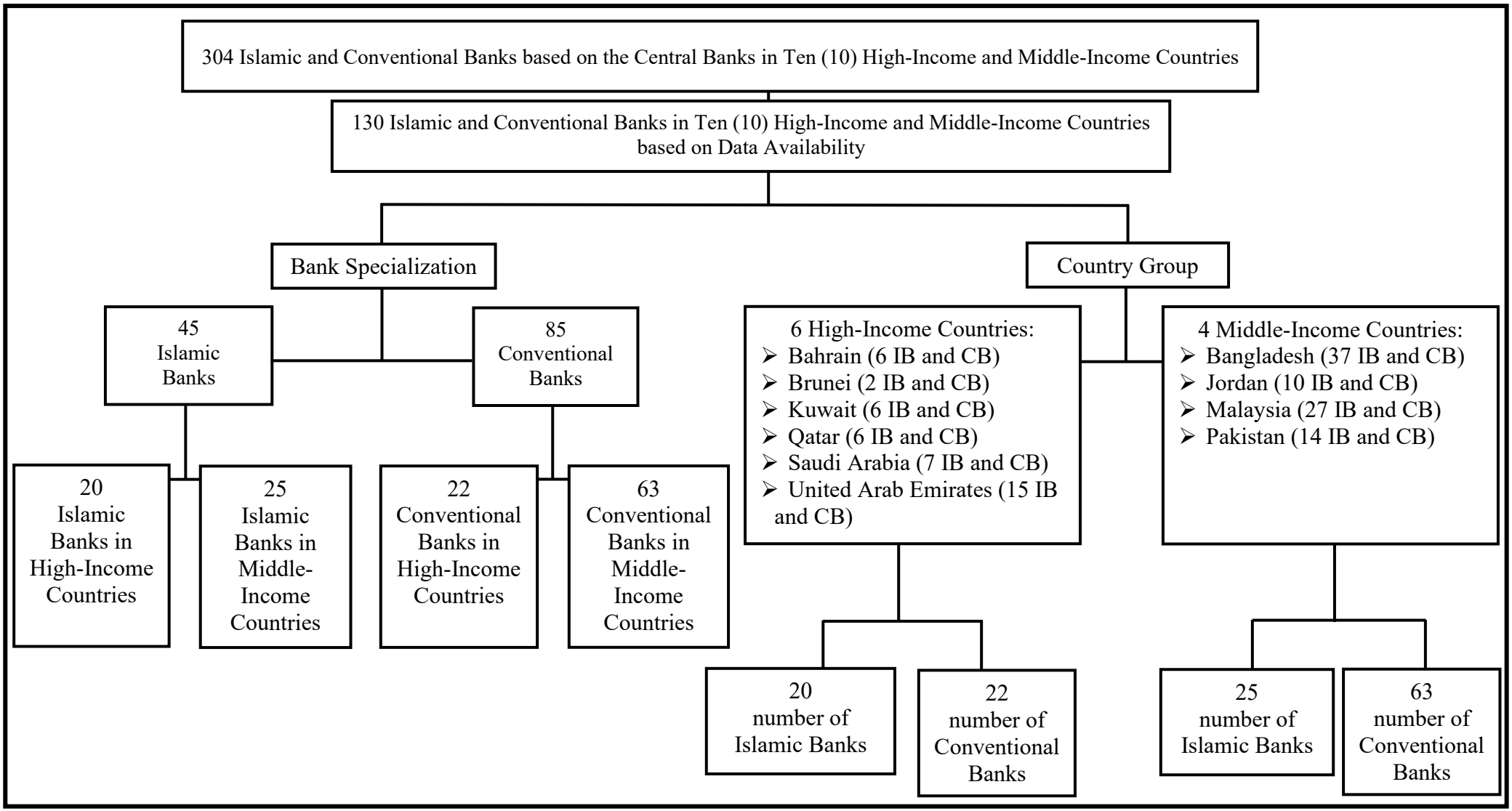

Figure 3.15 Data Organization of Research Study

Note: IB refers to Islamic banks and CB refers to conventional banks.

3.8 Preliminary Analysis

A preliminary analysis could showcase an overall perspective of the data collected, such as the distribution and average of the data. This helps the researcher understand the data better before proceed with the regression. Descriptive analysis and correlation analysis are carried out as the preliminary analysis.

3.8.1 Descriptive Analysis

Descriptive analysis is conducted to provide the researcher with information about each of the variables from the data gathered. This information is related to the counts, minimum, mean, maximum, median, standard deviation, skewness, and kurtosis. The discussion of the descriptive analysis is elaborated independently for each variable, without comparing them. The mean difference test for the dummy variables is also executed to assess whether there is any significant differences exist between crisis and non-crisis periods, between Islamic and conventional banks, and between High-Income and Middle-Income countries.

3.8.2 Correlation Analysis

Correlation analysis is performed to explore the direction, statistical significance, and strength of any two variables. This analysis would give a coefficient value that is either between or equal to +1 and -1. A perfectly positive relationship between two variables is reflected by a coefficient value of +1, whereas a coefficient value of -1 means a perfectly negative relationship exists between two variables. A zero value of a coefficient indicates no relationship exists between two variables. Furthermore, a correlation coefficient of less than 5 is considered a weak correlation, so it is less probable for a multicollinearity issue to occur between two variables. Meanwhile, a correlation coefficient above 5 means a strong correlation, so there is a high probability for a multicollinearity issue to arise. The study utilizes the Pearson correlation test instead of the Spearman because the variables are continuous and assumed to have a linear relationship (Tumminello et al., 2010).

3.9 Endogeneity Test

Endogeneity is an issue that occurs when a regressor is correlated with the error term, leading to biased and inconsistent estimation. To detect endogeneity issues, the Durbin-Wu-Hausman test is conducted to determine whether the explanatory variable in a regression model is endogenous or exogenous. The Durbin-Wu-Hausman test is introduced by Durbin (1970), with extensions by (Wu, 1973) and Hausman (1978). When a concern with endogeneity arising in a study, static regression is no longer appropriate; instead, dynamic regression is preferred. This is because static regression would render the results invalid when the data have an endogeneity issue. The null hypothesis for the Durbin-Wu-Hausman test is that there are no endogeneity issues in the data given that the p-value is above 0.05, whereas the alternate hypothesis is that there is an issue of endogeneity exist. Therefore, a significant p-value that is below 0.05, indicates that the study suffers from endogeneity issues.

3.10 Diagnostic Test for Static Panel Data

To ensure the data are free from potential issues before regression, several relevant diagnostic tests are executed. These tests would help prevent any unbiased data that can render the results invalid. The outlier test, multicollinearity test, heteroscedasticity test, serial correlation test, and unit root test are the basic forms of diagnostic testing for static panel data.

3.10.1 Outlier Test

A dataset with an observation deviating from the other values is considered to have an issue with outliers. The outlier test is important to ensure the validity and reliability of the results obtained later. There are many available test for the outlier such as Z-Score test, Interquartile Range (IQR) test, and Mahalanobis distance test. However, these tests are more complicated than Scatter plots and Cook's distance. Therefore, the study employs Scatter plots and Cook's distance test to detect outliers in a data collection, instead of the other available outlier tests. The reason is that Scatter plots and the Cook's distance test are easier to apply and interpret since a threshold value of 4/n is used. N refers to the total number of observations in the dataset. Any

observations with a Cook's distance greater or lower than 4/n are coded as one and considered extreme values. Additionally, to represent the panel data estimation, each group has a minimum of three consecutive years of observations. This reduces bias and provides consistent results, especially in a dynamic panel model (Arellano et al., 1999; Baltagi et al., 2023).

3.10.2 Multicollinearity Test

Where two or more independent variables are correlated with each other, this is recognized as a multicollinearity issue. The variance inflation factor (VIF) is a common tool used to measure the severity of a multicollinearity issue. If the VIF is more than five (5), the multicollinearity issue is considered severe, and vice versa. However, if there are many independent variables, the VIF benchmark can be increased slightly, according to the nature of the data. This study uses five (5) as the VIF benchmark as it is the most commonly used rule of thumb (Studenmund, 2017). To remedy a severe multicollinearity issue in the data, highly correlated variables are eliminated from the regression model.

3.10.3 Heteroscedasticity Test

Heteroscedasticity occurs when the distribution of the error terms is not constant, so it varies depending on the observations. The error distribution for a large observation might have a large variance, and a small observation might have a small variance. This means the variance of the error term is not constant across the observations. If heteroscedasticity is present, the ordinary least squares estimator is no longer suitable as it has violated the classical assumptions of constant variances for different observations of the error term. According to Studenmund (2017), the Breusch-Pagan test and the White test are the two most popular and powerful tests for heteroscedasticity. However, this study utilizes the Modified Wald test to detect heteroscedasticity issues in the panel data. This is because the Modified Wald test is suitable for various types of models, such as linear and non-linear relationships. Most importantly, the Modified Wald test is effective at handling heteroscedasticity in clustered data, while the Breusch-Pagan and White tests are not (Astivia & Zumbo,

2019). In the Modified Wald test, the null hypothesis indicates that the error term is homoscedastic, and the alternate hypothesis indicates the error term is heteroscedastic. If the p-value is significant, below 0.05, a serious issue of heteroscedasticity exists in the panel data, and vice versa. A robust standard error must be executed to rectify a heteroscedasticity issue.

3.10.4 Serial Correlation Test

When the current year values of a variable are related to the previous year values, a serial correlation problem arises. With serial correlation, ordinary least squares estimators can no longer be used due to the violation that observations of the error term are uncorrelated with each other. Many tests can be executed to detect for the serial correlation issue. The Durbin Watson test is one of the testing for serial correlation however, it has many limitations, such as being suitable only for balanced data, only catering for first-order serial correlation, and being unable to handle a regression model with a lagged dependent variable (Studenmund, 2017). Another popular alternative is the Lagrange Multiplier (LM) test, also known as the Breusch–Godfrey (LM) test. The LM test is also suitable only for balanced data and less effective in detecting high-order serial correlation (Breusch & Pagan, 1980). Hence, the study uses Wooldridge test over the other available serial correlation tests. This is because the Wooldridge test is suitable for both balanced and unbalanced data. In addition, the test caters for a high-order serial correlation, unlike the Durbin Watson test. The null hypothesis for the Wooldridge test assumes no serial correlation, while the alternate hypothesis asserts that serial correlation issues exist in the panel data. This means a significant result with a p-value below 0.05, reflects a serious serial correlation problem in the data, and vice versa. Autoregression is used to overcome this problem. However, if a panel dataset contains both serial correlation and heteroscedasticity, cluster regression is applied to address the issues.

3.10.5 Unit Root Test

Non-stationary data means the mean and variance change over time, leading to a unit root issue. Data with such issue may shift from the normal trend randomly and

become unpredictable because the data tend to follow a random route or show persistent trends over time. To detect a unit root issue in a dataset, many tests are available, such as the Levin Lin Chu, Hadri, Impesaran Shin (IPS), and Fisher-type tests. The Levin Lin Chu and Hadri tests are more suitable for balanced panel data, while the IPS and Fisher-type tests are most suitable for unbalanced panel data (Choi, 2001; Hadri, 2000; Im et al., 2003; Levin et al., 2002). Nevertheless, the former tests face limitations in handling data with gaps, with the latter tests better at handling such gaps (Barbieri, 2009). Two versions of the Fisher-type test are available, based on either the Phillips Perron test or the Augmented Dickey Fuller (ADF) test. The most widely used is the Fisher-type based on Phillips Perron because it is robust when using data with both serial correlation and heteroscedasticity issues. This makes it reliable for checking whether data have a unit root issue (Perron, 1988). On the other hand, the Fisher-type test based on Augmented Dickey Fuller (ADF) may not perform well if data are heteroscedastic, although it can handle data with serial correlation issues. Accordingly, to test for unit roots, the current study applies the Fisher-type based on the Phillips Perron test. The null hypothesis for this test is that the data contain unit root issues and are non-stationary. The alternate hypothesis is the data have no unit root issues and, therefore, are stationary. A significant p-value, one that is below 0.05, means the data have no unit root issues and do not change over time, and vice versa.

3.11 Panel Data Testing

The study employs panel data testing to determine the best static panel model to use out of the pooled ordinary least squares (POLS) model, fixed effects model (FEM), and random effects model (REM). The panel data testing consists of the F-Chow test, Breusch Pagan Lagrange Multiplier (BPLM) test, and Hausman test. The results obtained reflect the ideal static panel model to apply as the final estimation of the study.

3.11.1 F-Chow Test

The F-Chow test is used to choose between the pooled ordinary least squares model and fixed effects model to indicate the most appropriate. A significant F-value

with a p-value below 0.05 implies that the fixed effects model is more appropriate, and vice versa. The hypothesis statements for the F-Chow test are as follows:

H_0: The pooled ordinary least squares (POLS) model is appropriate.

H_A: The fixed effects model (FEM) is appropriate.

3.11.2 Breusch Pagan Lagrange Multiplier (BPLM) Test

The BPLM test is performed to identify the appropriate model between the pooled ordinary least squares (POLS) model and random effects model. A p-value of chibar2 is significant if it is below 0.05, indicating that the random effects model is better than the POLS model, and vice versa. The null and alternate hypotheses for the BPLM test are as follows:

H_0: The pooled ordinary least squares (POLS) model is appropriate.

H_A: The random effects model (REM) is appropriate.

3.11.3 Hausman Test

To determine the most appropriate model between the fixed effects model and random effects model, a Hausman test is carried out. If the p-value of chi2 is significant (below 0.05), the null hypothesis for the Hausman test is rejected. This means the fixed effects model is the more appropriate. However, if the null hypothesis fails to be rejected, the random effects model is better. The hypothesis statements for the Hausman test are as follows:

H_0: The random effects model (REM) is appropriate.

H_A: The fixed effects model (FEM) is appropriate.

3.12 Multiple Regression Analysis of Static Panel Data

The relationships between the potential variables and the capital level of Islamic and conventional banks in High-Income and Middle-Income countries are determined using multiple regression analysis. By employing static panel data, the study can determine the direct relationship between an independent variable and the dependent variable. This helps establish a clear understanding of the relationships before proceeding to complex dynamic panel data analysis. Essentially, the three main

methods utilized for static panel data are the pooled ordinary least squares, fixed effects, and random effects methods.

3.12.1 Pooled Ordinary Least Squares (POLS) Method

Pooled ordinary least squares assumes that the intercept, slope, and constant are the same for all entities. Therefore, all the data can be pooled together, and a common set of slopes can be imposed across the entities.

3.12.2 Fixed Effects Method (FEM)

The fixed effects model assumes that each cross-sectional unit has its own intercept. This means differences between individuals can be accommodated from different intercepts. As a result, fixed effects models produce a constant term and intercept term for each cross-sectional unit.

3.12.3 Random Effects Method (REM)

The random effects model also assumes that the intercept for each cross-sectional unit has its own intercept; however, it is applicable to random selection. This implies that an intercept difference for each individual is due to the randomness of the data sample. A random selection drawn from a large population means the data do not include all the entities in the sample, resulting in varying intercepts.

3.13 Diagnostic Testing for Dynamic Panel Data

The Generalized Method of Moments (GMM) is employed when an endogeneity issue exists in a dataset, causing the data to become dynamic panel data instead of static panel data. Endogeneity issues can arise for various reasons, such as reverse causality. Reverse causality is where an independent variable may also influence the capital level, so it becomes a dependent variable instead. Moreover, unobserved factors affecting the capital level could also lead to endogeneity issues in a data sample. This means that omitted variables, such as other factors, could influence the capital level of banks but are not included in the study. In addition, the inclusion of

a lagged dependent variable on the right-hand side of the equation could influence the dependent variable on the left-hand side as it is correlated with the error terms, which leads to endogeneity issues. This means the past capital level may influence the current capital level. For example, if a bank had a higher capital level the previous year, the bank might maintain or adjust the current capital based on this past amount. These three factors (reverse causality, omitted variables, and a lagged dependent variable) could create endogeneity problems in a data sample and make the regression results invalid. An endogeneity problem is a major concern in any research study because it may lead to inconsistent estimates, misinterpretation of results, and misleading conclusions (Ullah et al., 2018).

Addressing these issues requires additional and different diagnostic testing, alongside the common diagnostic testing used for static panel data. The relevant diagnostic tests are Arellano and Bond test, Sargan-Hansen test, and difference-in-Sargan test. Additionally, to determine whether to employ the first difference or system Generalized Method of Moments, prior estimation of a pooled ordinary least squares and fixed effects method is required for the dynamic panel data. This is undertaken to obtain the range of the coefficient for the lagged dependent variable when estimated using the GMM so that it does not fall below the underestimated coefficient value or go above the overestimated coefficient value. All these tests are required to ensure that the validity of the GMM model used is unbiased.

3.13.1 Arellano and Bond Test

The consistency of the Generalized Method of Moments estimation depends on the absence of serial correlation in the residuals. Therefore, the Arellano and Bond test is conducted to identify whether an issue of serial correlation affects the data sample collected. According to Arellano and Bond (1991), the results of the Arellano and Bond test need to satisfy the conditions that there is a first-order autocorrelation (AR1) but no second-order autocorrelation (AR2) problem. A significant p-value, one that is below 0.05, implies autocorrelation. Meanwhile, a p-value above 0.05 indicates there are no serial correlation issues with either AR1 or AR2. The first differenced equation should reject the null hypothesis of no first-order serial correlation. Ergo, the hypothesis statements for the first differenced equation are as follows:

H_0: Absence of first-order serial correlation.

H_A: Presence of first-order serial correlation.

However, first differenced equation should not reject the null hypothesis that there is no second-order serial correlation. Hence, the hypothesis statements related to second-order autocorrelation of the first differenced residuals are as follows:

H_0: Absence of second-order serial correlation.

H_A: Presence of second-order serial correlation.

3.13.2 Sargan-Hansen Test

The consistency of the parameter estimates in the Generalized Method of Moments also heavily depends on the validity of the instruments used. The test is conducted to determine whether the instrumental variables used are too many or insufficient. Moreover, if the instruments are correlated with the error term in the equation, the instruments are also considered not good or weak. To check for the validity of the instruments, the Sargan-Hansen test is executed. Following Law (2018), the null hypothesis of the Sargan-Hansen test is that the instruments are valid, implying that the model is correctly specified and the instruments are uncorrelated with any of the error terms in the equation. The alternate hypothesis is that the instruments are not valid and a correlation with the error term exists in the equation, illustrating the misspecification of the model. The hypothesis statements for the Sargan-Hansen test are as follows:

H_0: The instrumental variables used are valid.

H_A: The instrumental variables used are invalid.

3.13.3 Difference-in-Sargan Test

The difference-in-Sargan test, suggested by Roodman (2007), is an additional type of test that is only used for the system Generalized Method of Moments (GMM). The test is conducted to choose between the first difference GMM or system GMM. The null hypothesis of the difference-in-Sargan test is that the system GMM is preferable. In the alternate hypothesis, the first difference GMM is preferable. A

significant p-value, below 0.05, indicates the rejection of the null hypothesis so the first difference GMM is the best model.

H_0: The system Generalized Method of Moments is appropriate.

H_A: The first difference Generalized Method of Moments is appropriate.

3.13.4 Pooled Ordinary Least Squares Estimation

When using the pooled ordinary least squares (POLS) estimation, all the observations are combined into a single regression. This is because POLS treats all entities as having the same relationship by assuming identical intercepts and slopes. However, for a dynamic panel model, the POLS estimation may result in an overestimation of the lagged dependent variable (LDV). An overestimation (upward biased) of the LDV means the estimate coefficient of the LDV is larger than it should be (the true effect).

3.13.5 Fixed Effects Method Estimation

The fixed effect model (FEM) assumes that each cross-sectional unit has a unique intercept, allowing individual differences to be captured through varying intercepts. As a result, the FEM includes a separate intercept for each unit. However, when applied to a dynamic model, the FEM tends to underestimate the coefficient of the lagged dependent variable. Conversely, an underestimation (downward biased) of the LDV means the estimate coefficient of the LDV is smaller than it should be (the true effect).

3.14 Multiple Regression Analysis of Dynamic Panel Data

The Generalized Method of Moments (GMM) estimator is frequently used for dynamic panel models, particularly if an issue of endogeneity exists within the dataset. The GMM estimation requires the data to be micro panel data, where the number of observations are more than the study period as the GMM is designated for this type of panel data. In other words, a dataset with a short timeframe and many observations is suitable for the GMM. The GMM estimation proposes using an instrumental variable that effectively explains the endogenous explanatory variables in order to eliminate the

correlation of the instrumental variable with the transform error term. Unfortunately, it is not easy to determine a good instrument that can replace the endogenous variable and is not correlated with the transform error term. Ergo, two lags of the dependent variable and one lag of the endogenous explanatory variable are suggested for use as the instrumental variable in the Generalized Method of Moments (Arellano & Bond, 1991; Schultz et al., 2010; Wintoki et al., 2012). For this reason, the study does not consider using the Instrumental Variable Two-Stage Least Squares (IV2SLS) method to tackle the endogeneity issue.

Basically, the Generalized Method of Moments has two types: the first difference GMM and the system GMM. Both can be applied using either a one-step or a two-step estimator. Nevertheless, to determine which type of GMM to use, certain conditions need to be met for the selection of the GMM estimator to be considered valid and to provide reliable results. One condition is that the GMM estimation of the dynamic model for a lagged dependent variable must be between the coefficient of the pooled ordinary least squares and fixed effects method estimation. Additionally, the coefficient of the lagged dependent variable needs to have a positive value that is not more than one and is significant. This is to prove a strong correlation between the lagged dependent variable and the dependent variable. The instruments used to replace the endogeneity variable also need to be proven as valid. Another crucial requirement is the absence of second-order serial correlation in the first-differenced residuals. The following subsection elaborates further on the first difference GMM and system GMM, as well as the differences between the one-step and two-step estimators.

3.14.1 First Difference Generalized Method of Moments

The first difference Generalized Method of Moments (GMM) estimator is introduced by Arellano and Bond (1991). The first difference GMM estimator resolves issues of endogeneity in data through differencing and uses the instruments to address the correlation between endogenous variables and transform error terms. However, information in the instrumental variables is wasted when using the first difference GMM. Besides, an issue of instrument proliferation is also a concern with the first difference GMM together, with the possibility of weak instrument problems.

3.14.2 System Generalized Method of Moments

Later, Arellano and Bover (1995) and Blundell and Bond (1998) introduce the system Generalized Method of Moments estimator to overcome the shortcomings in the first difference GMM. The system GMM adds another level of equation to the first differenced equation. The second equation uses the proposed instrumental variable in the first equation and differences it. As a result, the system Generalized Method of Moments (GMM) offers improvements over the first difference GMM by capturing the problem of information loss in the instrumental variables. However, the potential problems of instrument proliferation and weak instruments remain when using the system GMM.

3.14.3 One-Step and Two-Step Estimators

Generally, the first difference GMM and system GMM can each be implemented as a one-step estimator or a two-step estimator. In a one-step estimator, error terms are assumed to be independent and homoscedastic across units and over time. Meanwhile, in the two-step estimator, the calculations of the weight matrix allow for heteroscedasticity in the dataset. However, the two-step estimator is downward biased, specifically if the sample is small. As a result, Windmeijer's finite sample corrected standard errors must be employed together with the two-step estimator to correct the downward bias (Windmeijer, 2005).

3.15 Summary

Chapter 3 discloses the research design and methodology adopted in this study. The research framework and hypotheses are also thoroughly explained in this chapter. The measurement of each variable is also specified, in addition to an elaboration of the relevant preliminary analysis and diagnostic tests conducted for both the static panel data and the dynamic panel data. This chapter also discusses the multiple regression used for both types of data. The Stata statistical package is utilized to run and analyzed the data. In the next chapter, the analysis of the descriptive statistics, correlation analysis, diagnostic tests, panel data estimations, robustness and model assessment are presented in detail.

CHAPTER 4
FINDINGS AND ANALYSIS

4.1 Introduction

Chapter 4 focuses on analysing the study findings based on the data runs, according to the research methodology outlined in the previous chapter. The study begins with the preliminary analyses by examining the descriptive statistics of the data collected to obtain an overview of the datasets. The descriptive statistics are analyzed for all the variables independently. The chapter also presents the results of the mean difference test of each variable, based on bank specialization, country group, and crises period. Next, the correlation test is discussed prior to the relevant diagnostic testing. The diagnostic tests include the outlier test, multicollinearity test, heteroscedasticity test, serial correlation test, unit root test, and endogeneity test. All these tests are necessary to detect potential issues in the data that could render the results biased. Afterward, the study conducts panel data testing, using the F-Chow test, Breusch Pagan Lagrange Multiplier (BPLM) test, and Hausman test to determine the best model for the static regression. Thereafter, the study continues with the robustness and model assessment analysis to select the best model among the five proposed models: Model A (Full sample), Model B (Islamic banks), Model C (Conventional banks), Model D (High-Income countries), and Model E (Middle-Income countries). The best model is used as the final estimation of the study findings.

4.2 Descriptive Analysis

Descriptive analysis enables the study to independently review each variable and extract important information. This analysis helps ensure the datasets collected are entirely representative of the variables used. Each variable is described separately, based on bank specialization, country group, and crises period, as presented in Table 4.1, Table 4.2, and Table 4.3, respectively.

Table 4.1
Descriptive Analysis Based on Bank Specialization

Islamic Banks	N	Min	Mean	Max	Median	Standard Deviation	Skewness	Kurtosis
CAP (%)	609	3.030	8.881	17.250	8.410	2.635	0.476	2.946
CR (%)	609	0.070	3.220	14.710	2.650	2.277	1.731	6.568
LR (%)	609	0.960	19.345	126.150	15.310	14.606	1.858	8.887
PROFIT (%)	609	-1.610	1.381	6.520	1.230	0.904	1.060	5.979
BD (%)	609	0.320	24.009	100	21.170	14.583	1.692	7.986
SIZE ($ Mil.)	609	124.826	12524.519	259836	5453.424	22544.098	5.798	49.738
BG (%)	609	-46.240	13.566	74.230	11.150	13.991	0.707	5.158
CE (%)	609	0.480	1.611	4.350	1.610	0.657	0.752	4.094
EC (%)	609	25.335	98.236	152.631	101.140	22.629	-0.837	3.958
Conventional Banks	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	1463	1.480	9.493	17.520	9.270	3.235	0.177	2.499
CR (%)	1463	0.050	5.279	38.590	4.270	3.995	2.434	14.141
LR (%)	1463	0.860	25.378	155.400	20.390	17.054	1.699	7.774
PROFIT (%)	1463	-6.140	1.701	8.870	1.640	1.194	0.513	7.721
BD (%)	1463	3.930	34.382	121.530	31.680	13.597	1.153	5.445
SIZE ($ Mil.)	1463	60.507	16101.592	250255	4617.933	30244.508	3.786	20.159
BG (%)	1463	-61.160	12.555	117.700	10.450	15.077	1.361	9.235
CE (%)	1463	0.240	1.876	5.020	1.820	0.714	0.673	3.930
EC (%)	1463	24.995	86.371	216.595	91.835	30.041	-0.095	2.227
Overall	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	2072	1.480	9.313***	17.520	8.965	3.083	0.277	2.626
CR (%)	2072	0.050	4.674***	38.590	3.690	3.697	2.545	15.361
LR (%)	2072	0.860	23.605***	155.400	19.125	16.599	1.732	7.994
PROFIT (%)	2072	-6.140	1.607***	8.870	1.510	1.126	0.676	7.716
BD (%)	2072	0.320	31.333***	121.530	29.295	14.672	1.048	5.295
SIZE ($ Mil.)	2072	60.507	15050.223***	259836	4892.348	28241.948	4.188	24.831
BG (%)	2072	-61.160	12.852	117.700	10.795	14.770	1.192	8.253
CE (%)	2072	0.240	1.798***	5.020	1.740	0.708	0.696	3.948
EC (%)	2072	24.995	89.858***	216.595	97.595	28.577	-0.317	2.438

Notes: ***, **, and * denotes the statistical significance at the 1%, 5% and 10 % levels respectively. CAP is capital level is measured by equity to total assets, CR is credit risk is measured by loan loss allowances to gross loans, LR is liquidity risk uses an inverse proxy of liquid assets to deposit and short-term funding, PROFIT is profitability is measured by operating profit to average total assets, BD is bank diversification is measured by non-interest income to total operating income, SIZE is bank size, presented as total assets in USD million, BG is bank growth is measured by growth of gross loans, CE is cost efficiency is measured using inverse proxy of non-interest expenses to average total assets, EC is economy is measured by current price GDP to constant price GDP.

On average, the capital level of banks is found to be at 9.31 percent and significant at a 1% level for bank specialization, country group, and crises period in the mean difference test. This implies that, on average, Islamic and conventional banks in the High-Income and Middle-Income (HIMI) countries hold adequate capital level that are above the minimum 8 percent capital requirement. This suggests that most banks reflect good financial stability, having a sufficient capital level to absorb unexpected losses. The result shows that the highest capital level is held by a conventional bank based in a High-Income country. Specifically, Mashreqbank PSC, operating in the United Arab Emirates (UAE), holds a capital level of 17.52 percent, reflecting the

strong capital reserve of banks operating in High-Income countries. In contrast, the lowest capital level is displayed by a Middle-Income bank, Habib Bank Limited from Pakistan, at only 1.48 percent. This figure is alarming as it falls significantly below the minimum capital requirement of 8 percent. The introduction of the Crocrepati scheme in the late 1990s by Habib Bank Limited to attract more money from customers explains the extremely low capital level of the bank in 1999. The International Monetary Fund (2003) reports that Pakistan's economic growth slowed from the late 1980s, and the conditions worsened for more than two decades. Due to these poor economic conditions, the large funds raised through the deposit mobilization scheme were not utilized effectively. Demand for new loans was low, and the mark-up paid to depositors added extra costs for the bank, leading to bank capital reduction (Ravi Magazine, 2016). During crises, the capital level of banks is found to be significantly higher than it is in non-crisis periods. This reflects the procyclical behavior of financing activities and the capital level of banks in relation to the economy. In prosperous times, banks tend to lower their capital level to extend more financing, whereas in times of recession, banks restrict their financing activities to maintain a high capital level to absorb the unexpected realization of loan losses. Based on Table 4.3, the Commercial Bank of Dubai PSC in the UAE holds a relatively higher capital level at 17.33 percent during crises, whereas Silkbank Limited in Pakistan maintains a lower capital level at 1.82 percent. This suggests that High-Income countries are far more resilient in withstanding any shocks, while Middle-Income countries are vulnerable to shock.

As for credit risk, the mean difference test is found to be at a 1% significance level. On average, most banks exhibit a credit risk level of approximately 4.67 percent. Conventional banks have a relatively higher credit risk than Islamic banks. The highest level of credit risk is recorded by Ahli Bank Q.P.S.C. in Qatar, with a ratio of 38.59 percent, while Malaysia Building Society Berhad (MBSB) in Malaysia demonstrates a lower level of credit risk, at 14.71 percent. This indicates that Islamic banks have better asset quality than conventional banks, probably due to the Shariah-compliant principles that discourage excessive risk-taking and speculative activities. The figures also suggest that credit risk tends to be higher in High-Income countries compared to Middle-Income countries. This could be explained by the diversified loan portfolios of High-Income banks, which expose the banks to greater credit risk. Meanwhile, Middle-Income banks might adopt conservative financing approaches, resulting in less exposure to credit risk. The level of credit risk is observed to be significantly higher during non-crisis periods

compared to crises periods. This highlights the less prudent financing activities by banks in stable economic conditions, which are driven by enhanced credit ratings and profit-seeking behavior. The kurtosis for credit risk is greater than 3, at 15.99, implying a leptokurtic distribution. However, it is still considered normal as the average level of credit risk for most banks is still close to the standard deviation.

Table 4.2
Descriptive Analysis Based on Country Group

High-Income Countries	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	688	2.960	11.631	17.520	11.575	2.428	0.015	2.757
CR (%)	688	0.070	5.217	38.590	4.285	3.751	2.470	14.913
LR (%)	688	0.860	27.369	84.970	23.595	16.719	0.823	3.069
PROFIT (%)	688	-6.140	1.538	6.520	1.560	1.056	-0.293	8.941
BD (%)	688	3.260	28.640	100	27.280	11.966	1.530	9.554
SIZE ($ Mil.)	688	237.582	25992.990	259836	14974.217	34853.869	3.268	16.330
BG (%)	688	-61.160	10.504	74.230	7.840	14.126	0.777	5.695
CE (%)	688	0.240	1.472	3.690	1.415	0.557	0.634	3.297
EC (%)	688	25.335	89.842	134.177	97.595	26.178	-0.742	2.499
Middle-Income Countries	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	1384	1.480	8.161	17.020	7.870	2.702	0.621	3.647
CR (%)	1384	0.050	4.403	37.540	3.395	3.642	2.635	15.995
LR (%)	1384	0.960	21.733	155.400	17.475	16.223	2.305	11.802
PROFIT (%)	1384	-3.750	1.641	8.870	1.480	1.158	1.026	7.099
BD (%)	1384	0.320	32.673	121.530	30.350	15.680	0.844	4.321
SIZE ($ Mil.)	1384	60.507	9610.466	240564	3423.871	22400.181	5.378	37.634
BG (%)	1384	-52.510	14.019	117.700	11.910	14.948	1.373	9.201
CE (%)	1384	0.480	1.960	5.020	1.910	0.7190	0.611	3.981
EC (%)	1384	24.995	89.866	216.595	97.538	29.707	-0.171	2.378
Overall	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	2072	1.480	9.313***	17.520	8.965	3.083	0.277	2.626
CR (%)	2072	0.050	4.674***	38.590	3.690	3.697	2.545	15.361
LR (%)	2072	0.860	23.605***	155.400	19.125	16.599	1.732	7.994
PROFIT (%)	2072	-6.140	1.607**	8.870	1.510	1.126	0.676	7.716
BD (%)	2072	0.320	31.333***	121.530	29.295	14.672	1.048	5.295
SIZE ($ Mil.)	2072	60.507	15050.223***	259836	4892.348	28241.948	4.188	24.831
BG (%)	2072	-61.160	12.852***	117.700	10.795	14.770	1.192	8.253
CE (%)	2072	0.240	1.798***	5.020	1.740	0.708	0.696	3.948
EC (%)	2072	24.995	89.858	216.595	97.595	28.577	-0.317	2.438

Notes: ***, **, and * denotes the statistical significance at the 1%, 5% and 10 % levels respectively. CAP is capital level is measured by equity to total assets, CR is credit risk is measured by loan loss allowances to gross loans, LR is liquidity risk uses an inverse proxy of liquid assets to deposit and short-term funding, PROFIT is profitability is measured by operating profit to average total assets, BD is bank diversification is measured by non-interest income to total operating income, SIZE is bank size, presented as total assets in USD million, BG is bank growth is measured by growth of gross loans, CE is cost efficiency is measured using inverse proxy of non-interest expenses to average total assets, EC is economy is measured by current price GDP to constant price GDP.

Table 4.3
Descriptive Analysis Based on Crises Period

Crises Period	N	Min	Mean	Max	Median	Standard Deviation	Skewness	Kurtosis
CAP (%)	644	1.820	9.768	17.330	9.760	3.009	0.152	2.545
CR (%)	644	0.070	4.312	37.540	3.615	3.190	3.992	34.283
LR (%)	644	0.860	21.320	155.400	18.280	14.391	2.606	18.878
PROFIT (%)	644	-3.750	1.490	5.550	1.390	1.072	0.276	5.292
BD (%)	644	0.320	31.094	121.530	28.740	14.038	1.081	6.135
SIZE ($ Mil.)	644	201.811	19662.298	250255	8116.424	31004.773	3.487	18.343
BG (%)	644	-26.320	11.421	59.670	9.740	13.035	0.737	4.197
CE (%)	644	0.450	1.669	3.830	1.620	0.646	0.451	2.778
EC (%)	644	36.133	99.471	216.595	101.855	24.392	-0.176	3.097
Non-Crisis Period	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	1428	1.480	9.108	17.520	8.665	3.095	0.344	2.702
CR (%)	1428	0.050	4.837	38.590	3.720	3.895	2.132	11.147
LR (%)	1428	1.710	24.635	124.450	19.625	17.410	1.460	5.569
PROFIT (%)	1428	-6.140	1.660	8.870	1.560	1.146	0.812	8.470
BD (%)	1428	0.350	31.441	106.560	29.370	14.953	1.032	4.975
SIZE ($ Mil.)	1428	60.507	12970.267	259836	4101.001	26654.839	4.674	29.910
BG (%)	1428	-61.160	13.498	117.700	11.310	15.450	1.276	8.882
CE (%)	1428	0.240	1.856	5.020	1.810	0.727	0.741	4.132
EC (%)	1428	24.995	85.523	149.511	95.910	29.268	-0.259	2.110
Overall	**N**	**Min**	**Mean**	**Max**	**Median**	**Standard Deviation**	**Skewness**	**Kurtosis**
CAP (%)	2072	1.480	9.313***	17.520	8.965	3.083	0.277	2.626
CR (%)	2072	0.050	4.674***	38.590	3.690	3.697	2.545	15.361
LR (%)	2072	0.860	23.605***	155.400	19.125	16.599	1.732	7.994
PROFIT (%)	2072	-6.140	1.607***	8.870	1.510	1.126	0.676	7.716
BD (%)	2072	0.320	31.333	121.530	29.295	14.672	1.048	5.295
SIZE ($ Mil.)	2072	60.507	15050.223***	259836	4892.348	28241.948	4.188	24.831
BG (%)	2072	-61.160	12.852***	117.700	10.795	14.770	1.192	8.253
CE (%)	2072	0.240	1.798***	5.020	1.740	0.708	0.696	3.948
EC (%)	2072	24.995	89.858***	216.595	97.595	28.577	-0.317	2.438

Notes: ***, **, and * denotes the statistical significance at the 1%, 5% and 10 % levels respectively. CAP is capital level is measured by equity to total assets, CR is credit risk is measured by loan loss allowances to gross loans, LR is liquidity risk uses an inverse proxy of liquid assets to deposit and short-term funding, PROFIT is profitability is measured by operating profit to average total assets, BD is bank diversification is measured by non-interest income to total operating income, SIZE is bank size, presented as total assets in USD million, BG is bank growth is measured by growth of gross loans, CE is cost efficiency is measured using inverse proxy of non-interest expenses to average total assets, EC is economy is measured by current price GDP to constant price GDP.

The study uses an inverse proxy of liquid assets to deposits and short-term funding to measure the liquidity risk. Most Islamic banks have, on average, a liquidity risk of 19.35 percent, while conventional banks show a higher average of 25.38 percent. The mean difference test for liquidity risk is revealed to be significant at the 1% level. This indicates that Islamic banks are exposed to higher liquidity risk than conventional banks. This suggests that Islamic banks find it challenging to raise funds quickly due to the limited sources of Shariah-compliant money markets. Therefore, Islamic banks prefer to hold high amounts of liquidity to manage the liquidity risk. Moreover, banks in Middle-Income countries face higher liquidity risk issues compared to banks in High-

Income countries, with means of 21.73 percent and 27.37 percent, respectively, that are significant at the 1% level. This validates how the financial markets in High-Income countries are more developed than those in Middle-Income countries. As a result, banks in High-Income countries have easier access to liquidity instruments and a greater capacity to raise funds due to the superior financial infrastructure. The descriptive statistics also show that banks face a high risk of illiquidity in times of crisis compared to normal times, with means of 21.32 percent and 24.64 percent, respectively, that are statistically significant at the 1% level. This is attributed to the unexpected materialization of loan losses, resulting in a lower level of liquidity during such times to meet the withdrawal demands of customers.

The profitability for most banks is found to be 1.61 percent, and this is significant at the 1% level for the mean difference test across bank specialization, country group, and crises period. Conventional banks exhibit higher profitability than Islamic banks, with an average profit of 1.70 percent compared to 1.38 percent. Hongkong and Shanghai Banking Corporation Limited (HSBC) branches in Bangladesh obtain high profitability at 8.87 percent. Meanwhile, the highest profitability for Islamic banks is 6.52 percent, achieved by the Al Rajhi Banking and Investment Corporation based in Saudi Arabia. Greater access to financial resources enables conventional banks to earn from various income streams, while Islamic banks are restricted by adherence to Shariah principles. Additionally, the descriptive statistics show that banks operating in Middle-Income countries are more profitable than those in High-Income countries, as reflected in the mean value of 1.64 percent for the former relative to 1.54 percent for the latter. However, during crises, the profitability of banks declines. In 2020, Silkbank Limited showed a negative value of profits at -3.75 percent. This was partly due to the sudden outbreak of the COVID-19 pandemic that year, which disrupted business activities globally, including the banking sector. As most sectors were required to cease operations and many were forced to shut down, unemployment rates surged unexpectedly. These indirectly affected the ability of people to meet their loan obligations. The failure of borrowers to meet these obligations reduced the profits gained by banks, resulting in the negative value of profitability.

Given that banks are exposed to greater risk, diversification is one of the tools that banks adopt to decrease risk while pursuing high profits. The descriptive results reveal that conventional banks are more diversified than Islamic banks, with a significant mean difference test at the 1% level. The high level of diversification among

conventional banks validates that these banks have a broad array of resources to choose from and can diversify without operational constraints. In contrast, Islamic banks are bound by Shariah principles, which limit their operational activities, as well as the range of products and services the banks can offer. Consequently, the ability of Islamic banks to diversify is constrained as they must be more selective. The results also reveal that greater diversification activities are demonstrated by Middle-Income banks relative to High-Income banks. The mean difference test is statistically significant at the 1% level. This is because of the volatile economic conditions in Middle-Income countries, with such environments exposing banks to higher levels of risk. By engaging in non-interest income activities, banks in Middle-Income countries can counter these uncertainties and enhance profitability. In contrast, the stable economic environments in High-Income countries enable banks operating there to possess strong profitability with stable profits without relying heavily on diversification activities.

Examining the bank size, the average total assets of both the Islamic and conventional banks in the HIMI countries amounted to USD 15050.22 million. This figure is significant at the 1% level in the mean difference test for bank specialization, country group, and crises period. A greater disparity in terms of bank size is observed when comparing smaller banks and larger banks. This is because of the larger minimum and maximum total assets for Islamic and conventional banks in HIMI countries. The minimum total assets, USD 60.51 million, belongs to The Premier Bank PLC in Bangladesh, while the highest total assets is held by the Al Rajhi Banking and Investment Corporation from Saudi Arabia, at USD 259836 million. Consequently, the standard deviation for bank size is very high at 4892.35, resulting in the leptokurtic distribution of the total assets. This could be explained by the differences in market access and resources between smaller and larger banking institutions. The latter typically have extensive access to various markets and substantial resources, enabling the attraction of a larger customer base and offerings of various products and services. In contrast, banks that smaller in size have limited market access and resources, making them unable to offer their products and services to a larger customer base.

Concerning the bank growth variable, the study indicates that banks operating in Middle-Income countries experience more significant growth than banks in High-Income countries. The differences are significant at the 1% level, with a mean value of 12.85 percent. This can be explained by the well-established banking systems in High-Income countries, where market saturation limits bank growth and expansion as most

people already have access to a wide range of banking services. Conversely, banks in Middle-Income countries have more room for growth because there are still unmet needs and untapped markets, providing opportunities for banks to explore, grow, and expand. Evidently, the maximum bank growth is found to be 117.7 percent for Hong Leong Bank Berhad in Malaysia, while the lowest bank growth is -61.16 percent, which belongs to Arab Banking Corporation B.S.C. from Bahrain. Growth in the banking sector appears to be significantly higher in normal periods relative to bad times. This is reflected in the significant mean difference test at the 1% level, which shows 13.50 percent bank growth during non-crisis periods compared to 11.42 percent in crises periods. This suggests that the lower-risk environments during stable economic conditions encourage banks to relax their financing standards and engage in imprudent financing activities while pursuing growth. On average, bank growth is higher for Islamic banks at 13.57 percent compared to conventional banks at 12.56 percent, although this is insignificant.

Non-interest expenses to average total assets is the inverse proxy used to represent cost efficiency. A high ratio indicates a bank has lower cost efficiency. The average cost efficiency is found to be 1.80 percent at the 1% significance level in the mean difference test for bank specialization, country group, and crises period. Specifically, Islamic banks display stronger cost efficiency than conventional banks. This is primarily due to the high administrative costs associated with the dual governance structures in Islamic banks. Unlike conventional banks, the additional layers of oversight introduced to comply with Shariah principles incur greater operating costs for Islamic banks. In addition, banks in High-Income countries are more cost-efficient than Middle-Income banks. The strong cost efficiency of High-Income banks is due to the presence of advanced technology and robust regulatory frameworks. The descriptive analysis further reveals that most banks achieve greater cost efficiency in times of crises than in normal periods. This is supported by the mean values of cost efficiency at 1.67 percent during crises and 1.86 percent during normal times, which are significant at the 1% level.

The descriptive results reveal that only economy is skewed to the left, with a platykurtic distribution. On average, the economy is found to be at 89.86 percent. The mean difference test shows a 1% significance level for both bank specialization and crises periods, but the country group results are not significant. During times of crisis, the economy of Bangladesh is shown to have the lowest GDP deflator of 36.13 percent,

in 1998, while Pakistan demonstrates a strong economy during normal times, with a GDP deflator of 25 percent. The GDP deflator is measured using current price GDP to constant price GDP. The higher minimum value of the GDP deflator during crises periods is because of the monsoon flood crisis in Bangladesh in 1998. According to a World Bank Group (1998), this monsoon flood caused major damage to the country's economy, with 1.4 million acres of crops destroyed, 980,000 homes damaged, and 15,927km of roads and 6,795 bridges rendered unusable.

4.3 Proportion Analysis

Table 4.4 summarizes the proportions of crises period, bank specialization, and country group in the dataset. Over the 30-year period, only 31 percent is from crises while the remaining 69 percent is from non-crisis periods. The majority of the data come from conventional banks that is 71 percent and only 29 percent of the data sample is from Islamic banks. This is likely due to the long history and market presence of conventional banks, which make them widely established. In contrast, Islamic banks are still considered infants and in a growing phase. In addition, 67 percent of the banks operate in the Middle-Income countries, whereas only 33 percent operate in High-Income countries. Based on the proportions of crises period, bank specialization, and country group, this is considered acceptable and representative of the dummy. This is because although the study is unbalanced, at least 30 percent can represent each of the dummy created for crises period, bank specialization and country group.

Table 4.4
Proportions of Crises Period, Bank Specialization, and Country Group in the Dataset

	Proportion	Number of Observations
Crises Period		
Crises Period	0.311	644
Non-Crisis Period	0.689	1428
Bank Specialization		
Islamic Banks	0.294	609
Conventional Banks	0.706	1463
Country Group		
High-Income Countries	0.332	688
Middle-Income Countries	0.668	1384

4.4 Correlation Analysis

The study conducts Pearson's correlation analysis to assess the strength of the variables. Table 4.5 shows the results of the Pearson's correlation coefficient test. The

study employs inverse proxies to represent liquidity risk and cost efficiency. However, the symbols are reversed to facilitate a clearer interpretation and ensure consistency in the analysis. The capital level is found to be positively related to profitability, bank size, cost efficiency, and economy; meanwhile, it is negatively correlated with credit risk, liquidity risk, bank diversification, and bank growth. Both the positive and negative relationships are significant at the 1% significance level, except for credit risk, which is significant at the 10% level. No statistically significant correlation is found between bank diversification and profitability. Furthermore, all the variables have a coefficient below 0.4, indicating a lower probability that two variables are correlated to one another.

Table 4.5
Pearson's Correlation Coefficient Test

Variables	CAP	CR	LR	PROFIT	BD	SIZE	BG	CE	EC
CAP	1.000								
CR	-0.037*	1.000							
LR	-0.210***	-0.198***	1.000						
PROFIT	0.358***	-0.186***	-0.051**	1.000					
BD	-0.150***	0.115***	-0.221***	0.179***	1.000				
SIZE	0.171***	-0.114***	0.102***	-0.016	-0.098***	1.000			
BG	-0.247***	-0.238***	0.122***	0.253***	0.101***	-0.112***	1.000		
CE	0.180***	-0.215***	-0.106***	-0.062***	-0.232***	0.275***	-0.084***	1.000	
EC	0.113***	-0.087***	0.357***	-0.228***	-0.236***	0.179***	-0.220***	0.132***	1.000

Notes: ***, **, and * denotes the statistical significance at the 1%, 5% and 10 % levels respectively. CAP is capital level is measured by equity to total assets, CR is credit risk is measured by loan loss allowances to gross loans, LR is liquidity risk uses an inverse proxy of liquid assets to deposit and short-term funding, PROFIT is profitability is measured by operating profit to average total assets, BD is bank diversification is measured by non-interest income to total operating income, SIZE is bank size, presented as total assets in USD million, BG is bank growth is measured by growth of gross loans, CE is cost efficiency is measured using inverse proxy of non-interest expenses to average total assets, EC is economy is measured by current price GDP to constant price GDP.

4.5 Endogeneity Test

The Durbin-Wu-Hausman test is conducted prior to regression analysis to examine whether each five model has an endogeneity issue. The Durbin-Wu-Hausman test results are presented in Table 4.6. The result of the F value of the robust regression fails to reject the null hypothesis that there is no endogeneity issue, given that the p-value is above the 5% significance level. This implies that no endogeneity issues are detected in any of the five static models for both basic and interaction. This highlights that static regression can proceed instead of dynamic regression for the final estimation of this study.

Table 4.6
Durbin-Wu-Hausman Test

	Basic Static Models				
	Model A (Full Sample)	Model B (Islamic Banks)	Model C (Conventional Banks)	Model D (High-Income Countries)	Model E (Middle-Income Countries)
Robust Score Chi2	2.000	0.006	0.938	0.785	0.047
Robust Regression (F Value)	1.954	0.006	0.918	0.757	0.046
	Interaction Static Models				
	Model A (Full Sample)	Model B (Islamic Banks)	Model C (Conventional Banks)	Model D (High-Income Countries)	Model E (Middle-Income Countries)
Robust Score Chi2	1.878	0.006	0.916	0.787	0.039
Robust Regression (F Value)	1.835	0.006	0.895	0.757	0.038

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.
H_0: There is no endogeneity issue.
H_A: There is an endogeneity issue.

4.6 Static Panel Data Diagnostic Tests Result

Due to no endogeneity issues detected in any of the models in this study, so static regression is preferred over the dynamic regression. The diagnostic tests that are relevant for a static model include the outlier, multicollinearity, heteroscedasticity, serial correlation, and unit root tests.

4.6.1 Outlier Test

The study executes Scatter plots and Cook's distance tests separately for each of the five models to remove any extreme values from the dataset that could be either too large or too small. The study contains five models: Model A (Full sample), Model B (Islamic banks), Model C (Conventional banks), Model D (High-Income countries), and Model E (Middle-Income countries). Originally, the data contain 4,595 observations in the full sample model, 1,352 in the Islamic banks model, 3,242 in the conventional banks model, 1,585 in the High-Income countries model, and 3,010 in the Middle-Income countries model. After removing extreme outliers, the full sample is left with a total of 2,072 observations, Islamic banks with a total of 505 observations, conventional banks with a total of 1,505 observations, High-Income countries with a total of 661 observations, and Middle-Income countries with a total of 1,325 observations. The two-way scatter plot graphs for each model after excluding outliers are shown in Figure 4.1, Figure 4.2, Figure 4.3, Figure 4.4, and Figure 4.5 below,

respectively. To ensure the data represent the panel data, the study ensures that the final number of observations for the five models fulfills the minimum of three consecutive years of observations for each group.

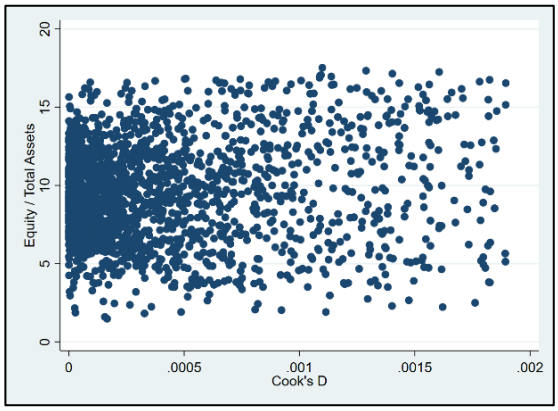

Figure 4.1 Two Ways Scatter Plot Graph of Model A (Full Sample)

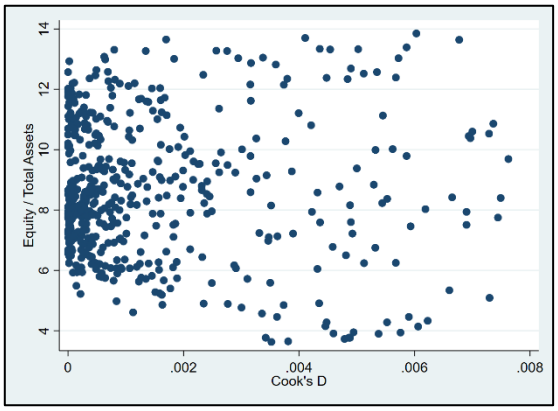

Figure 4.2 Two Ways Scatter Plot Graph of Model B (Islamic Banks)

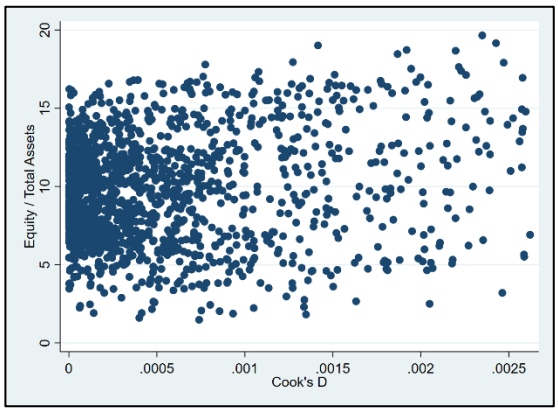

Figure 4.3 Two Ways Scatter Plot Graph of Model C (Conventional Banks)

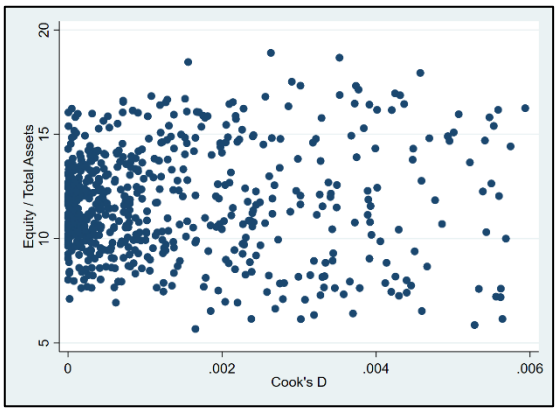

Figure 4.4 Two Ways Scatter Plot Graph of Model D (High-Income Countries)

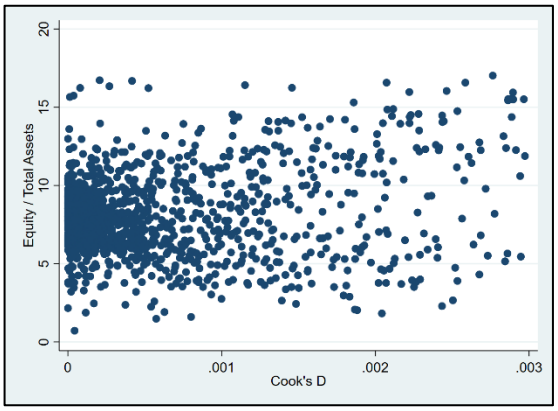

Figure 4.5 Two Ways Scatter Plot Graph of Model E (Middle-Income Countries)

4.6.2 Multicollinearity Test

The study further strengthens the results of the Pearson two-tailed correlation test with multicollinearity testing using the variance inflation factor (VIF). The VIF results for each model are shown in Table 4.7.

Table 4.7
Variance Inflation Factor

	Model A (Full Sample)	Model B (Islamic Banks)	Model C (Conventional Banks)	Model D (High-Income Countries)	Model E (Middle-Income Countries)
Credit Risk	1.23	1.39	1.21	1.33	1.40
Liquidity Risk	1.34	1.39	1.31	1.46	1.32
Profitability	1..17	1.24	1.15	1.19	1.24
Bank Diversification	1.18	1.22	1.10	1.18	1.18
Bank Size	1.13	1.14	1.19	1.15	1.12
Bank Growth	1.23	1.17	1.28	1.20	1.39
Cost Efficiency	1.26	1.34	1.24	1.10	1.35
Economy	1.34	1.58	1.32	1.40	1.45
Mean VIF	1.23	1.31	1.23	1.25	1.31

The mean VIF results for all the models are reveal to be below five. This indicates that no serious multicollinearity issues affect the five models, thus validating the results of the correlation test.

4.6.3 Heteroscedasticity Test

The study identifies whether a model has heteroscedasticity issues by employing the Modified Wald test. The Modified Wald test results reveal that a heteroscedasticity issue exists in all five models, as presented in Table 4.8. Given that the value of Chi2 is significant at the 1% level for all models, the study can reject the null hypothesis that the error term is homoscedastic. Indirectly, this indicates that all models have a heteroscedastic issue, whereby each bank and each country have different characteristics.

Table 4.8
Modified Wald Test

	Model A (Full Sample)	Model B (Islamic Banks)	Model C (Conventional Banks)	Model D (High-Income Countries)	Model E (Middle-Income Countries)
Chi2 Value	3793.36***	732.83***	2645.75***	1192.67***	8163.93***

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.
H_0: The error term is homoscedastic.
H_A: The error term is heteroscedastic.

4.6.4 Serial Correlation Test

A Wooldridge test is conducted to confirm whether a model has serial correlation issues. Table 4.9 shows the results of the Wooldridge test. The p-value is found to be below 0.01, indicating that the study could reject the null hypothesis that a model has no serial correlation issue. Likewise, the results demonstrate that an issue of serial correlation is present in all five models. For this reason, the study considers cluster regression to remedy both the heteroscedasticity and serial correlation issues in the static models.

Table 4.9
Wooldridge Test

	Model A (Full Sample)	Model B (Islamic Banks)	Model C (Conventional Banks)	Model D (High-Income Countries)	Model E (Middle-Income Countries)
F Value	226.920***	34.757***	202.622***	107.884***	117.471***

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.
H_0: There is no serial correlation issue.
H_A: There is a serial correlation issue.

4.6.5 Unit Root Test

Given that the study spans a period of 30 years, the possibility of non-stationarity issues arising in the dataset is high. The study employs Fisher-type tests based on Phillips Perron and Augmented Dickey Fuller to test for unit root issues in the unbalanced panel data of all the five models. The unit root test results are summarized in Table 4.10.

Table 4.10
Fisher-type Unit Root Test for the Five Models

	Inverse Chi-squared (P)	Inverse Normal (Z)	Inverse Logit (L*)	Modified Inverse Chi-squared (Pm)
Model A (Full Sample)				
Capital Level	499.557***	-2.408***	-5.330***	10.895***
Credit Risk	340.318***	3.286	2.368	3.830***
Liquidity Risk	554.693***	-4.393***	-7.233***	13.341***
Profitability	622.929***	-4.540***	-8.261***	16.370***
Bank Diversification	461.855***	-3.801***	-5.624***	9.222***
Bank Size	98.428	13.663	14.394	-6.902
Bank Growth	1150.258***	-21.436***	-27.246***	39.765***
Cost Efficiency	672.493***	-4.902***	-10.106***	18.568***
Economy	231.311	8.682	7.348	-1.007
Model B (Islamic Banks)				
Capital Level	167.991***	-2.233**	-3.679***	6.480***
Credit Risk	131.854***	2.157	1.633	3.692***
Liquidity Risk	215.230***	-2.967***	-5.455***	10.125***
Profitability	320.921***	-4.917***	-10.676***	18.289***
Bank Diversification	266.311***	-4.829**	-8.241***	14.066***
Bank Size	40.493	8.317	9.309	-3.357
Bank Growth	266.866***	-9.017***	-10.325***	14.108***
Cost Efficiency	213.046***	-2.805***	-5.018***	9.956***
Economy	52.039	5.284	5.737	-2.466
Model C (Conventional Banks)				
Capital Level	233.735***	-0.949	-2.261**	4.543***
Credit Risk	183.863**	1.310	1.638	1.702**
Liquidity Risk	191.258**	0.227	-0.451	2.123**
Profitability	391.603***	-4.621***	-7.311***	13.539***
Bank Diversification	260.454***	-2.815***	-4.178***	6.066***
Bank Size	54.656	10.136	10.585	-5.659
Bank Growth	519.265***	-11.325***	-14.931***	20.813***
Cost Efficiency	183.593*	-0.764	-0.961	1.686**
Economy	44.421	11.781	13.252	-6.244
Model D (High-Income Countries)				
Capital Level	208.900***	-2.309***	-5.182***	9.636***
Credit Risk	126.691***	-1.142	-1.506*	3.294***
Liquidity Risk	223.553***	-4.105***	-6.734***	10.767***
Profitability	296.829***	-6.839***	-10.785***	16.420***
Bank Diversification	136.067***	-1.591*	-2.615***	4.017***
Bank Size	16.341	10.184	11.524	-5.220
Bank Growth	384.706***	-12.276***	-16.170***	23.200***
Cost Efficiency	243.132***	-2.197**	-5.624***	12.277***
Economy	200.764***	-1.246	-4.952***	9.009***
Model E (Middle-Income Countries)				
Capital Level	308.503***	-0.680	-2.651***	7.821***
Credit Risk	203.717**	3.243	2.339	2.070**
Liquidity Risk	346.389***	-2.930***	-4.535***	9.900***
Profitability	349.567***	-0.896	-3.350***	10.075***
Bank Diversification	347.020***	-2.456***	-4.900***	9.935***
Bank Size	85.888	10.467	10.942	-4.397
Bank Growth	696.298***	-15.919***	-19.785***	29.104***
Cost Efficiency	398.298***	-3.624***	-7.394***	12.749***
Economy	39.080	11.795	13.190	-6.966

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.
H_0: All panels contain unit roots.
H_A: At least one panel is not a unit root.

Based on the unit root testing, the study rejects the null hypothesis that the data have a unit root and are non-stationary. In other words, the datasets encounter no unit root issues and are stationary, except in regard to the bank size and economy. The unit root issue for bank size is present in all the five models. Consequently, bank size is

converted into a logarithm for all the models. Whereas the issue of unit root for economy exists in all five models except for Model D. Nevertheless, the study maintains the economy in nominal terms, as it uses an index of GDP deflator measured by the ratio of current price Gross Domestic Product (GDP) to constant price GDP. This is because price conditions affect banks' costs, profitability, and capital choices, and these effects are more accurately reflected when the GDP deflator is kept in its original form rather than transformed as evident by Naoaj (2023). Likewise, earlier banking studies including Beck and Weber (2012) and Berger and Bouwman (2009) consistently keeps inflation or price-level variables in levels because these measures directly affects banks' costs, profits, and capital accumulations, all of which are fundamental drivers of bank capital level.

4.6.6 Panel Data Testing

The study executes the F-chow test, BPLM test, and Hausman test to determine whether pooled ordinary least squares (POLS) or generalized least squares (GLS) is the most suitable estimator for the static regression of the basic and interaction models. Table 4.11 provides the results of the panel data testing. POLS is proven unsuitable for this study as the diagnostic tests reveal violations of classical assumptions, such as homoscedasticity and independence of error terms. This indicates that the POLS estimator fails to account for unobserved heterogeneity and serial correlation across the cross-sectional study, which can lead to biased and invalid estimates. The alternative estimator (GLS) using either a fixed effects model or a random effects model offers better estimates when a study has both heteroscedasticity and serial correlation issues. Subsequently, the study proceeds with the GLS random effects model despite the Hausman test results revealing that a fixed effects model (FEM) is more appropriate for the basic and interaction models.

Table 4.11
Panel Data Testing

	Basic Static Regression				
	A1	B1	C1	D1	E1
F-Chow Test					
F value	115.31***	34.13***	99.17***	44.66***	88.95***
Breusch Pagan Lagrange Multiplier Test					
Chibar2 value	1453.30***	339.56***	1335.14***	233.19***	684.14***
Hausman Test					
Chi2 value	78.12***	13.54	132.33***	24.18***	190.77***
Appropriate Model	GLS FEM	GLS REM	GLS FEM	GLS FEM	GLS FEM
	Interaction Static Regression				
	A3	B3	C3	D3	E3
F-Chow Test					
F value	105.80***	31.39***	90.43***	41.51***	84.81***
Breusch Pagan Lagrange Multiplier Test					
Chibar2 value	1446.85***	341.08***	1340.60***	246.87***	686.83***
Hausman Test					
Chi2 value	101.81***	26.44***	132.62***	23.89***	195.62***
Appropriate Model	GLS FEM				

Notes: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively. A1 and A3 represent Model A (full sample), B1 and B3 represent Model B (individual Islamic banks), C1 and C3 represent Model C (individual conventional banks), D1 and D3 represent Model D (individual High-Income countries), E1 and E3 represent Model E (individual Middle-Income countries).

This is because to answer the research objectives, a random effects model (REM) is considered more appropriate as the FEM omits the two dummy variables that are considered crucial for the analysis (bank specialization and country group) due to the collinearity issue. Baltagi (2008) and Hausman and Taylor (1981) explicitly recommends using REM for panel data to keep time-invariant variables while guarding against the risk of omitted variable bias arising from unobserved heterogeneity. Bank specialization and country group must both be investigated in this study, and the elimination of these variables hinders the analysis in terms of achieving the study objectives. Therefore, the REM with cluster standard errors is used for regression in both the basic and interaction versions of the five models to address both the heteroscedasticity and the serial correlation issues. This approach is evident in several empirical of banking studies such as (Beck et al., 2006; Beck et al., 2004; Berger & DeYoung, 1997; Berger et al., 2017).

4.7 Robustness and Model Assessment

Table 4.12 reports the results of the random effects model using the cluster standard errors of the basic and interaction versions of all five models. To recap, the

five models in this study are Model A (Full sample), Model B (Islamic banks), Model C (Conventional banks), Model D (High-Income countries), and Model E (Middle-Income countries).

Model A (Full sample) is the pooled data that combine all the Islamic and conventional banks across the High-Income and Middle-Income countries. Therefore, the results of Model A average out all the effects of bank specialization and country group. Considering that the capital decision of banks may vary due to institutional characteristics and different income group levels, the study split the data into Model B (Islamic banks), Model C (Conventional banks), Model D (High-Income countries), and Model E (Middle-Income countries). These four distinct models of individual Islamic banks, individual conventional banks, individual High-Income countries, and individual Middle-Income countries aim to capture and analyze the potential heterogeneity behavior across different bank specializations and country groups when examining the capital decision of banks.

Overall, the estimation results of this study are considered robust due to the similar findings in both basic and interaction static for the five models. This is supported by the statistically significant result of the Wald Chi2 value at the 1% significance level for the five models, which indicates the validity and reliability of the models. Note that liquidity risk and cost efficiency are measured using an inverse proxy in this study. Nevertheless, the direction of the symbols in the final estimation is reversed to ensure consistency and avoid misinterpretation of the variables. Credit risk, bank growth, bank specialization, and country group are found to negatively influence the capital level in both the basic and interaction models. Similarly, profitability consistently demonstrates a positive relationship with the capital level of banks across all five models in the basic and interaction regression.

Meanwhile, bank size and cost efficiency are shown to be negatively related in all five models of the basic and interaction regression. Across the five models, the negative relationship between bank size and capital level is only significant for conventional banks and High-Income countries. In terms of cost efficiency, the negative relationship remains statistically insignificant only for High-Income countries as the study fails to reject the null hypothesis in both the basic and interaction regression.

Table 4.12
Random Effects Model using Cluster Standard Errors of Basic and Interaction for All Models

	Basic Static Regression					Interaction Static Regression				
	A1 (Full Sample)	**B1 (Islamic Banks)**	**C1 (Conventional Banks)**	**D1 (High-Income Countries)**	**E1 (Middle-Income Countries)**	**A3 (Full Sample)**	**B3 (Islamic Banks)**	**C3 (Conventional Banks)**	**D3 (High-Income Countries)**	**E3 (Middle-Income Countries)**
Credit Risk (%)	-0.096***	-0.122***	-0.091***	-0.095***	-0.174***	-0.094***	-0.117***	-0.088***	-0.096***	-0.170***
	(0.020)	(0.043)	(0.023)	(0.032)	(0.030)	(0.020)	(0.044)	(0.023)	(0.032)	(0.029)
Liquidity Risk (%)	-0.012**	0.006	0.0003	-0.009	-0.011	-0.011*	0.006	0.001	-0.008	-0.009
	(0.006)	(0.010)	(0.007)	(0.007)	(0.008)	(0.006)	(0.010)	(0.007)	(0.007)	(0.008)
Profitability (%)	1.164***	0.548***	1.206***	1.679***	1.114***	1.161***	0.552***	1.203***	1.677***	1.111***
	(0.073)	(0.067)	(0.089)	(0.147)	(0.085)	(0.073)	(0.067)	(0.090)	(0.148)	(0.085)
Bank Diversification (%)	-0.028***	-0.004	-0.040***	0.012	-0.031***	-0.002	0.007	-0.010	-0.038	0.006
	(0.005)	(0.005)	(0.007)	(0.009)	(0.006)	(0.012)	(0.015)	(0.017)	(0.027)	(0.013)
Bank Size (%)	-0.137	-0.102	-0.322**	-0.340**	-0.098	-0.122	-0.086	-0.319**	-0.357**	-0.082
	(0.116)	(0.154)	(0.127)	(0.169)	(0.108)	(0.117)	(0.155)	(0.129)	(0.171)	(0.107)
Bank Growth (%)	-0.041***	-0.038***	-0.044***	-0.043***	-0.048***	-0.041***	-0.037***	-0.044***	-0.042***	-0.048***
	(0.003)	(0.003)	(0.004)	(0.006)	(0.004)	(0.003)	(0.003)	(0.004)	(0.006)	(0.004)
Cost Efficiency (%)	-0.489***	-0.717***	-0.478**	-0.089	-0.490***	-0.934***	-0.874***	-0.983**	0.820	-1.092***
	(0.153)	(0.162)	(0.200)	(0.337)	(0.156)	(0.274)	(0.221)	(0.387)	(0.678)	(0.258)
Economy (%)	0.023***	-0.024***	0.028***	0.028***	0.020***	0.022***	-0.024***	0.027***	0.027***	0.019***
	(0.004)	(0.004)	(0.004)	(0.007)	(0.004)	(0.004)	(0.004)	(0.005)	(0.007)	(0.004)
Crises Period	0.046	-0.123	0.010	0.478***	-0.132	0.054	-0.114	0.020	0.480***	-0.124
	(0.088)	(0.107)	(0.114)	(0.138)	(0.094)	(0.087)	(0.106)	(0.113)	(0.141)	(0.093)
Bank Specialization	-1.276***			-1.120***	-1.172***	-1.224***			-1.166***	-1.078***
	(0.250)			(0.363)	(0.304)	(0.253)			(0.365)	(0.306)
Country Group	3.729***	3.625***	4.117***			3.729***	3.622***	4.167***		
	(0.293)	(0.355)	(0.432)			(0.295)	(0.354)	(0.435)		
Bank Diversification*Cost Efficiency						0.014**	0.007	0.015*	-0.031*	0.018***
						(0.006)	(0.009)	(0.008)	(0.017)	(0.006)
Constant	6.413***	10.002***	8.158***	10.176***	6.951***	5.559***	9.642***	7.207***	11.834***	5.793***
	(1.021)	(1.293)	(1.054)	(1.831)	(1.007)	(1.017)	(1.315)	(1.196)	(1.999)	(1.061)
Observations	2072	505	1505	661	1325	2072	505	1505	661	1325
Wald Chi^2	985.433***	888.838***	674.030***	238.275***	376.273***	991.912***	817.442***	683.148***	245.811***	375.299***
Within R^2	0.345	0.387	0.382	0.395	0.381	0.349	0.391	0.385	0.403	0.391
Overall R^2	0.582	0.704	0.546	0.500	0.460	0.584	0.703	0.545	0.503	0.461
Between R^2	0.721	0.826	0.666	0.738	0.671	0.721	0.822	0.665	0.729	0.667

Notes: Standard errors are in parentheses. ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively. Capital level is measured by equity to total assets, credit risk is measured by loan loss allowances to gross loans, liquidity risk uses an inverse proxy of liquid assets to deposit and short-term funding, profitability is measured by operating profit to average total assets, bank diversification is measured by non-interest income to total operating income, bank size measures as natural logarithm of total assets, bank growth is measured by growth of gross loans, cost efficiency is measured using inverse proxy of non-interest expenses to average total assets, economy is measured using current price GDP to constant price GDP, crises period where 1 coded as during crises and 0 during non-crisis periods, bank specialization use 1 for Islamic banks and 0 for conventional banks, country group use 1 as High-Income countries while 0 as Middle-Income countries.

A mixed relationship is revealed in both economy and crises period with the capital level of banks. While a significant positive relationship is found between economy and capital level in all five models in both types of regression, Islamic banks demonstrate a statistically significant negative relationship. For crises period, both sets of regression results reveal a positive relationship in the full sample, conventional banks, and High-Income countries, although the relationship is significant only in the High-Income countries. Islamic banks and Middle-Income countries are shown to be negative and insignificant for crises period.

Liquidity risk is negatively significant only in the full sample model, while it remains negatively insignificant for the other models in both the basic and interaction regression. With a mixed relationship, bank diversification is found to be insignificant across all the models in both types of regression, except for the full sample, conventional banks, and Middle-Income countries in the basic regression. In the interaction regression, the positive relationship between bank diversification and capital level for High-Income countries changes to negative from the basic regression. Meanwhile, for Islamic banks and Middle-Income countries, the negative relationship changes to positive in the interaction regression. The non-significant relationship for bank diversification in all five models is because the effect is absorbed and reflected in the interaction variable.

As for the interaction variable, the relationship is revealed to be significant across all five models, except for Islamic banks. The relationship is found to be negative in High-Income countries, while the full sample, conventional banks, and Middle-Income countries each exhibit a positive relationship.

Overall, the study concludes that both regression models have a good fit, with robust results observed in both. The interaction regression is regarded as the most plausible model to use in the final estimation and for further discussion, with basic regression serving as the baseline model. The interaction regression findings are presented in detail in the next chapters.

4.8 Summary

In summary, the study proceeds with static regression because no endogeneity issues are detected in the data. Additionally, the diagnostic test results show no serious multicollinearity issue, but there is an issue of heteroscedasticity and serial correlation

present in the model. The study identifies the presence of a unit root in the bank size and economic variables thus applying appropriate corrective measures to address these issues. Based on the panel data testing, the study considers generalized least squares of the random effects model as the most appropriate model estimator for the final estimation. The study further concludes that the individual model is a plausible model to further examine the capital decision of Islamic and conventional banks in High-Income and Middle-Income countries over the pooled data of the full sample model. Cluster regression is adopted to remedy both the heterogeneity and serial correlation issues in the data. In the following chapter, a detailed interpretation of the interaction static estimation results is discussed. The discussion focuses on answering all the seven research objectives outlined in this study.

CHAPTER 5
FINDINGS AND DISCUSSION

5.1 Introduction

This chapter discusses the results of the final estimation using the most plausible individual model of the interaction regression. The empirical findings focus on the individual models of Islamic banks (Model B), conventional banks (Model C), High-Income countries (Model D), and Middle-Income countries (Model E). Section 5.2 discusses the capital drivers for Islamic and conventional banks, as well as for High-Income and Middle-Income countries. Meanwhile, Sections 5.3 and 5.4 focus on the differences between the capital level of Islamic and conventional banks and those of High-Income and Middle-Income countries, respectively. Subsequently, Section 5.5 shifts the focus onto the capital level of Islamic and conventional banks in High-Income and Middle-Income countries during crises and non-crisis periods. Section 5.6 explores in depth the final estimation of the interaction effects of cost efficiency on the relationship between bank diversification and capital level.

5.2 The Drivers of Bank Capital Level

This section employs the final estimation based on the interaction model, by bank specialization and by country group, to capture the differences between the capital decision of Islamic and conventional banks and the capital decision of High-Income and Middle-Income countries. To recap, research objective one is to investigate the determinants of the capital decision of Islamic and conventional banks, followed by the comparison between both types of banking systems using each variable. Meanwhile, research objective three is to investigate the determinants of the capital level of banks in High-Income and Middle-Income countries, comparing the two country groups using all the variables. Table 5.1 reports the results of the random effects model with cluster standard errors by bank specialization and by country group.

Table 5.1
Random Effects Model with Cluster Standard Errors by Bank Specialization and Country Group

	Interaction Static Regression			
	B3 (Islamic Banks)	**C3 (Conventional Banks)**	**D3 (High-Income Countries)**	**E3 (Middle-Income Countries)**
Credit Risk (%)	-0.117***	-0.088***	-0.096***	-0.170***
	(0.044)	(0.023)	(0.032)	(0.029)
Liquidity Risk (%)	0.006	0.001	-0.008	-0.009
	(0.010)	(0.007)	(0.007)	(0.008)
Profitability (%)	0.552***	1.203***	1.677***	1.111***
	(0.067)	(0.090)	(0.148)	(0.085)
Bank Diversification (%)	0.007	-0.010	-0.038	0.006
	(0.015)	(0.017)	(0.027)	(0.013)
Bank Size (%)	-0.086	-0.319**	-0.357**	-0.082
	(0.155)	(0.129)	(0.171)	(0.107)
Bank Growth (%)	-0.037***	-0.044***	-0.042***	-0.048***
	(0.003)	(0.004)	(0.006)	(0.004)
Cost Efficiency (%)	-0.874***	-0.983**	0.820	-1.092***
	(0.221)	(0.387)	(0.678)	(0.258)
Economy (%)	-0.024***	0.027***	0.027***	0.019***
	(0.004)	(0.005)	(0.007)	(0.004)
Crises Period	-0.114	0.020	0.480***	-0.124
	(0.106)	(0.113)	(0.141)	(0.093)
Bank Specialization			-1.166***	-1.078***
			(0.365)	(0.306)
Country Group	3.622***	4.167***		
	(0.354)	(0.435)		
Bank Diversification*Cost Efficiency	0.007	0.015*	-0.031*	0.018***
	(0.009)	(0.008)	(0.017)	(0.006)
Constant	9.642***	7.207***	11.834***	5.793***
	(1.315)	(1.196)	(1.999)	(1.061)
Observations	505	1505	661	1325
Wald Chi^2	817.442***	683.148***	245.811***	375.299***
Within R^2	0.391	0.385	0.403	0.391
Overall R^2	0.703	0.545	0.503	0.461
Between R^2	0.822	0.665	0.729	0.667

Notes: Standard errors are in parentheses. ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively. Capital level is measured by equity to total assets, credit risk is measured by loan loss allowances to gross loans, liquidity risk uses an inverse proxy of liquid assets to deposit and short-term funding, profitability is measured by operating profit to average total assets, bank diversification is measured by non-interest income to total operating income, bank size measures as natural logarithm of total assets, bank growth is measured by growth of gross loans, cost efficiency is measured using inverse proxy of non-interest expenses to average total assets, economy is measured using current price GDP to constant price GDP, crises period where 1 coded as during crises and 0 during non-crisis periods, bank specialization use 1 for Islamic banks and 0 for conventional banks, country group use 1 as High-Income countries while 0 as Middle-Income countries.

The capital strategies adopted by Islamic and conventional banks are similar in terms of the determinants and direction of the relationships for all the variables except bank diversification and economy, which shows a mixed relationship. The capital decision of both Islamic and conventional banks are driven by credit risk, profitability, cost efficiency, bank growth, and economy. Bank size is found to play a crucial role in

determining the capital level of conventional banks, in addition to the aforementioned capital drivers. Likewise, banks operating in High-Income and Middle-Income (HIMI) countries are found to be very similar in terms of banks' capital decision and its relationships, except for bank diversification. Credit risk, profitability, bank growth, and economy are found to be equally important for banks in both High-Income and Middle-Income countries, allowing them to critically strategize capital decision. Interestingly, the study reveals that High-Income banks additionally consider bank size to be a key factor in determining their capital level, whereas Middle-Income banks place greater emphasis on cost efficiency in their capital decision making. The relationship between each explanatory variable and the capital level is discussed further in Subsections 5.2.1 to 5.2.8.

5.2.1 Empirical Findings between Credit Risk and Capital Level

Being one of the major risks in banking institutions, credit risk is found to be statistically significant across four models at the 1% level. The relationship for credit risk is found to be negative with the capital level of Islamic banks, conventional banks, High-Income countries, and Middle-Income countries. This means that a one percent increase in a bank's credit risk results in the capital level decreasing by 0.117 percent and 0.088 percent for Islamic banks and conventional banks, respectively. For High-Income and Middle-Income countries, the capital level declines by 0.096 percent and 0.170 percent, respectively, for every one percent increase in credit risk. Many prior studies document a similar relationship between credit risk and the capital level (Moudud-Ul-Huq et al., 2022; Toh & Zhang, 2022).

The finding proves that the capital level plays a crucial role in absorbing potential losses resulting from an increased credit risk. This relationship is expected, given that banks are susceptible to credit risk due to their improper financing activities arising from lax credit screening processes (Le et al., 2022; Naili & Lahrichi, 2022). Therefore, banks are duly required to improve their borrower monitoring, which leads to increased monitoring costs. As a result, the capital level declines as banks prioritize control of credit risk over capital accumulation. Conversely, a decrease in the credit risk leads to an increase in the capital level of both types of banking institutions and country groups. Lower credit risk reduces the probability of loan defaults and potential loan losses, thereby improving the quality of asset quality of banks. This means fewer

resources are required for loan-loss allowances, enabling banks to allocate additional capital instead, which subsequently enhances their resilience against future financial shocks. Injecting more capital means banks trade-off their financing activities. Despite having a lower credit risk, banks retain high amounts of capital to safeguard against potential loan losses, especially in times of crisis. Strong capitalization demonstrates a high capacity for banks to absorb unexpected losses. Following signaling theory, banks hold high capital level to increase depositor and investor confidence while simultaneously reducing the insolvency risk.

The decline of the capital level whenever the credit risk increases is greater in Islamic banks than in conventional banks. This is because Islamic banks' financing activities are mainly backed by real assets, so they are tied to real economic transactions. Although this is considered safe and secure, it exposes Islamic banks to fluctuations in market performance and asset values (Shahari & Rahman, 2021; Sobarsyah et al., 2020). This exposes the financing activities of Islamic banks to higher risk. When the credit risk increases, the value of underlying assets tends to depreciate. This depreciation increases potential losses and necessitates higher provisioning to mitigate the elevated risk. Consequently, the capital base of Islamic banks is significantly diminished. On the other hand, the financing activities of conventional banks are predominantly debt-based, with income from interest. Thus, credit risk for conventional banks mainly arises from borrower defaults on financing obligations. When borrowers fail to meet repayment schedules, conventional banks face more non-performing loans. To mitigate the elevated risk of non-performing loans, conventional banks may adjust the loan-loss provision and modify interest rates, enabling the banks to manage credit risk exposure more effectively (Bae et al., 2024). This flexibility reduces the impact of credit risk on the capital level of conventional banks, although the relationship remains negative.

This finding further reveals that banks in Middle-Income countries experience a sharper decline in the capital level when exposed to high credit risk than banks in High-Income countries. This is because of inadequate monitoring and oversight by the authorities in Middle-Income countries. This lack of proactive measures and intervention exacerbates the vulnerability of banks operating in Middle-Income countries, leaving the banks with less adequate capital to absorb shocks when the credit risk increases. As emphasized by the World Bank Group (2020) and Mili et al. (2017), ineffective regulation due to inadequate regulatory frameworks, corruption, and lack of

transparency compromises the risk management and undermines the robustness of banking systems. In contrast, banks based on High-Income countries benefit from strong regulatory frameworks, which help mitigate the impact of credit risk on their capital level (Tran et al., 2022). Additionally, banks in High-Income countries are equipped with better risk management techniques, which gives the banks the confidence to operate with less capital while undertaking extensive financing activities (Tölö & Virén, 2021; Vithessonthi, 2023). Furthermore, the tendency of banks in Middle-Income to prioritize growth opportunities over capital accumulation further amplifies the impact of credit risk on their capital level. By channeling resources to credit expansion and investment activities, banks operating in Middle-Income countries can increase their market share. When the credit risk increases, especially in countries with weak regulatory frameworks, the trade-off between risk and long-term stability leads to a decrease in the capital level of banks.

5.2.2 Empirical Findings between Liquidity Risk and Capital Level

Liquidity risk, on the other hand, positively influences the capital level of both Islamic and conventional banks. One percent increases in the liquidity risk result in 0.006 percent increases in the capital level of Islamic banks and 0.001 percent increases in the capital level of conventional banks. Similar findings are revealed for liquidity risk and the capital level of banks in High-Income and Middle-Income (HIMI) countries, where a negative relationship is portrayed between the two variables. One percent increases in the liquidity risk result in 0.008 percent and 0.009 percent declines in the capital level of banks in High-Income and Middle-Income countries, respectively.

The findings imply that less liquid banks undertake more financing activities, resulting in their liquidity levels drying up, which exposes the banks to high liquidity risks. Consequently, more capital is held by less liquid banks to mitigate the liquidity risk and meet the withdrawal demands of depositors. This applies particularly in times of recession, when the materialization of loan losses is high (Antoun et al., 2021). This is consistent with the risk absorption hypothesis, which suggests that a high capital buffer is required to absorb increased liquidity risk in bank operations. In the opposite situation, banks with a lower liquidity risk retain more liquid assets by reducing their financing activities, reflecting a stronger liquidity position. Hence, lower capital level are retained by highly liquid banks since there is a probability of facing risks. A negative

relationship is also possible, where increased liquidity risk may lead banks to hold lower capital. This is because banks may liquidate assets at discounted prices when facing a high liquidity risk to meet the withdrawal demands of depositors (Berger et al., 2022; Etudaiye-Muhtar & Abdul-Baki, 2021). Such behavior may result in a decline in the capital level and limit profit growth over time. This is because liquidating assets at discounted prices imposes significant costs on banks, thereby eroding profitability and diminishing retained earnings. As retained earnings serve as a primary source of Tier 1 regulatory capital, a decline in the capital level is observed. From another viewpoint, a decrease in the liquidity risk leads to a stronger capital position. This is because banks are less likely to liquidate assets at discounted prices to meet withdrawal demands. This improves the profitability of banks, leading to higher retained earnings and, therefore, increased capital buffers.

Liquidity risk tends to have a higher impact on the capital level of Islamic banks than that of conventional banks, primarily because a lack of Shariah-compliant liquidity infrastructure limits Islamic banks' ability to raise funds. This constraint forces Islamic banks to hold higher capital level as a precaution to absorb potential liquidity shocks while remaining stable. In contrast, conventional banks enjoy wider access to capital markets and diversified funding instruments, enabling these banks to easily raise funds and respond quickly to elevated liquidity risk. Furthermore, Islamic banks face with higher withdrawal and displacement risk owing to the non-guaranteed nature of returns on investment account holders (Arshad et al., 2013). Under liquidity stress, the withdrawal risk is more pronounced in Islamic banks than in conventional banks. As a result, maintaining a high capital level is crucial for Islamic banks to remain stable and prevent bank runs when the liquidity risk is high.

However, in High-Income and Middle-Income (HIMI) countries, the relationship between liquidity risk and capital level turns negative. This indicates that banks in HIMI countries trade-off their capital level to grant more financing activities. The intense market competition faced by those banks in High-Income compels the banks to adopt more aggressive financing activities. This financing behavior increases their exposure to liquidity risk and weakens the capital position of banks in High-Income countries. Meanwhile, in Middle-Income countries, the elevated liquidity risk is driven by the reliance on short-term funding due to the less-developed capital markets (Rojas-Suarez, 2014). Such capital markets lack innovative and sophisticated financial instruments, limiting the availability of long-term stable funding sources.

Consequently, banks in Middle-Income countries face constraints in accessing stable funding sources, which negatively affects their ability to maintain adequate capital buffers. This study, however, fails to reject the null hypothesis, indicating there is no statistically significant evidence to support the existence of a relationship between liquidity risk and capital level in Islamic banks, conventional banks, High-Income countries, and Middle-Income countries. This finding can be explained by Basel III requirements, which mandate that banks maintain both robust capital adequacy and liquidity positions. These requirements encourage banks to strengthen their capital and liquidity positions simultaneously. However, since capital adequacy and liquidity are monitored through separate regulatory ratios in which capital through the Capital Adequacy Ratio (CAR), and liquidity through metrics such as the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR) (Carletti et al., 2020; Coelho & Restoy, 2024). As a result, banks may manage these two aspects independently which leads to the insignificant direct relationship between liquidity risk and capital level.

5.2.3 Empirical Findings between Profitability and Capital Level

Profitability is pivotal to ensuring the long-term growth and sustainability of banking institutions. At the 1% significance level, the relationship between profitability and the capital level of Islamic and conventional banks appears to be positively related. A one percent increment in profitability results in the capital level of Islamic and conventional banks increasing by 0.552 percent and 1.203 percent, respectively. Similarly, the relationship between profitability and capital level in High-Income and Middle-Income countries is revealed to be statistically positively significant at the 1% level. One percent increases in profitability results in the capital level of banks in HIMI countries increasing by 1.677 percent and 1.111 percent.

The results validate that banks rely on ongoing retained earnings to improve their capital level. Aligned with signaling theory, highly profitable banks boost their capital level to signal of their financial stability to external stakeholders. In fact, Etudaiye-Muhtar and Abdul-Baki (2021) and Bitar et al. (2018) claim that raising capital using external financing is more expensive due to the presence of information asymmetry and agency problems, particularly in countries with less-established financial markets. For that reason, injecting capital using retained earnings is considered cheaper and easier by banks. Moreover, highly profitable banks are less

likely to face financial constraints because of their high capital reserves. This resilience stems from the utilization of profits as the main source with which to bolster capital buffers, reducing the likelihood of bank failure and ensuring greater financial stability. Meanwhile, less-profitable banks tend to experience a decline in the capital level, primarily due to their lower earnings, which restrict their ability to build retained earnings. This constraint makes it difficult for less-profitable banks to strengthen their capital position because retained earnings are key sources of capital growth in banking institutions, as documented in previous literature (Abiodun et al., 2020; Bitar & Tarazi, 2019; Das & Rout, 2020). Banks with less profit tend to engage in minimal financial risk, avoiding high-risk exposure activities to ensure compliance with the minimum capital requirements imposed by their respective central banks, and thereby reducing the need to hold expensive high capital.

The findings disclose that conventional banks exhibit higher profitability than Islamic banks, as evidenced by the significant mean difference test of the profitability at the 1% level in the descriptive statistics shown in Table 4.1. This enhanced profitability enables conventional banks to strengthen their capital position more aggressively in response to higher earnings. The unrestricted and easy access to greater resources contributes to the high income generated by conventional banks. In contrast, Islamic banks operate under strict Shariah compliance, which limits the resource options of the banks. This, in turn, constrains the ability of Islamic banks to achieve higher profits. Moreover, the long presence of conventional banks in the financial markets has enabled these banks to build strong reputations and establish wider customer bases over time. These well-established conventional banks contribute to enhanced customer trust by providing benefits that attract depositors, like attractive interest rates, and securing funding at lower costs. Indirectly, this helps strengthen both the liquidity position and profitability of conventional banks. However, Islamic banks are still new to the financial market and are in the growing phase, so the banks face challenges in gaining depositor trust and have a smaller customer base. These limitations reduce the ability of Islamic banks to achieve economies of scale, resulting in high funding costs and making it difficult for the banks to generate substantial earnings.

The capital level of banks is discovered to be more influenced by profitability in High-Income countries than in Middle-Income countries. This is due to robust financial systems with strong regulatory frameworks, which allow banks to retain more

returns and inject capital at lower cost, contributing to the high capital level (Nakhli et al., 2020). Moreover, greater access to financial resources and stable funding allows banks to raise capital more efficiently (Nasim et al., 2024). This suggests that High-Income banks maintain strong capital positions due to their high reliance on retained earnings. Meanwhile, Middle-Income banks operate in less-developed financial markets and with weaker regulatory frameworks, which may limit the capital retention of these banks, despite increases in profitability. Accessing long-term funding instruments is challenging due to the less-developed financial markets, forcing the banks to rely heavily on short-term profits rather than building strong capital buffers. As a result, the influence of profitability on capital level is less pronounced in Middle-Income countries, albeit positively related.

5.2.4 Empirical Findings between Bank Size and Capital Level

In agreement with the majority of the prior literature, bank size is found to be negatively related to the capital level of Islamic and conventional banks. A one percent increase in bank size, the capital level of Islamic banks decreases by 0.086 percent and conventional banks decreases by 0.319 percent. Likewise, a negative relationship is observed between bank size and capital level for High-Income and Middle-Income (HIMI) countries. As the size of banks increases by one percent, the capital level of banks in High-Income countries declines by 0.357 percent while the capital level of banks in Middle-Income countries declines by 0.082 percent. Toh and Zhang (2022) support the existence of a negative relationship between bank size and capital level.

Indisputably, banks that increase in size gain the privilege of entering the market more easily and diversifying their asset portfolio to minimize risk, due to their economies of scale (Alzoubi et al., 2022; Bogale, 2020). As a result, less capital is maintained by larger banks as they have less risk exposure. Nevertheless, larger banks take their 'Too Big to Fail' (TBTF) benefits for granted by engaging in high-risk activities while holding significantly lower capital. The implicit government support received, especially in times of difficulty, makes these TBTF banks display less market discipline (Bremus & Ludolph, 2021; Moudud-Ul-Huq et al., 2022). Furthermore, the greater resources linked to a larger bank size allows these banks to invest heavily in technology to better control their risk. For this reason, larger banks possess effective monitoring and credit screening processes, making the banks to be less dependent on

high capital buffers. Smaller banks behave otherwise, with an increase in the capital level observed. The main reason is that a lack of diversification opportunities exposes these smaller banks to high risk (Mohanty & Mahakud, 2021). Moreover, inefficient credit control due to less sophisticated risk technology in smaller banks further exposes them to greater risk (Ali et al., 2023). These smaller banks do not gain the benefits of being 'Too Big to Fail' (TBTF), so high capital reserves are maintained by smaller banks to cushion against unexpected financial shocks that could threaten their stability. Consistent with the absorption hypothesis, high capital reserves are maintained by smaller banks to cushion against unexpected financial shocks that could threaten their stability.

The findings further disclose that the moral hazard issue of TBTF is prevalent among larger conventional banks but not larger Islamic banks (Basher et al., 2017; Bitar, Hassan, et al., 2017). This indicates that larger conventional banks tend to be riskier than larger Islamic banks. Conventional banks are deemed to be well-established due to their longer maturity in the financial market. This means that conventional banks gain benefits from economies of scale, which may further encourage risk-taking behavior with a lower capital level. Conversely, larger Islamic banks may adopt conservative approaches to risk-taking, despite their larger size, owing to their obligation to comply with Shariah principles. As a result, a greater decline in the capital level is observed for conventional banks relative to Islamic banks when they increase in size. The challenges of accessing capital markets also reduce the ability of larger Islamic banks to aggressively engage in expansion activities, thereby alleviating the moral hazard issue of TBTF. This study, however, found a statistically significant relationship between bank size and capital level among conventional banks but not Islamic banks.

In High-Income countries, the majority of the banking systems are dominated by conventional banks with larger total assets. This is proven by the mean difference test result from the descriptive statistics presented in Table 4.2, which illustrates that banks in High-Income countries, on average, are significantly larger compared to those in Middle-Income countries. Consequently, the concerns about the moral hazard issue of TBTF is more pronounced in High-Income countries than in Middle-Income countries. Given that conventional banks are larger due to their longer market presence, these banks are considered systematically important. Hence, the failure of these banks could trigger widespread financial instability due to their larger size and

interconnectedness within the financial system. For that reason, governments often provide implicit support to facilitate bailouts of these banks in difficult times. This subsequently motivates larger banks in High-Income countries to operate with a significantly lower capital level. Although the same negative relationship is observed between bank size and capital level, the issue of TBTF is less severe in Middle-Income countries. This could be due to the weaker regulatory frameworks, in which government interventions for larger banks during times of financial stress are less credible. Consequently, less impact on the capital level of banks in Middle-Income countries is perceived among larger banks. The study, however, found a statistically significant relationship between bank size and capital level for High-Income countries but not Middle-Income countries, although the relationship is the same.

5.2.5 Empirical Findings between Bank Growth and Capital Level

Bank growth is revealed to be inversely related to the capital level of both Islamic and conventional banks at the 1% significance level. This indicates that as bank growth increases by one percent, the capital level of Islamic banks decreases by 0.037 percent while that of conventional banks decreases by 0.044 percent. Consistently, bank growth is found to negatively influence the capital level of banks in High-Income and Middle-Income countries at the 1% significance level. As the bank grows by one percent, the capital level of banks in High-Income and Middle-Income countries decrease by 0.042 percent and 0.048 percent, respectively. This negative relationship corroborates the findings obtained by Bhowmik and Sarker (2021) and S.-W. Wu et al. (2022).

These findings suggest that for banks to grow, banks need to trade-off their capital to increase their financing activities (Alzoubi et al., 2022). According to the trade-off theory, when banks prioritize on growth, this comes at the cost of letting go the opportunity to hold excess capital buffers. This strategic choice allows banks to allocate more resources to financing activities. Increases in bank growth often require increases in the financing amounts provided by banks. In such scenarios, banks sacrifice holding high amounts of capital buffers to free up resources and offer more financing activities, resulting in the thinning of the capital level. In contrast, when bank growth declines, the capital level of both Islamic and conventional banks tend to increase. This

occurs because banks reduce their financing activities to redirect resources to strengthening their capital ratios, following the trade-off theory.

A more substantial decline in the capital level of conventional banks is observed compared to Islamic banks. This is because conventional banks can more easily access large funds from capital markets or borrow money at lower cost to finance growth, instead of depending on the capital ratio (Bogale, 2020; Ünvan, 2020). As a result, conventional banks tend to maintain a capital level closer to the regulatory minimum so that more profits can be utilized for growth initiatives. On the other hand, Islamic banks adopt more conservative growth strategies because of Shariah-compliant constraints. Rather than relying on high leverage or engaging in speculative funding to fuel bank growth, Islamic banks expand through asset-backed financing activities (Maharani, 2017). The growth strategies adopted by Islamic banks follow the Shariah principles that prohibit interest-based transactions and speculative activities, requiring all financing to be linked to real tangible assets. As a result, during periods of bank growth, Islamic banks may experience a slight decline in their capital level due to the inherent risks associated with underlying physical assets.

The high growth opportunities in Middle-Income countries lead to a significant drop in the capital level of banks in Middle-Income countries compared to banks operating in High-Income countries. The pursuit of growth opportunities often incentivizes banks in Middle-Income countries to operate with lower capital reserves to expand their financing activities. Consequently, to support economic development and meet the rising credit demand in less-developed capital markets, banks compromise their capital buffer to offer more financing activities. This imprudent financing behavior is in accordance with the trade-off theory, whereby banks prioritize bank growth over maintaining strong capital buffers. In such cases, banks are exposed to heightened financial vulnerability because reducing the capital level to increase financing significantly undermines a bank's resilience to shocks. This is strengthened more by the relatively high average bank growth in Middle-Income countries, as illustrated in the descriptive statistics in Table 4.2. In contrast, banks in High-Income countries can sustain extensive financing activities, even with lower capital reserves, due to their strong regulatory framework and advanced risk management control. Therefore, these banks benefit from good supervision and oversight with good risk management control, which collectively reduce the need for excessive capital accumulation while enabling efficient credit allocation. Prior evidence suggests that the higher regulatory capital in

High-Income countries does not hinder economic growth or funding capacity, instead it enhances banking stability and supports long-term sustainable growth (Stewart et al., 2021).

5.2.6 Empirical Findings between Economy and Capital Level

Economy is found to significantly influence the capital level of both Islamic and conventional banks at the 1% significance level. However, the relationship is shown to be negatively related for Islamic banks but positively related for conventional banks. The study measures economy using the GDP deflator to account for inflation. Thus, an increase in economy means high inflation while a decrease in economy reflects deflation. The results reveal that an increase in economy leads to a 0.024 percent decrease in the capital level of Islamic banks. A 0.027 percent increase in the capital level of conventional banks is observed when economy increases by one percent. The findings also reveal a statistically positive significant relationship between economy and the capital level of banks in both High-Income and Middle-Income (HIMI) countries. At the 1% significance level, capital level increments of 0.027 percent and 0.019 percent are demonstrated by the two types of HIMI countries, respectively, when there is a one percent increase in economy. Benbouzid et al. (2022) confirm the negative relationship between economy and capital level, whereas Moudud-Ul-Huq (2019) documents a positive relationship between the variables.

In times of inflation, Islamic banks are encouraged to maximize profits by reducing the capital level to extend more financing to profitable business ventures. These aggressive financing activities of Islamic banks are driven by underestimations of their risk in such times, which occur due to improved borrower credit ratings (Modugu & Dempere, 2022; Ovi et al., 2020). As a result, the capital level moves to be procyclical with the economy. In contrast, conventional banks, High-Income countries, and Middle-Income countries prefer to strengthen their capital position by cutting financing activities in order to inject additional capital during such times. This countercyclical behavior aligns with the Basel III objective outlined by the Basel Committee on Banking Supervision, which emphasizes building strong and good quality capital in good times to enhance resilience against unexpected financial shocks especially during crises (Basel Committee on Banking Supervision, 2010a). In the other economic situation, Islamic banks that act procyclically are forced to induce more

capital. The expensive cost of raising new capital during deflation pushes Islamic banks to cut financing activities in such periods to enhance their capital level and ensure compliance with the minimum regulatory capital ratios. Consistently, as Bitar et al. (2018) prove, for Islamic banks operating in the Middle East and North Africa, as well as Southeast Asia, raising capital tends to be expensive due to the less-developed Islamic financial markets. This is because of the greater informational asymmetry and higher transaction costs. Aligns with the risk absorption hypothesis, larger capital reserves increase bank resilience during economic downturns. Meanwhile, conventional banks in High-Income and Middle-Income countries are observed to continuously provide financing, even during deflationary periods, by releasing the capital buffers built up during good economic conditions. This countercyclical behavior of the capital level helps sustain credit flows when the economy declines. Grounded in the trade-off theory, banks limit excessive financing activities and risk-taking to enhance their capital reserves, which serve as a safety net against future uncertainties.

In a dual banking system, this study confirms, Islamic banks tend to adjust their capital level procyclically to the economy, unlike conventional banks, which exhibit countercyclical behavior. This procyclical behavior of Islamic banks is mainly driven by their pursuit of market stability and growth in competitive market settings alongside conventional banks (Aysan & Ozturk, 2018; Ibrahim, 2016). This is followed by the aggressive financing approaches employed by Islamic banks to prioritize expansion over capital accumulation. In addition, the high cost of raising capital in less-developed financial markets intensifies the procyclicality of Islamic banks' capital with the economy, particularly during weak economic conditions. Such costs are driven by the informational asymmetries and agency problems that make the acquisition of additional capital costly (Benbouzid et al., 2022).

The findings also reveal that the countercyclical effect of the capital level with economy is stronger among banks in High-Income countries than those in Middle-Income countries. Banks typically rely on retained earnings derived from improved profitability during favorable economic conditions to build stronger capital buffers. In High-Income countries, banks may be encouraged to proactively build buffers, owing to the robust regulatory frameworks and advanced financial markets. In contrast, in Middle-Income countries, a smaller increase in the capital level is observed, even in good economic conditions. This is because of the weaker regulatory oversight and less-

developed financial markets, which restrict access to external funding for those banks operating in Middle-Income countries.

5.2.7 Empirical Findings between Bank Diversification and Capital Level

It is equally important to consider how diversification strategies impact banking stability, particularly in terms of capital level. The findings reveal a positive relationship between bank diversification and the capital level of Islamic banks, while a negative relationship is portrayed for conventional banks. As bank diversification increases by one percent in Islamic banks, the capital level increases by 0.007 percent. Meanwhile, for conventional banks, a one percent increase in bank diversification results in the capital level falling by 0.010 percent. In High-Income countries, bank diversification is negatively related to the capital level. In contrast, a positive relationship between bank diversification and capital level is found for Middle-Income countries. This means that increased bank diversification activities results in the capital level of banks in High-Income countries falling by 0.038 percent, while the capital level of banks in Middle-Income countries is observed to increase by 0.006 percent.

The results suggest that bank diversification plays different strategic roles for Islamic banks, conventional banks, High-Income countries, and Middle-Income countries. An increase in the capital level when diversification increases for Islamic banks and those banks in Middle-Income countries can be explained by signaling theory. According to the theory, highly diversified banks maintain a high capital level as a positive signal to the market, which indicates financial strength and stability arising from profits earned from multiple income streams. This reassures stakeholders about a bank's ability to withstand risk and maintain performance. This enhances the bank's reputation and competitive position due to the strong capital position. From another perspective, greater bank diversification may reduce the capital level of banks, resulting in a negative relationship, as observed for conventional banks and High-Income countries. This is because banks with diversified activities are perceived as being low-risk as their risk exposures are distributed across various asset portfolios (Adem, 2023; Chazi et al., 2024). Low risk exposure means that highly diversified banks may feel less need to maintain a high capital buffer. Additionally, increased diversification enhances the profitability of banks because of earnings generated from multiple income streams. This improved profitability may encourage banks to allocate excess profits to

investments or profitable financing activities, rather than retaining it to boost capital as a safety cushion (Kim, 2020; Taylor, 2022). Meanwhile, less-diversified banks may struggle to generate profits, given their restricted ability to raise funds externally through capital markets. This applies to Islamic banks and Middle-Income countries. Nevertheless, less-diversified conventional banks and High-Income countries may retain higher capital level as a precautionary measure against potential shocks.

The findings further suggest that the difficulty of accessing Shariah-compliant capital markets means that Islamic banks must carefully balance financing activities and diversification in order to grow. This limited diversification frequently leads to lower profitability and hinders capital accumulation for Islamic banks. Therefore, diversification becomes a critical tool to enhance the profitability and boost the capital level of Islamic banks, resulting in a positive relationship. Given the high operating costs of Islamic banks, the banks need to rely on both traditional financing activities and diversification to increase capital. This dual reliance on financing activities and diversification in Islamic banking reflects that diversification is not only a growth strategy but also a necessary mechanism for financial sustainability and resilience (Putri & Viverita, 2024). On the contrary, conventional banks use diversification as a key strategy to mitigate risk and increase profits from additional resources due to their greater access to capital markets (Adem, 2023). When spreading risk across diverse portfolios, the overall risk exposure reduces, causing conventional banks to perceive less need to hold excessively high capital buffers.

This suggests that diversification in High-Income countries helps banks mitigate risk, thereby discouraging banks from holding higher capital. This is because banks benefit from sophisticated risk management techniques, robust regulatory frameworks, and access to diversified financial instruments in economies with mature financial systems (Nasim et al., 2024). As a result, banks in High-Income countries rely more on diversification activities to gain stable returns without relying considerably on larger capital buffers (Antoun et al., 2021). Meanwhile, in Middle-Income countries, diversification is often followed by an increase in the capital level due to the less-developed financial systems. In such environments, banks pursue diversification into non-interest income activities to enhance profitability and cost efficiency. These additional income sources contribute to higher retained earnings, which help banks accumulate higher capital level (Alam et al., 2019).

Despite this finding, the study fails to reject the null hypothesis and support the relationship between bank diversification and capital level for Islamic and conventional banks in High-Income and Middle-Income countries. Further explanations related to bank diversification and the capital level are given in Section 5.6.

5.2.8 Empirical Findings between Cost Efficiency and Capital Level

The cost efficiency results are found to be statistically negatively related to the capital level of Islamic and conventional banks. The relationship is significant at the 1% level for the former and the 5% level for the latter. A one percent increase in the cost efficiency of both types of banks results in the capital level falling by 0.874 percent for Islamic banks and 0.983 percent for conventional banks. A similar relationship is found for Middle-Income countries at the 1% significance level. A one percent increase in cost efficiency leads to the capital level of banks in Middle-Income countries falling by 1.092 percent. Conversely, in High-Income countries, cost efficiency is found to be positively related to the capital level. As a result, a one percent increase in cost efficiency increases the capital level of banks in these countries by 0.820 percent.

Increased cost efficiency demonstrates that better credit risk assessment is being conducted by banks (Do Van, 2021; Manlagnit, 2015). This reflects good asset quality, so less monitoring is required. Indirectly, this lowers the risk of borrowers defaulting, allowing banks to release capital to invest in other profitable business ventures instead of retaining high amounts of costly capital buffers. In contrast, for less cost-efficient banks, a decrease in cost efficiency leads to an increase in the capital level. This is because the likelihood of risk is higher for less cost-efficient banks due to the poor asset quality in their financing activities (Alsharif, 2021; Miah & Sharmeen, 2015). Consequently, these banks require extensive monitoring to control the risk of borrowers defaulting. In accordance with the risk absorption hypothesis, more capital infusion is required to safeguard against potential defaults. This negative relationship applies to Islamic banks, conventional banks, and Middle-Income countries. For High-Income countries, increases in cost efficiency higher capital level of banks. This is because effective cost control allows banks to generate higher profitability at lower cost. Thus, greater retained earnings can be allocated to strengthening the capital base. Conversely, when cost efficiency decreases, reduced bank profitability is observed. As a result, banks maintain lower capital level due to the diminished retained earnings.

Surprisingly, Islamic banks appear to display relatively higher cost efficiency than conventional banks. This is evident from the notably lower average cost efficiency reported in the descriptive statistics, as shown in Table 4.1 in the previous chapter. Islamic banks record a mean value of 1.61 percent, which is statistically significant at the 1% level, compared to conventional banks with a value of 1.88 percent. Perhaps due to the high administrative cost related to the double layer of governance, the complexity involved in structuring Shariah-compliant products, and other operational challenges, Islamic banks must prioritize effective cost management (Majeed, 2021; Nomran & Haron, 2020). By managing cost efficiently, Islamic banks could reduce the need for excessive capital accumulation and allocate profit to other profitable business activities. Effective cost management helps ensure the long-term sustainability and stability that enable Islamic banks to remain competitive alongside conventional banks. This is consistent with the findings of Abdulrahman et al. (2023), who document an inverse relationship between the cost efficiency and capital level of Islamic banks. As a result, a slight decline in the capital level of Islamic banks is observed. Meanwhile, a greater reduction in the capital level of conventional banks is revealed when the banks become more cost-efficient. This is because cost-efficient conventional banks may operate closer to the regulatory minimum capital requirements to leverage the economies of scale and enhance retained earnings. Furthermore, conventional banks have greater access to external funding sources, allowing these banks to rely less on retained earnings for capital accumulation. As a result, lower capital is sustained by conventional banks when they achieve higher cost efficiency.

It is also found that banks in High-Income countries are more efficient in managing cost than banks in Middle-Income countries. The good screening and evaluation of borrowers reflect the robust credit risk assessment in High-Income countries (Goyal et al., 2023). This leads to the high asset quality of the financing activities of High-Income banks, which lowers the potential for non-performing loans. This makes banks operating in High-Income countries highly efficient in managing cost, which leads to the improved profitability of the banks. As a result, more capital is retained through the higher earnings. Etudaiye-Muhtar and Abdul-Baki (2021) argue that highly efficient banks in High-Income countries tend to strengthen their capital level to safeguard against potential loan losses, thereby protecting future profitability. For that reason, these banks prioritize cost control, which explains the insignificant influence of cost efficiency on capital level in this study. Meanwhile, in Middle-Income

countries, the intense market competition compels banks to create a trade-off between efficiency and risk, which may expose the banks to financial vulnerabilities. Evidently, highly cost-efficient banks in Middle-Income countries decrease their capital level significantly to chase short-term gains rather than long-term stability. Consistent with the risk absorption hypothesis, less cost-efficient banks operating in Middle-Income countries sustain significantly higher capital reserves to absorb the increased risk exposure that stems from the high operating costs.

The findings related to cost efficiency and capital level are found to be significant only for Islamic banks, conventional banks, and Middle-Income countries, but not for High-Income countries. Section 5.6 provides a comprehensive explanation of cost efficiency and capital level.

5.3 Bank Capital Level: During Crises versus Non-Crisis Periods

This subsection aims to answer research objective five. To recap, research objective five is to examine the significant difference between the capital level of Islamic and conventional banks in High-Income and Middle-Income countries during crises and non-crisis periods. The findings confirm that the capital level of Islamic banks is adversely affected during crises, when compared to non-crisis periods. During crises, the capital level of Islamic banks is found to be notably lower, by 0.114 percent. Similarly, Middle-Income countries also hold substantially lower capital in times of crises than during normal periods. The capital level of banks in Middle-Income countries are significantly lower by 0.124 percent during crises. Meanwhile, for conventional banks and High-Income countries, the capital level is significantly higher during crises periods compared to normal times, indicating a positive relationship. This capital level is higher by 0.020 percent for conventional banks and 0.480 percent for High-Income countries during crises periods.

Under stressful economic conditions, asset quality tends to deteriorate as borrowers increasingly default on their debt obligations (AlHassan et al., 2022; Repullo & Suarez, 2013). Therefore, Islamic banks and Middle-Income countries draw on capital buffers to mitigate the unexpected materialization of loan losses, resulting in a negative association. Alternatively, conventional banks and High-Income countries may respond to the heightened credit risk during such periods by increasing their capital level to form a buffer against financial distress. Parallel to the risk absorption

hypothesis, high capital reserves are crucial to increase bank survivability, particularly in bad economic conditions, by increasing the risk absorption capability of banks. Conversely, during normal periods, conventional banks and High-Income countries may be encouraged to decrease the capital level in order to channel resources toward expanding financing activities for profitable business ventures. This approach is taken due to the favorable market conditions, when perceived risk is considered minimal. Thus, banks pursue profit generation over maintaining costly capital buffers. Meanwhile, Islamic banks tend to be conservative by building strong capital buffers during stable periods. This approach aims to safeguard against potential financial shocks during crises periods while ensuring resilience in such times.

Although banks remain fragile and vulnerable during crises period due to the elevated risk of asset quality degradation, the findings highlight the role of economic stabilizers among Islamic banks. This is because of the continuous ability to provide financing demonstrated by Islamic banks in such times, even with lower capital. Empirical research clearly indicates that Islamic banks maintain greater stability during crises periods because they are less involved in speculative operations and derivative-based instruments, as required by Shariah principles (Causevic, 2018; Maharani, 2017). Unlike Islamic banks, the capital level of conventional banks is relatively higher during crises compared to non-crisis periods. The results demonstrate that conventional banks are forced to increase their capital in hard times by sacrificing financing activities as injecting new capital is costly in such periods. The high capital retention is intended to absorb unexpected loan losses and avoid the penalty cost of breaching the minimum capital. The current study, however, fails to reject the null hypothesis, finding no significant difference between the capital level of Islamic and conventional banks during crises and non-crisis periods.

During crises, the capital level of banks is revealed to be adversely affected in Middle-Income countries but not High-Income countries. This further strengthens the view that banking systems in High-Income countries are more resilient against crises than those in Middle-Income countries. This may be because High-Income countries benefit from effective governance and better regulatory frameworks, which contribute to high capital ratios and overall banking stability (Mutarindwa et al., 2021). Following the risk absorption hypothesis, banks in High-Income countries enhance their capital level when facing elevated risk during crises periods. In contrast, Middle-Income countries have weaker regulatory environments, as highlighted by the World Bank

Group (2020), along with challenges such as high corruption and political instability. This hinder effective financial supervision, resulting in the fragility of the banking systems in Middle-Income countries. Consequently, banks become vulnerable during crises, causing their capital level to decline to absorb unexpected risks. As argued by Vithessonthi (2023), banking and economic crises happen more frequently in developing countries than in advanced countries, since the latter have better risk management techniques and lower non-performing loans. However, the findings are found to be significant only for High-Income countries. The results fail to support evidence indicating a negative influence on bank capital level in Middle-Income countries during crises periods.

5.4 Bank Capital Level: Islamic Banks versus Conventional Banks

Research objective two, which is to examine the significant difference between the capital level of Islamic and conventional banks, is achieved in this subsection. The results disclose a significant difference between the capital level of Islamic and conventional banks, regardless of whether they are in High-Income or Middle-Income (HIMI) countries. Unsurprisingly, in HIMI countries, the capital level of Islamic banks is revealed to be significantly lower relative to that of conventional banks at the 1% significance level. The capital level of Islamic banks in High-Income and Middle-Income countries are significantly lower, by 1.166 percent and 1.078 percent, respectively, in comparison to those of conventional banks. The findings are consistent with the mean difference test from the descriptive statistics listed in Table 4.1, which reveal that, on average, the capital level of Islamic banks is significantly lower than that of conventional banks. Consistently, the findings support the view that Islamic banks struggle to boost their capital level, primarily due to difficulty of accessing capital markets because of the lack of Islamic interbank money markets and Shariah-compliant lenders of last resort (El-Ansary et al., 2019). Since conventional banks are well established in the market, the banks benefit from broad access to diversified funding resources. In this way, conventional banks can enhance their capital more easily with greater flexibility and speed.

5.5 Bank Capital Level: High-Income Countries versus Middle-Income Countries

This subsection intends to answer research objective four, to examine the significant difference between the capital level of banks in High-Income and Middle-Income (HIMI) countries. The results disclose a significant difference between the capital level of banks in the two country groups for Islamic and conventional banks. At the 1% significance level, the capital level of Islamic and conventional banks operating in High-Income countries are found to be significantly higher relative to those banks operating in Middle-Income countries. The capital level sustained by Islamic banks in High-Income countries are significantly higher by 3.622 percent compared to those of Islamic banks in Middle-Income countries. Meanwhile, conventional banks in High-Income countries hold significantly higher capital by 4.167 percent in comparison to conventional banks operating in Middle-Income countries. The findings are consistent with the mean difference test in the descriptive statistics reported in Table 4.2. This reveals that, on average, the capital level of banks operating in High-Income countries is significantly higher than those banks operating in Middle-Income countries. This can be explained by the effective supervisory and monitoring in High-Income countries, which occur due to the strong regulatory frameworks. These allow banks to easily comply and hold more capital (Mutarindwa et al., 2021). The greater access to resources of banks in High-Income countries due to the robust financial systems also contributes to the high capital level of these banks. Meanwhile, banks in Middle-Income countries struggle to allocate more capital as a buffer to absorb financial shocks. This is due to the difficulties of accessing stable funding sources, given their less-developed capital markets (Yin, 2021). Additionally, the weaker regulatory frameworks in Middle-Income countries further exacerbate this constraint, compelling banks to operate with smaller capital buffers relative to those banks in High-Income countries.

5.6 The Interaction Effect of Cost Efficiency and Bank Diversification on Bank Capital Level

This section intends to answer research objectives six and seven. Research objective six is to analyze the interaction effects of cost efficiency on the relationship between bank diversification and the capital level of Islamic and conventional banks.

Meanwhile, research objective seven is to analyze the interaction effects of cost efficiency on the relationship between bank diversification and the capital level of banks in High-Income and Middle-Income countries. Following the discussion in Section 4.7, the study focuses only on the individual model of the split sample for Islamic banks (Model B), conventional banks (Model C), High-Income countries (Model D), and Middle-Income countries (Model E), instead of the combined data of the full sample (Model A), when discussing the interaction effects. This is because the split four models have been determined to be most plausible for investigating the capital decision of Islamic and conventional banks in High-Income countries and Middle-Income countries. This is due to the varying results from the combined full sample (Model A).

Originally, bank diversification influences the capital level of conventional banks and Middle-Income countries in the baseline model. The same applies to cost efficiency, which has significant relationships with the capital level of Islamic banks, conventional banks and Middle-Income countries. However, the direct relationship becomes insignificant in the interaction regression for bank diversification in all four models, but it remains significant for cost efficiency in the aforementioned three models, except for High-Income countries. This insignificant relationship for bank diversification could be because it has been absorbed in the interaction effect of cost efficiency on the relationship between bank diversification and capital level.

The interaction effects are discussed separately for each individual Islamic banks (Model B), conventional banks (Model C), High-Income countries (Model D), and Middle-Income countries (Model E). The marginal effects of bank diversification and the capital level in response to cost efficiency for Islamic banks, conventional banks, High-Income countries, and Middle-Income countries are displayed in Table 5.2, Table 5.3, Table 5.4, and Table 5.5, respectively. Figure 5.1, Figure 5.2, Figure 5.3, and Figure 5.4 illustrate the marginal effects of bank diversification and the capital level in response to cost efficiency for Islamic banks, conventional banks, High-Income countries, and Middle-Income countries.

Table 5.2
Marginal Effects of Bank Diversification on Capital Level in Response to Cost Efficiency for Islamic Banks

	Cost Efficiency	Capital Level/Bank Diversification	Delta-method Standard Error	95% Confidence Interval	
Low Efficient	4.5	-0.0239	0.0254	-0.0737	0.0259
	4.4	-0.0232	0.0246	-0.0714	0.0249
	4.3	-0.0226	0.0237	-0.0690	0.0239
	4.2	-0.0219	0.0228	-0.0666	0.0229
	4.1	-0.0212	0.0220	-0.0643	0.0219
	4	-0.0205	0.0211	-0.0619	0.0209
	3.9	-0.0198	0.0203	-0.0595	0.0199
	3.8	-0.0192	0.0194	-0.0572	0.0189
	3.7	-0.0185	0.0186	-0.0548	0.0179
	3.6	-0.0178	0.0177	-0.0525	0.0169
	3.5	-0.0171	0.0169	-0.0502	0.0159
	3.4	-0.0164	0.0160	-0.0478	0.0150
	3.3	-0.0158	0.0152	-0.0455	0.0140
	3.2	-0.0151	0.0143	-0.0432	0.0130
	3.1	-0.0144	0.0135	-0.0409	0.0121
	3	-0.0137	0.0127	-0.0386	0.0112
	2.9	-0.0130	0.0119	-0.0363	0.0103
	2.8	-0.0124	0.0111	-0.0341	0.0094
	2.7	-0.0117	0.0103	-0.0319	0.0085
	2.6	-0.0110	0.0095	-0.0297	0.0077
	2.5	-0.0103	0.0088	-0.0275	0.0069
	2.4	-0.0096	0.0080	-0.0254	0.0061
	2.3	-0.0090	0.0073	-0.0234	0.0054
	2.2	-0.0083	0.0067	-0.0214	0.0048
	2.1	-0.0076	0.0061	-0.0195	0.0043
	2	-0.0069	0.0056	-0.0178	0.0040
	1.9	-0.0062	0.0051	-0.0163	0.0038
	1.8	-0.0056	0.0048	-0.0150	0.0039
	1.7	-0.0049	0.0047	-0.0141	0.0043
	1.6	-0.0042	0.0047	-0.0134	0.0050
	1.5	-0.0035	0.0049	-0.0131	0.0060
	1.4	-0.0028	0.0052	-0.0130	0.0073
	1.3	-0.0022	0.0056	-0.0132	0.0088
	1.2	-0.0015	0.0061	-0.0135	0.0106
	1.1	-0.0008	0.0067	-0.0140	0.0124
High Efficient	1	-0.0001	0.0074	-0.0146	0.0144

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.

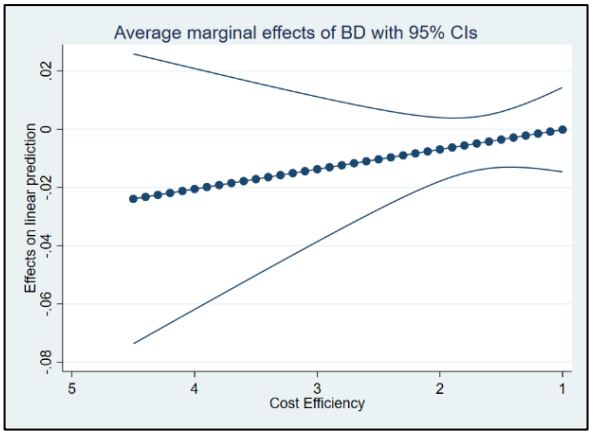

Figure 5.1 Marginal effects graph of bank diversification and capital level in response to cost efficiency for Islamic Banks

To address research objective six, the study analyze the interaction effects of cost efficiency and bank diversification on the capital level for Islamic banks and conventional banks. The marginal effects of bank diversification and the capital level for Islamic banks (Model B) reveal a negative relationship. Referring to Table 5.2, Islamic banks decrease their capital level when the banks increase diversification activities. This is because banks are exposed to less uncertainty of facing risk when their asset portfolio is diversified into non-interest income. Hence, lower capital buffers is sustained by Islamic banks. Chazi et al. (2024) assert that multiple revenue streams act as a hedge for banks, lowering their overall risk while simultaneously improving profitability. High reliance on non-interest income such as commissions, fees, and service charges makes earnings more stable (Adem, 2023; Taylor, 2022). This is because fee-based income is less sensitive to interest rate fluctuations or borrower defaults. Therefore, the need for precautionary capital buffers reduces due to the lower perceived risk when diversification activities increase. In another scenario, decreased diversification results in the capital level of banks rising. A lack of diversification often exposes banks to high risk, particularly in times of crises. This is because decreases in non-interest income indicate increased reliance on financing activities. This exposes banks to earnings volatility and risk exposure stemming from borrower defaults and interest rate fluctuations (Alam et al., 2019; Zhang et al., 2016). In response, banks sustain high capital buffers as a precautionary measure to absorb potential losses and maintain financial stability.

The marginal effects are found to be less pronounced for high cost-efficient Islamic banks than for low cost-efficient Islamic banks. This implies that when

diversification activities increase, slightly smaller decreases in the capital level are observed for high cost-efficient Islamic banks compared to low cost-efficient Islamic banks. This may be because high cost-efficient Islamic banks tend to reinvest additional income into other profitable financing or investment activities instead of increasing their capital level. Their effective control over overhead and administrative expenses helps reduce the need for further capital enhancement (Do Van, 2021). Meanwhile, low cost-efficient Islamic banks utilize the profit generated from non-financing activities via bank diversification to cover high operating costs, rather than allocate profit to strengthening their capital level (Antoun et al., 2021). In another scenario, low cost-efficient Islamic banks may sustain higher capital when their diversification activities decrease, relative to high cost-efficient Islamic banks. This is because poor cost management imposes greater risk on these banks, especially when diversification activities are limited. As a result, low cost-efficient Islamic banks accumulate more capital as a protective buffer against the heightened risk exposure. Grounded in the risk absorption hypothesis, high capital retention helps to absorb potential losses from the ineffective cost management and lack of diversification opportunities of these banks. As for high cost-efficient Islamic banks, a slight increase in the capital level is observed when there is less diversification activity. This is because improved profitability due to effective cost management reduces the reliance on high capital buffers, despite the decrease in diversification activities (Nomran & Haron, 2020).

The current study, however, fails to reject the null hypothesis, implying that the relationship between bank diversification and the capital level of Islamic banks is independent on the level of cost efficiency. In accordance with Shariah principles, Islamic banks are prohibited from engaging in excessive risk-taking and must operate free from gharar (uncertainty), maysir (gambling), and riba (interest) (Bourkhis & Nabi, 2013; Daher et al., 2015). When Islamic banks are less diversified, their risk exposure increases, leading to greater uncertainty (gharar). Consequently, capital level increases to absorb the increases in risks consistent with the risk absorption hypothesis. In fulfilling the Shariah principles, increase in excessive risk (gharar) necessitates higher capital level, regardless of whether the Islamic banks are low or high cost-efficient. This restrictive nature of Shariah-compliant operations limits the extent of risk Islamic banks can assume, which likely contributes to the insignificant interaction effect observed. On the other hand, conventional banks, not bound by Shariah principles, tend to take excessive risks. The interaction results for conventional banks show that greater

diversification leads to larger declines in capital level for low cost-efficient banks, indicating that conventional banks take excessive risks without maintaining adequate capital buffers despite being cost inefficient.

Similar marginal effect result is revealed for conventional banks (Model C) with a negative interaction effect. Unlike Islamic banks, the interaction effect is found to be significant for conventional banks, implying that the negative relationship between bank diversification and capital level is significantly dependent on the level of cost efficiency. Referring to Table 5.3, an inverse relationship between bank diversification and the capital level of conventional banks is revealed. This means increased diversification leads to a decrease in the capital level of conventional banks. Conventional banks pursue increased diversification activities by leveraging economies of scale to achieve cost reduction and improved profitability with reduced risk. As a result, relying on a large capital buffer as a precaution becomes less necessary for conventional banks. Additionally, increased diversification into commissions, fees, and service charges contributes to greater income stability for conventional banks (Sobol et al., 2023). This reduces earnings volatility and improves revenues from various income streams, enabling conventional banks to operate with lower capital level. From the other viewpoint, less bank diversification results in increases in the capital level. A lack of diversification activities exposes conventional banks to an elevated risk of income volatility. This vulnerability arises because conventional banks mainly rely on debt-based financing activities to generate interest income. When borrowers default or market conditions fluctuate, conventional banks face significant earnings instability (Alam et al., 2019; Zhang et al., 2016). Consequently, a high capital buffer is required to absorb the unexpected possible losses associated with income volatility. Following the risk absorption hypothesis, conventional banks strengthen capital buffers as a precautionary measure to offset increased risk exposure due limited diversification activities.

Table 5.3
Marginal Effects of Bank Diversification on Capital Level in Response to Cost Efficiency for Conventional Banks

	Cost Efficiency	Capital Level/Bank Diversification	Delta-method Standard Error	95% Confidence Interval	
Low Efficient	5	-0.0829***	0.0259	-0.1337	-0.0321
	4.9	-0.0814***	0.0251	-0.1307	-0.0322
	4.8	-0.0800***	0.0244	-0.1277	-0.0322
	4.7	-0.0785***	0.0236	-0.1248	-0.0323
	4.6	-0.0771***	0.0228	-0.1218	-0.0323
	4.5	-0.0756***	0.0221	-0.1189	-0.0324
	4.4	-0.0742***	0.0213	-0.1159	-0.0324
	4.3	-0.0727***	0.0205	-0.1130	-0.0325
	4.2	-0.0713***	0.0198	-0.1100	-0.0325
	4.1	-0.0698***	0.0190	-0.1071	-0.0325
	4	-0.0684***	0.0183	-0.1042	-0.0325
	3.9	-0.0669***	0.0175	-0.1013	-0.0325
	3.8	-0.0654***	0.0168	-0.0984	-0.0325
	3.7	-0.0640***	0.0161	-0.0955	-0.0325
	3.6	-0.0625***	0.0154	-0.0926	-0.0324
	3.5	-0.0611***	0.0146	-0.0898	-0.0324
	3.4	-0.0596***	0.0139	-0.0869	-0.0323
	3.3	-0.0582***	0.0132	-0.0841	-0.0322
	3.2	-0.0567***	0.0126	-0.0813	-0.0321
	3.1	-0.0553***	0.0119	-0.0786	-0.0319
	3	-0.0538***	0.0112	-0.0759	-0.0318
	2.9	-0.0524***	0.0106	-0.0732	-0.0315
	2.8	-0.0509***	0.0100	-0.0705	-0.0313
	2.7	-0.0494***	0.0095	-0.0680	-0.0309
	2.6	-0.0480***	0.0089	-0.0655	-0.0305
	2.5	-0.0465***	0.0084	-0.0631	-0.0300
	2.4	-0.0451***	0.0080	-0.0608	-0.0294
	2.3	-0.0436***	0.0076	-0.0586	-0.0287
	2.2	-0.0422***	0.0073	-0.0565	-0.0278
	2.1	-0.0407***	0.0071	-0.0546	-0.0268
	2	-0.0393***	0.0069	-0.0529	-0.0257
	1.9	-0.0378***	0.0069	-0.0513	-0.0243
	1.8	-0.0364***	0.0069	-0.0499	-0.0228
	1.7	-0.0349***	0.0071	-0.0487	-0.0211
	1.6	-0.0334***	0.0073	-0.0477	-0.0192
	1.5	-0.0320***	0.0076	-0.0469	-0.0171
	1.4	-0.0305***	0.0080	-0.0461	-0.0149
	1.3	-0.0291***	0.0084	-0.0455	-0.0126
	1.2	-0.0276***	0.0089	-0.0450	-0.0102
	1.1	-0.0262***	0.0094	-0.0446	-0.0078
High Efficient	1	-0.0247**	0.0100	-0.0442	-0.0052

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.

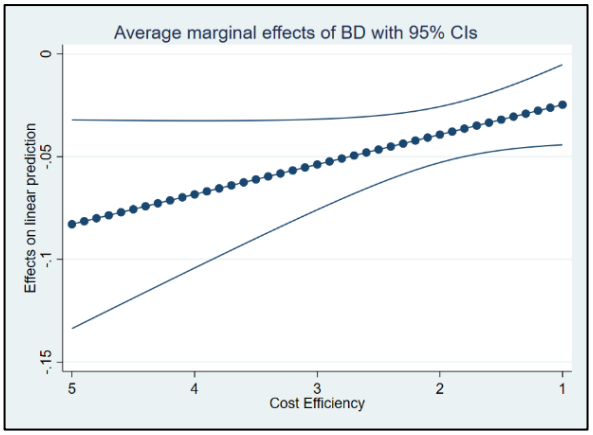

Figure 5.2 Marginal effects graph of bank diversification and capital level in response to cost efficiency for Conventional Banks

The marginal effects appear to be less pronounced for high cost-efficient conventional banks relative to low cost-efficient conventional banks. For high cost-efficient conventional banks, an increase in diversification results in only a slight decrease in the capital level. Enhanced cost management enables these banks to leverage economies of scale by diversifying into a broader range of asset portfolios. As a result, profits via bank diversification are utilized for other profitable business projects instead of being allocated to maintaining larger capital buffers as a safeguard. Conversely, low cost-efficient conventional banks tend to decrease their capital level more significantly when diversification increases. Although diversification helps minimize risk and maximize profit, additional resources and managerial capacity are required to manage it effectively. Due to limited flexibility and constrained resources, low cost-efficient conventional banks often struggle to cope with both cost inefficiency and the associated complexities. Consequently, low cost-efficient conventional banks exhibit greater capital reduction compared to high cost-efficient conventional banks. From another perspective, decreases in diversification result in higher capital level for both high cost-efficient and low cost-efficient conventional banks. The marginal effects are significantly greater for low cost-efficient conventional banks than high cost-efficient conventional banks. This is widely understood as a lack of diversification may expose low cost-efficient conventional banks to a high risk of income volatility. As a result, the banks depend heavily on larger capital buffers to absorb the perceived high risk and remain financially stable, following the risk absorption hypothesis. In contrast, high cost-efficient conventional banks increase their capital level moderately when diversification activities decline. This is because the superior cost management and broader income diversification of high cost-efficient conventional banks help in

mitigating high risk exposure and reducing the necessity for larger capital reserves. As a result, high cost-efficient conventional banks may be incentivized to increase their capital level, but the increment tends to be smaller.

Table 5.4
Marginal Effects of Bank Diversification on Capital Level in Response to Cost Efficiency for High-Income Countries

	Cost Efficiency	Capital Level/Bank Diversification	Delta-method Standard Error	95% Confidence Interval	
Low Efficient	4	0.0874**	0.0422	0.0046	0.1701
	3.9	0.0842**	0.0406	0.0047	0.1638
	3.8	0.0811**	0.0390	0.0047	0.1575
	3.7	0.0779**	0.0374	0.0047	0.1512
	3.6	0.0748**	0.0358	0.0047	0.1449
	3.5	0.0716**	0.0342	0.0047	0.1386
	3.4	0.0685**	0.0326	0.0047	0.1323
	3.3	0.0654**	0.0310	0.0046	0.1261
	3.2	0.0622**	0.0294	0.0046	0.1198
	3.1	0.0591**	0.0278	0.0045	0.1136
	3	0.0559**	0.0263	0.0044	0.1074
	2.9	0.0528**	0.0247	0.0043	0.1013
	2.8	0.0496**	0.0232	0.0041	0.0951
	2.7	0.0465**	0.0217	0.0039	0.0890
	2.6	0.0433**	0.0202	0.0037	0.0830
	2.5	0.0402**	0.0188	0.0034	0.0770
	2.4	0.0370**	0.0174	0.0030	0.0711
	2.3	0.0339**	0.0160	0.0025	0.0653
	2.2	0.0308**	0.0147	0.0019	0.0596
	2.1	0.0276**	0.0135	0.0012	0.0541
	2	0.0245**	0.0124	0.0002	0.0487
	1.9	0.0213*	0.0114	-0.0010	0.0437
	1.8	0.0182*	0.0106	-0.0026	0.0390
	1.7	0.0150	0.0100	-0.0046	0.0346
	1.6	0.0119	0.0097	-0.0071	0.0308
	1.5	0.0087	0.0096	-0.0101	0.0276
	1.4	0.0056	0.0098	-0.0137	0.0249
	1.3	0.0025	0.0103	-0.0178	0.0227
	1.2	-0.0007	0.0111	-0.0224	0.0210
	1.1	-0.0038	0.0120	-0.0273	0.0196
High Efficient	1	-0.0070	0.0130	-0.0325	0.0186

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.

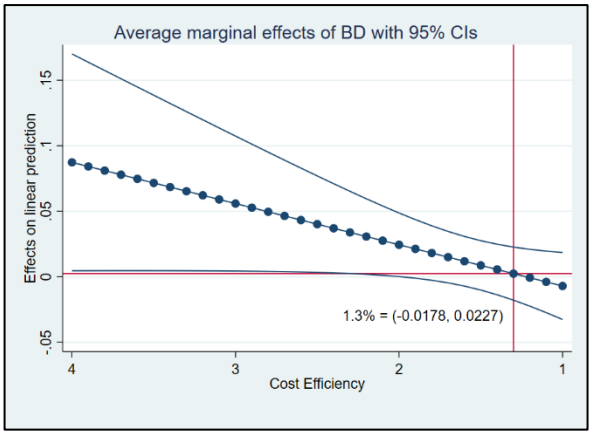

Figure 5.3 Marginal effects graph of bank diversification and capital level in response to cost efficiency for High-Income Countries

To address research objective seven, the study shifts the analysis to focus on the interaction effects of cost efficiency and bank diversification on the capital level of High-Income and Middle-Income countries. Cost efficiency is found to significantly interact the relationship between bank diversification and the capital level of high cost-efficient banks in High-Income countries, with a negative effect. This indicates that an increase in bank diversification leads to a decline in the capital level of high cost-efficient banks operating in High-Income countries. This suggests that in High-Income countries, expanding into non-financing activities allows high cost-efficient banks to operate confidently with a lower capital buffer. In High-Income countries, better regulation and oversight, accompanied by advanced risk management techniques, enable high cost-efficient banks to generate more stable income. This reduces the need for high cost-efficient banks in these countries to hold excess capital when they are increasingly diversified, as the banks can generate more income with less cost and less risk. Conversely, a decrease in bank diversification leads to an increase in the capital level of high cost-efficient banks operating in High-Income countries. This reflects a precautionary approach by these banks to retain more capital and remain compliant with the minimum regulatory requirements when the banks lack diversification activities. Reduced diversification heightens the income volatility of the banks, which can escalate their overall exposure to financial shocks. Therefore, maintaining strong capital buffers safeguards against potential losses arising from limited income streams. If unexpected shocks occur, high cost-efficient banks may proactively adjust their capital with ease due to their strong profitability, which stems from their high cost efficiency. This supports the view that robust regulatory frameworks and advanced technology enable

banks to operate efficiently and prudently, leading to increased banking stability (Antoun et al., 2021; Nasim et al., 2024). However, the negative interaction effects change to positive once cost efficiency reaches 1.3 percent and above, reflecting low cost efficiency due to high non-interest expenses. To be specific, low cost-efficient banks in High-Income countries increase their capital level when their diversification activities increase. This is because the strong regulatory oversight in High-Income countries encourages these low cost-efficient banks to strengthen their capital buffers to offset the greater uncertainty associated with diversified activities. Consistent with signaling theory, high capital retention signals the financial strength and stability of the banks in capital markets. Alternatively, decreased bank diversification leads to a decrease in the capital level of low cost-efficient banks in High-Income countries. Low cost-efficient banks with less diversification may retain lower capital due to the cost pressure. Therefore, these banks may prioritize relieving the financial strains of high operating costs over strengthening their capital position. Profits may be allocated directly to managing internal costs instead of enhancing the costly capital reserve. In line with the risk absorption hypothesis, high capital helps increase the financial resilience of banks by absorbing the high-cost pressure when there are limited diversification opportunities.

In Middle-Income countries, the interaction effects of cost efficiency and bank diversification on the capital level are revealed to be significant. Based on Table 5.5, cost efficiency is found to negatively interact the relationship between bank diversification and the capital level of Middle-Income countries. As bank diversification increases, the capital level of banks in Middle-Income countries decrease. In Middle-Income countries, unstable market conditions and weaker regulatory frameworks expose banks to greater financial risk. Therefore, diversification becomes a key strategy adopted by banks in Middle-Income countries to counter such risks and strengthen financial performance, based on diversified income streams. Diversifying into non-interest income activities such as commissions, fees, and service charges reduces the overall risk exposure and leads to improved earnings stability (de-Ramon et al., 2021; Kim, 2020). This strategy not only strengthens the resilience of banks but also allows banks to optimize resource allocation. Thus, banks in Middle-Income countries have less need to maintain excessively high capital buffers. However, when bank diversification decreases, the capital level of banks in Middle-Income countries increases. This is because limited diversification exposes banks to a

heightened risk of income volatility. Greater reliance on a single income source may amplify the vulnerability of a bank's stability due to the risk of income volatility (Saadaoui & Mokdadi, 2022). To mitigate such risk, banks in Middle-Income countries hold high capital buffers to ensure resilience against potential losses arising from the lack of diversified income sources. Moreover, less-developed financial markets further constrain the diversification opportunities for banks in Middle-Income countries (Bitar et al., 2018; Etudaiye-Muhtar & Abdul-Baki, 2021). As a result, raising funds externally through the capital market is difficult for banks operating in these countries, requiring banks to sustain a high capital level as a protection against unexpected financial shocks.

Table 5.5
Marginal Effects of Bank Diversification on Capital Level in Response to Cost Efficiency for Middle-Income Countries

	Cost Efficiency	Capital Level/Bank Diversification	Delta-method Standard Error	95% Confidence Interval	
Low Efficient	5	-0.0851***	0.0188	-0.1220	-0.0483
	4.9	-0.0833***	0.0183	-0.1191	-0.0475
	4.8	-0.0815***	0.0177	-0.1162	-0.0468
	4.7	-0.0797***	0.0172	-0.1133	-0.0461
	4.6	-0.0779***	0.0166	-0.1104	-0.0453
	4.5	-0.0760***	0.0161	-0.1075	-0.0446
	4.4	-0.0742***	0.0155	-0.1046	-0.0438
	4.3	-0.0724***	0.0150	-0.1018	-0.0430
	4.2	-0.0706***	0.0144	-0.0989	-0.0423
	4.1	-0.0688***	0.0139	-0.0960	-0.0415
	4	-0.0669***	0.0134	-0.0932	-0.0407
	3.9	-0.0651***	0.0129	-0.0903	-0.0399
	3.8	-0.0633***	0.0123	-0.0875	-0.0391
	3.7	-0.0615***	0.0118	-0.0847	-0.0383
	3.6	-0.0597***	0.0113	-0.0819	-0.0375
	3.5	-0.0578***	0.0108	-0.0791	-0.0366
	3.4	-0.0560***	0.0103	-0.0763	-0.0358
	3.3	-0.0542***	0.0099	-0.0735	-0.0349
	3.2	-0.0524***	0.0094	-0.0708	-0.0340
	3.1	-0.0506***	0.0089	-0.0681	-0.0330
	3	-0.0487***	0.0085	-0.0654	-0.0321
	2.9	-0.0469***	0.0081	-0.0627	-0.0311
	2.8	-0.0451***	0.0077	-0.0601	-0.0301
	2.7	-0.0433***	0.0073	-0.0576	-0.0290
	2.6	-0.0415***	0.0069	-0.0551	-0.0278
	2.5	-0.0396***	0.0066	-0.0526	-0.0266
	2.4	-0.0378***	0.0064	-0.0503	-0.0254
	2.3	-0.0360***	0.0061	-0.0480	-0.0240
	2.2	-0.0342***	0.0059	-0.0458	-0.0225
	2.1	-0.0323***	0.0058	-0.0437	-0.0210
	2	-0.0305***	0.0057	-0.0417	-0.0193
	1.9	-0.0287***	0.0057	-0.0399	-0.0175
	1.8	-0.0269***	0.0057	-0.0381	-0.0156
	1.7	-0.0251***	0.0058	-0.0365	-0.0136
	1.6	-0.0232***	0.0060	-0.0350	-0.0115
	1.5	-0.0214***	0.0062	-0.0336	-0.0093
	1.4	-0.0196***	0.0064	-0.0322	-0.0070
	1.3	-0.0178***	0.0067	-0.0310	-0.0046
	1.2	-0.0160**	0.0071	-0.0298	-0.0021
	1.1	-0.0141**	0.0074	-0.0287	0.0004
High Efficient	1	-0.0123	0.0078	-0.0276	0.0030

Note: ***, **, and * denotes the statistical significance at the 1%, 5%, and 10 % levels, respectively.

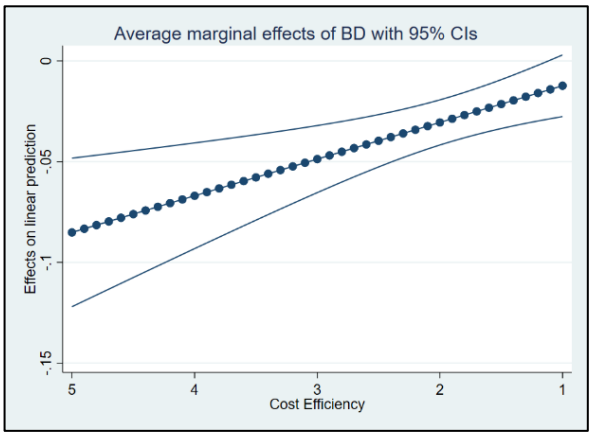

Figure 5.4 Marginal effects graph of bank diversification and capital level in response to cost efficiency for Middle-Income Countries

The marginal effect for high cost-efficient banks and low cost-efficient banks in Middle-Income countries are revealed to negatively interact the relationship between bank diversification and capital level. Specifically, the marginal effects are significantly greater for low cost-efficient banks in Middle-Income countries, compared to high cost-efficient banks. This means that for low cost-efficient banks in Middle-Income countries, bigger decline in the capital level is observed when diversification activities increase. This is because increase diversification activities allow banks to leverage their considerable cost management capability to further enhance profitability from various income streams. This strategy reduces the overall risk of the banks, so there is less need for extra capital for emergencies. Whereas strong and effective cost management by high cost-efficient banks in Middle-Income countries serves as an effective hedge against potential financial shocks. This reflects the ability of these banks in Middle-Income countries to optimize resources and maintain financial stability without relying considerably on high capital buffers. Through a different lens, when low cost-efficient banks in Middle-Income countries increase their diversification, this results in a significantly greater decline in the capital level. Due to their poorer cost management, low cost-efficient banks operating in Middle-Income countries face a dilemma between enhancing profitability and improving financial resilience. Low cost-efficient banks in these countries tend to prioritize improving profitability over capital accumulation to compensate for their ineffective cost management. In pursuit of higher income with reduced risk, low cost-efficient banks may trade-off capital to finance for diversification activities. This strategy exposes these banks to heightened financial

vulnerability, as their cost inefficiency hinders effective risk mitigation. Consequently, the capital level diminishes more significantly in low cost-efficient banks in Middle-Income countries. On the other hand, a decrease in bank diversification leads to increases in the capital level of both high cost-efficient and low cost-efficient banks in Middle-Income countries, with a stronger marginal effect for the latter relative to the former. A significantly high capital level is held by low cost-efficient banks in Middle-Income countries when diversification drops. This is because low profitability stems from both cost inefficiency and a lack of diversified income streams, necessitating that a relatively higher capital buffer is sustained by low cost-efficient banks in Middle-Income countries to absorb any uncertainties. Meanwhile, high cost-efficient banks operating in Middle-Income countries increase their capital moderately when their diversification activities reduce. This reflects the strong cost efficiency demonstrated by high cost-efficient banks that have effective risk management techniques, which enables the banks to maintain financial resilience without relying on excessive capital.

5.7 Summary

In summary, the results in this chapter indicate that liquidity is considered unimportant in the capital decision of Islamic and conventional banks in High-Income and Middle-Income (HIMI) countries. Credit risk, profitability, bank growth, and economy are found to be crucial factors in the capital decision of both Islamic and conventional banks in HIMI countries. These variables displayed a negative relationship with the two types of banks and country groups, except for profitability, which positively influences the capital level of Islamic and conventional banks in High-Income and Middle-Income countries. Economy negatively influences the capital decision of Islamic banks, while it is positively related to the capital level of conventional banks, High-Income countries, and Middle-Income countries. Bank size plays an additional role alongside the aforementioned determinants when strategizing capital level management in conventional banks and High-Income countries. Meanwhile, Middle-Income countries consider cost efficiency as an important factor in capital decision making, besides credit risk, profitability, bank growth, and economy. During crises, the capital level of High-Income countries is found to be significantly higher compared to non-crisis periods. Banks in High-Income countries retain higher capital level compared to banks in Middle-Income countries. More specifically, Islamic

banks hold relatively lower capital than conventional banks, regardless of whether they operate in High-Income or Middle-Income countries. For the interaction, cost efficiency is found to significantly interact with the relationship between bank diversification and the capital level of conventional banks, High-Income countries, and Middle-Income countries. The insights derived from the findings and discussion pave the way for the concluding chapter, where the overall implications of the results are synthesised and followed by recommendations for practitioners such as policymakers, banking institutions, and body of knowledge which is future researcher.

CHAPTER 6
CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This final chapter starts with a conclusion section, based on the main findings drawn from the results of the final estimation of bank capital level. Section 6.2 revisits and concludes the major findings to re-emphasize the key points by ensuring that all research objectives of the study are addressed. Following the conclusion, the study provides recommendations. The recommendations are specifically tailored for policymakers and banking institutions with the aim of strengthening the capital level of banks and enhancing the overall resilience of banking systems. The limitations of the study are outlined in the next section, highlighting the challenges encountered while conducting the study. The limitations are discussed to guide future researchers in identifying opportunities for potential future investigations that address and close the remaining knowledge gaps.

6.2 Conclusion

To conclude, the capital level acts as a crucial buffer, allowing banks to absorb unexpected losses and maintain stability during periods of economic stress. Ergo, it is imperative for banks to ensure that an adequate capital level is always readily available. By maintaining adequate capital, banks can ensure they have the necessary resources to withstand unforeseen financial turbulence that could jeopardize their stability. One bank failure can cause ripple effects to other banks in the financial system, potentially creating a loss of confidence among depositors and investors. Therefore, ensuring that banks are adequately capitalized is crucial not only for the health of individual banks but also to maintain the confidence of depositors and investors in the overall stability of the financial system. This is because well-capitalized banks are better prepared to face any financial shocks. This study investigates the capital decision of Islamic and conventional banks in High-Income and Middle-Income (HIMI) countries. The study focuses on ten HIMI countries spanning a 30-year period.

The results reveal that Islamic banks in High-Income and Middle-Income countries hold significantly lower capital level relative to conventional banks in both groups of countries. This is attributed to the nascent growth of Islamic banks in many regions, despite their growing popularity due to the appeal of their ethical Shariah principles. This early stage of development limits Islamic banks' access to capital markets for raising funds and injecting capital. Furthermore, due to their Shariah compliance, Islamic banks find it difficult to raise capital efficiently due to the lack of robust and diversified Shariah-compliant capital markets in most regions. Also, higher operating costs further hinder the ability of Islamic banks to strengthen their capital level. These elevated costs arise from the complexity of Shariah-compliant financial structures, which require additional layers of governance such as Shariah supervisory boards and specialized product development (Abdulrahman et al., 2023). The need to ensure compliance with Islamic principles, added to the administrative costs and regulatory burdens, contributes to Islamic banks having lower capital level. On the other hand, conventional banks benefit from economies of scale and well-established networks, owing to their long establishment in the financial system. Therefore, conventional banks have greater access to diversified funding sources, which enables these banks to build and maintain higher capital level.

The findings further reveal that banks in High-Income countries appear to hold significantly higher capital level compared to banks operating in Middle-Income countries. This highlights the importance of having a good regulatory framework that entails better supervision and regulation of banking institutions. High-Income countries have better regulatory frameworks than Middle-Income countries, which contributes to the high capital level maintained by the banks operating in the former group of countries (Mutarindwa et al., 2021). The robust regulatory frameworks in High-Income countries not only mandate banks to maintain higher capital ratios but also facilitate effective oversight and supervision. Unlike those banks in High-Income countries, banks in Middle-Income countries struggle to build and sustain a high capital level because of the weaker regulatory framework. This leads to ineffective banking monitoring and supervision, corroborating studies by the World Bank Group (2020) and Ullah et al. (2022).

The difference between the capital level holdings of Islamic and conventional banks, as well as High-Income and Middle-Income (HIMI) countries, is because of bank-specific factors that may influence the capital decision-making strategies of

banks. The study discovers that the capital decision of Islamic and conventional banks are very similar. Likewise, High-Income and Middle-Income countries demonstrate similar capital decision strategies. Credit risk, profitability, bank growth and economy are equally important in the capital decision of Islamic and conventional banks in both High-Income and Middle-Income countries. A negative relationship is found between the capital level and both credit risk and bank growth, while profitability positively influences the capital level of banks. Economy is positively related with the capital of conventional banks, High-Income and Middle-Income countries while negatively related with the capital level of Islamic banks.

Increased credit risk is found to significantly erode the capital level of Islamic and conventional banks in High-Income and Middle-Income (HIMI) countries. This indicates that both types of banks in HIMI countries do not enhance their capital level in response to elevated credit risk. Failure to correspond accordingly may threaten the stability of banks, increasing their exposure to financial shocks, especially during crises. This impact of credit risk on the capital level appears to be more severe for Islamic banks in Middle-Income countries. This is because of the high reliance on asset-backed financing activities that are closely tied to real economic performance. In countries with weaker regulatory frameworks and less-developed financial markets, these financing activities expose Islamic banks to greater credit risk, resulting in a more pronounced decline in the capital level.

Indeed, profitability is proven to positively enhance the capital level of Islamic and conventional banks in High-Income and Middle-Income countries. Banks with high and stable earnings tend to inject additional capital, in accordance with signaling theory. A strong capital position serves as a positive signal of financial strength and stability, fostering market confidence and trust. Moreover, it promotes long-term growth and sustainability for banking institutions. This positive influence of profitability on the capital level is greater for conventional banks in High-Income countries. In well-developed financial markets with advanced risk management practices, conventional banks primarily build capital through retained earnings. Their easy access to resources and capital markets further reinforces the relationship between profitability and capital level. Profitable conventional banks in High-Income countries convert retained earnings into high capital buffers to ensure stability while simultaneously complying with the regulatory requirements.

In terms of bank growth, Islamic and conventional banks in both High-Income and Middle-Income countries are found to trade-off their capital level in pursuit of growth. When banks prioritize growth, they often allocate resources to financing activities rather than maintaining robust capital buffers. This approach exposes banks to elevated risk due to the significant reduction in their capital level. Conventional banks experience greater declines in their capital level by having easier access to external funding and high reliance on leverage, allowing the banks to operate close to the minimum regulatory capital. Meanwhile, Islamic banks adopt more conservative growth strategies by providing asset-backed financing that aligns with Shariah principles, resulting in less influence on the capital reduction. Banks in Middle-Income countries face high capital risk while pursuing growth due to the insufficient capital protection in countries with weaker regulatory enforcement and less-developed financial markets. In contrast, banks in High-Income countries maintain strong stability through robust regulation and advanced risk management, enabling sustainable growth without excessive capital accumulation.

Bank size is revealed to play a pivotal role in the capital strategies of conventional banks and High-Income countries, in addition to the importance of credit risk, profitability, bank growth and economy. This finding reinforces the 'Too Big to Fail' (TBTF) theory, which posits that larger banks are susceptible to capital risk due to implicit safety nets that reduce perceived default risk, which applies especially for conventional banks and High-Income countries. Such government guarantees further incentivize larger banks to pursue aggressive growth strategies without holding adequate capital buffers due to the expectation of regulatory intervention during financial distress. The moral hazard issue of TBTF is pronounced among larger conventional banks and those larger bank size in High-Income countries, where government resources and regulatory capacity make bailouts more credible. In such environments, larger conventional banks benefit from political stability, well-developed financial markets, and robust regulatory frameworks. As a result, these banks enjoy lower borrowing costs and greater market credibility, which subsequently enables the banks to extend substantial financing at competitive interest rates. This accelerates credit growth while simultaneously amplifying risk-taking behavior, thereby weakening market discipline among larger conventional banks in High-Income countries.

In a direct relationship, cost efficiency negatively influences the capital level of Islamic banks, conventional banks, and Middle-Income countries, whereas it positively influences the capital level of High-Income countries. Interestingly, cost efficiency emerges as an important determinant of capital ratios in the four models, especially when interacting with bank diversification. The findings indicate that cost efficiency significantly interacts the relationship between bank diversification and the capital level of conventional banks but not Islamic banks, although both are negatively correlated. This underscores how bank diversification is crucial for conventional banks to take full advantage of cost efficiency to enhance profits and mitigate risks while remaining financially resilient. This is because inefficient cost management may exacerbate the impact of diversification on the capital level, resulting in a more significant drop in the capital level. On the other hand, high cost-efficient conventional banks benefit from economies of scale, enabling them to diversify their high operating costs while reducing risks in order to generate more income. This contributes to capital savings for high cost-efficient conventional banks when they increase diversification into non-interest income without compromising their financial stability. This may not apply to Islamic banks in terms of the interaction effect. However, the direct negative and significant relationship between cost efficiency and capital level underscores the equal importance for Islamic banks to be cost-efficient in order to effectively manage their capital level. Better cost management in Islamic banks contributes to capital savings by reducing operating expenses. This promotes more profits and means there is less need for large capital buffers.

Furthermore, the results of this study reveal that the capital level of High-Income and Middle-Income countries depend on the level of cost efficiency, especially when banks increase or decrease diversification activities. In both High-Income and Middle-Income countries, high cost-efficient banks demonstrate lower reliance on the capital level when their diversification increases. Strong cost management in high cost-efficient banks enables these banks to enhance profitability through diversification activities with a reduced overall risk. Consequently, there is less need for high capital buffers. Even when less diversified, having strong cost efficiency enables banks to manage risk by boosting their capital level using ongoing earnings. Conversely, for low cost-efficient banks, different behavior is observed across High-Income and Middle-Income countries. Low cost-efficient banks in High-Income countries tend to increase their capital level when diversification activities increase, primarily as a precautionary

response to risk exposure from non-financing activities. Meanwhile, in Middle-Income countries, a decline in the capital level is observed for low cost-efficient banks when diversification increases. This is primarily because profit is often redirected to manage their high internal costs in order to alleviate the financial cost burden, instead of strengthening the capital level. This also highlights that banks operating in High-Income countries behave prudently because the stringent regulatory oversight and sound risk management practices help to enhance their ability to manage and mitigate financial risk. In essence, banks may strategically strategize their bank diversification activities depending on the different level of cost efficiency to enhance their capital level by optimizing resources fully to gain more profits with reduced risk.

The results further indicate that the capital level of banks in High-Income countries is significantly higher during crises than non-crisis period. The findings highlight the strong resilience of banks operating in High-Income countries. This also support the robust risk management practices by banks in High-Income countries that enable these banks to absorb unexpected shocks and remain stable in times of financial distress (Tölö & Virén, 2021; Vithessonthi, 2023). This resilience further reflects the effectiveness of banking system in High-Income countries likely due to stringent regulatory frameworks that ensures continuous oversight and monitoring on the banking institutions (Mutarindwa et al., 2021). As a result, the resilience fostered by robust risk management and stringent regulatory oversight enables banks in High-Income countries to navigate unexpected crises effectively. Thereby, increasing the banking stability while at the same times strengthening depositor and investor confidence.

The findings correspond with the countercyclical behavior in the capital level of banks in High-Income countries in relation to the economy. Banks operating in High-Income countries demonstrate forward-looking behavior by building strong capital buffers during periods of economic prosperity to safeguard against possible loan losses during unexpected financial distress. This proactive approach reflects prudent risk management through the accumulation of capital buffer in favorable economic conditions to ensure resilience when adverse shocks occur, in parallel to the role of countercyclical capital buffers outlined in Basel III. This approach is also demonstrated by conventional banks and Middle-Income countries. The countercyclical capital buffer serves as a critical macroprudential tool that helps to mitigate the systemic risk by requiring banks to accumulate additional capital during period of good economic

conditions to ensure continuous credit flow to the economy. On the other hand, Islamic banks appear to be acting procyclically to the economy. During favorable economic conditions, Islamic banks decrease their capital to allocate more resources to financing activities instead of strengthening their capital position. Consequently, this strategy exposes Islamic banks to heightened vulnerability during economic downturns. The unexpected materialization of loan losses in adverse economic conditions erodes the capital level of Islamic banks, limiting their ability to absorb shocks and maintain stability.

6.3 Recommendations

Acknowledging the critical role that banking institutions play by acting as an essential intermediary within the financial system, it becomes even more essential to ensure their banking stability. A banking institution helps facilitate the transfer of surplus funds from savers and investors to the individuals and businesses that need money. This role of banks has become fundamental in driving the economic growth of a country. For this reason, having adequate capital is deemed crucial for a banking institution, especially during adverse events such as sudden economic downturns, due to the unexpected surge of loan defaults and other unforeseen crises. The study discovers that the capital level of banks is significantly influenced by both bank-specific and macroeconomic factors. Hence, based on the new empirical findings, the study suggests several important policy recommendations for policymakers, banking institutions, and future researchers.

Notably, the analysis reveals that Islamic banks in High-Income and Middle-Income (HIMI) countries hold significantly lower capital level in comparison to conventional banks. Therefore, the study suggests that strict oversight and monitoring are required for Islamic banks to ensure the continued retaining of high capital level, especially during crises. The study findings reveal that during crises, the capital level of Islamic banks is significantly lower than during non-crisis periods. This drop may reflect the high reliance of Islamic banks on asset-backed nature contracts, reducing the perceived need for large capital buffers. However, having lower capital during crises can limit the ability of Islamic banks to absorb unforeseen financial shocks, making adequate capital reserves crucial for maintaining solvency and ensuring continuous operation under stressful conditions. Berger and Bouwman (2013) agree that having

additional capital during tough times increases the survivability of banks against unforeseen financial shocks. Additionally, to mitigate the procyclical effects of the capital of Islamic banks on the economy, stringent capital requirements must be enforced by regulators in HIMI countries, specifically on Islamic banks. This is to ensure that Islamic banks have adequate capital available to absorb potential loan losses, even during crises. When banks are adequately capitalized, they are more likely to continue financing activities even during recessions, which can help stimulate economic growth and mitigate the adverse effects of a recession, in line with the objectives of Basel III. In essence, strong capital positions safeguard against unexpected withdrawal demands and unexpected loan losses. This is consistent with the risk absorption hypothesis, whereby having higher capital indicates a bank's greater capacity to absorb potential loan losses, and vice versa. This reinforces confidence in the banking system and contributes to the long-term growth and sustainability of banks.

It is equally important for regulators in HIMI countries to guarantee that all banks adopt the risk absorption hypothesis when undertaking high-risk financing activities. Credit risk is known to be the primary driver of capital erosion in banking institutions. Moreover, given that credit risk significantly influences capital level in a negative way, policymakers should emphasise enhanced credit risk management practices. Banking institutions must adopt an advanced credit score system using the latest AI technology for credit risk assessments before approving financing. Regulators should also mandate the adoption of early warning credit systems as a proactive measure to mitigate credit risk and safeguard bank capital. This type of early mechanism enables banking institutions to detect potential problems with borrowers before their credit quality deteriorates and defaults occur. This early identification allows banks to implement timely corrective measures, such as restructuring financing and adjusting credit terms. As a result, this reduces the need for high loan loss allowance to gross loans due to decrease non-performing loans. Minimizing unexpected credit shocks helps to strengthen the resilience of banking systems and preserve the capital level of banks.

Furthermore, the positive and significant profitability of the capital level of Islamic and conventional banks in HIMI countries highlights the need for regulators to design policies that foster consistent and reliable profitability as a means to strengthen the capital ratios. Profitability functions as a crucial internal source of capital accumulation that is less costly and readily accessible as an alternative to external

financing. To achieve this, regulators should encourage strategies that improve the cost efficiency of banks and promote income diversification within banking institutions. These measures not only enhance profitability but also contribute to long-term financial stability by ensuring that banks remain well-capitalized and capable of absorbing unexpected losses. A regulatory framework that integrates profitability with prudent capital management is essential to safeguard the banking sector against systemic risks. This framework not only strengthens the ability of banks to absorb financial shocks but also enhances resilience during economic downturns. By promoting sustainable earnings and robust capital buffers, regulators can create environments that support long-term stability and foster sustainable growth among banks in both High-Income and Middle-Income countries.

Greater attention to bank growth is needed, as it negatively affects the capital level of both Islamic and conventional banks in HIMI countries. Policymakers should impose higher capital buffer requirements during periods of excessive credit growth. This is because higher growth periods are often associated with increased financing activities and reduced capital ratios, as evident in the findings. Strengthening capital buffers during periods of rapid credit expansion serves as a countercyclical measure. As outlined in Basel III, a countercyclical capital buffer functions as an instrument to mitigate systemic risk arising from accelerated credit growth. This type of buffer operates by requiring banks to accumulate capital buffers in good times and release these buffers during periods of economic stress. This helps promote both financial stability and long-term credit provision. The actions should be accompanied by strict monitoring and oversight by regulators to ensure banks maintain sufficient capital reserves while pursuing growth. Undeniably, bank growth is essential for Islamic and conventional banks in HIMI countries to maintain both their market share and their viability in highly competitive markets; however, maintaining high capital is required while pursuing growth. Banks with a strong capital position can better navigate highly competitive markets and undertake risky financing activities to grow and expand.

Furthermore, strong emphasis on larger conventional banks and those larger banks operating in High-Income countries is necessary to address the moral hazard issues of being ‘Too Big to Fail’ (TBTF). When larger conventional banks operate with lower capital level, they tend to rely on implicit government support during crises. This reduces the market discipline and encourages excessive risk-taking behavior, which can increase the vulnerability of these banks to crises. Such behavior increases the fragility

of larger banks, which are considered systemically important institutions, so their failure raises the risk of widespread financial instability. This is because when systemically important banks operate with insufficient capital, their failure may trigger a chain reaction across the financial system, affecting smaller banks and the broader economy. Consequently, enforcing stringent capital requirements for systemically important banks is essential to break the potential domino effect that often occurs because of the TBTF phenomenon. This helps reduce the contagion risk and promotes more resilient banking institutions. Stringent capital requirements should be supplemented by enhanced supervisory oversight by regulators to discourage imprudent risk-taking behavior and ensure compliance. This may indirectly strengthen banking stability within the overall financial system.

The significant role of cost efficiency, particularly through its interaction with bank diversification and capital level, underscores the key roles played by cost efficiency and bank diversification in the capital decision of banks. Policymakers should promote initiatives that enhance the cost efficiency of banks. By strategically reinvesting profits into diverse asset portfolios and multiple business segments, low cost-efficient banks in High-Income countries can improve their profitability and enhance the capital level. However, high cost-efficient banks in High-Income countries need to need to critically strategize their bank diversification activities based on their level of cost efficiency to strengthen the capital level. Efficient cost management enhances profitability and promotes the long-term stability of banks. Subsequently, banks are enabled to support strategic diversification by freeing resources for investment across different asset portfolios and business segments. The same applies to the high cost-efficient and low cost-efficient conventional banks and those banks operating in Middle-Income countries. Low cost-efficient banks are more vulnerable because their higher operating costs make the banks more likely to face financial trouble. Following the trade-off theory, these banks should hold a larger capital buffer as an extra protection to absorb the perceived high risk against both weaker cost control and lack of diversification. In contrast, although high cost-efficient banks already appear strong due to their stable performance, signaling theory suggests that these banks must continue demonstrating their strength by consistently maintaining solid capital level to reassure and retain investor confidence.

Overall, the study suggests that policymakers in High-Income and Middle-Income (HIMI) countries implement different capital requirement policies related to the

capital decision of Islamic and conventional banks. Although the capital strategies of these banks are very similar, it is imperative for policymakers to address differently the issues affecting the capital level of both types of banks because one policy that fits all banks is impossible in this context. It is recommended that regulators incorporate the existing capital regulation frameworks following the factors that affect the capital level of Islamic and conventional banks in High-Income and Middle-Income countries. A capital regulation framework should reflect the unique and distinct institutional characteristics of Islamic and conventional banks across countries with different income level. For Islamic banks, this may include considerations of credit risk, profitability, bank growth, cost efficiency, and economy. For conventional banks, emphasis should be placed on bank size, in addition to credit risk, profitability, bank growth, cost efficiency, and economy. In High-Income and Middle-Income countries, capital regulations should primarily address factors such as credit risk, profitability, bank growth, and economy. Greater emphasis on bank size is crucial for banks operating in High-Income countries, while cost efficiency is critical for banks operate in Middle-Income countries. By tailoring capital requirements specifically to Islamic and conventional banks in either High-Income or Middle-Income countries, regulators can enhance the overall banking stability and ensure financial resilience, thereby increasing depositor and investor confidence in the global banking system.

6.4 Limitations of the Study

Acknowledging the limitations of the study allows future researchers to improve their research and provide new contributions based on different insights and perspectives. These limitations help future researchers to build upon existing work by addressing the gaps and exploring new opportunities, hitherto overlooked. Indirectly, a deeper understanding of the capital level of banks can be achieved and benefit the relevant body of knowledge. Several limitations are evident in this study. These challenges pertain to the datasets, and the variables used in the study.

The datasets in this study are solely collected from the Fitch Ratings PRO database, except for data on the gross domestic products (GDP) deflator. This is because the Fitch Ratings PRO database provides data for Islamic and conventional banks in High-Income and Middle-Income (HIMI) countries. However, the database relies on

the availability and accuracy of financial data disclosed and shared by banks. Thus, there are missing data, which resulted in a reduced number of observations in this study.

In terms of variables, future researchers may also consider extending the set of variables by incorporating climate-related risks into bank capital studies. As climate risk increasingly shapes economic and financial conditions, integrating indicators such as physical risk exposure (e.g., flood, hurricane, typhoon), transition risks (e.g., carbon footprint, climate policy stringency), may offer a more comprehensive understanding of how environmental vulnerabilities influence banks' capital decision across different banking systems and income groups. In addition, future researchers may assess whether banks with stronger sustainability practices or green financing portfolios exhibit more resilient capital positions. Expanding the analytical framework in this direction would not only fill an emerging gap in the literature but also provide valuable insights for regulators to promote more climate-resilient banking institutions.

6.5 Summary

This chapter presents the challenges faced while conducting this study. Additionally, several recommendations are highlighted to future researchers intending to address issues concerning the capital level of Islamic and conventional banks across High-Income and Middle-Income (HIMI) countries. The study provides useful policy implications that benefit policymakers and banking institutions, enabling them to direct attention and strategically address the management of the capital decision of banks.

Islamic and conventional banks in both High-Income and Middle-Income countries need to adopt the risk absorption hypothesis when undertaking additional financing risk. This approach allows banks to continue supporting financing activities while safeguarding their financial stability, especially during economic stress. For this reason, banks need to proactively strengthen their capital position by injecting additional buffers during good times while limiting excessive financing activities. Therefore, in a recession, capital can be released to buffer against potential loan losses while banks simultaneously maintain the credit flow to the economy, in line with the Basel III regulation.

Additionally, efficient cost management allows banks to generate higher returns without relying heavily on capital, which strengthens their financial stability. However, focusing on cost efficiency alone is not sufficient. Improving cost efficiency and

diversifying business activities are key strategies for managing capital level for both Islamic and conventional banks in HIMI countries. Lower costs improve risk management and profitability for banks, while diversification decreases dependence on a single revenue stream, thereby lowering vulnerability to sector-specific shocks. These two factors enhance the resilience and stability of banking institutions across countries with different income level. Banks in High-Income countries typically benefit from the advanced technology, robust regulatory frameworks, and well-developed financial markets, leading to stronger returns and ability to control risk effectively. Banks in Middle-Income countries, on the other hand, face more volatile markets, as well as poorer regulatory monitoring and oversight, making efficiency and diversification key instruments for minimizing high risk exposure and unpredictable earnings.

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APPENDICES

APPENDIX 1

Research Ethics Exemption Approval

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UNIVERSITI TEKNOLOGI MARA

Pejabat
Timbalan Naib Canselor
(Penyelidikan dan Inovasi)

Reference : 600-TNCPI (5/1/6)
Our reference : REC/10/2024 (PG/EX/82)
Date : 1446H جمادي الأول 12
14 November 2024

Ms Nur Syahirah Rokeman
(Supervisor: PM Dr Wahida Ahmad)
Faculty of Business and Management
UiTM Puncak Alam Campus
42300 Bandar Puncak Alam
SELANGOR

سلام عليكم ورحمة الله وبركاته and Greetings

Ms

ETHICS REVIEW EXEMPTION - UiTM RESEARCH ETHICS COMMITTEE

Thank you for submitting your research proposal to the Research Ethics Committee (REC). After considering your application, the Committee agreed that your proposal titled "Capital Decision of Islamic and Conventional Banks in Developed and Developing Countries: An Interaction Effect of Bank Size" is exempted from ethics review.

Details of the ethics review exemption are as follows:

Ref. number:	REC/10/2024 (PG/EX/82)
Authorised personne:	1. Nur Syahirah Rokeman 2. Assoc. Prof. Dr Wahida Ahmad

The UiTM Research Ethics Committee operates in accordance to the ICH Good Clinical Practice Guidelines, Malaysian Good Clinical Practice Guidelines and the Declaration of Helsinki. The ethics review exemption of this project is conditional upon your continuing compliance with these guidelines and declaration.

If you require further information, please contact the REC Secretariat at 03-55448069/03-55442794 or email at recsecretariat@uitm.edu.my.

اوسها، تقوى، مولىا
"MALAYSIA MADANI"
"BERKHIDMAT UNTUK NEGARA"

Yours sincerely

EMERITUS PROFESSOR DATO' DR RAYMOND AZMAN ALI
Chairman
UiTM Research Ethics Committee

c.c.: Dean (Research and Innovation), Faculty of Business and Management , UiTM

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UiTM di hatiku

APPENDIX 2

List of Sample Islamic Banks in High-Income and Middle-Income Countries

No.	Islamic Banks	Country
1	Al-Arafah Islami Bank PLC	Bangladesh
2	Export Import Bank of Bangladesh PLC	Bangladesh
3	First Security Islami Bank PLC.	Bangladesh
4	Islami Bank Bangladesh PLC	Bangladesh
5	Shahjalal Islami Bank PLC	Bangladesh
6	Social Islami Bank PLC	Bangladesh
7	Standard Bank PLC	Bangladesh
8	Al Baraka Islamic Bank B.S.C. (c)	Bahrain
9	Al Salam Bank B.S.C	Bahrain
10	Bahrain Islamic Bank B.S.C.	Bahrain
11	Khaleeji Bank B.S.C.	Bahrain
12	Bank Islam Brunei Darussalam Berhad	Brunei
13	Islamic International Arab Bank	Jordan
14	Jordandan Islamic Bank	Jordan
15	Safwa Islamic Bank	Jordan
16	Ahli United Bank K.S.C.P.	Kuwait
17	Kuwait Finance House (K.S.C.P.)	Kuwait
18	WARBA Bank K.S.C.P.	Kuwait
19	Affin Islamic Bank Berhad	Malaysia
20	Al Rajhi Banking & Investment Corporation (Malaysia) Bhd	Malaysia
21	Alliance Islamic Bank Berhad	Malaysia
22	AmBank Islamic Berhad	Malaysia
23	Bank Islam Malaysia Berhad	Malaysia
24	Bank Muamalat Malaysia Berhad	Malaysia
25	HSBC Amanah Malaysia Berhad	Malaysia
26	Hong Leong Islamic Bank Berhad	Malaysia
27	MBSB Berhad	Malaysia
28	Public Islamic Bank Berhad	Malaysia
29	RHB Islamic Bank Berhad	Malaysia
30	Standard Chartered Saadiq Berhad	Malaysia
31	Albaraka Bank (Pakistanistan) Limited	Pakistan
32	Bank Islami Pakistanistan Limited	Pakistan
33	Faysal Bank Ltd.	Pakistan
34	AlRayan Bank	Qatar
35	Qatarar International Islamic Bank (Q.P.S.C.)	Qatar
36	Qatarar Islamic Bank (Q.P.S.C)	Qatar
37	Al Rajhi Banking and Investment Corporation	Saudi Arabia
38	Alinma Bank	Saudi Arabia
39	Bank Albilad	Saudi Arabia

40	Bank Aljazira	Saudi Arabia
41	Abu Dhabi Islamic Bank PJSC	United Arab Emirates
42	Ajman Bank PJSC	United Arab Emirates
43	Al Hilal Bank PJSC	United Arab Emirates
44	Emirates Islamic Bank PJSC	United Arab Emirates
45	Sharjah Islamic Bank PJSC	United Arab Emirates

APPENDIX 3

List of Sample Conventional Banks in High-Income and Middle-Income Countries

No.	Conventional Banks	Country
1	AB Bank PLC	Bangladesh
2	Agrani Bank PLC	Bangladesh
3	Bank Asia PLC	Bangladesh
4	City Bank PLC	Bangladesh
5	Commercial Bank of Ceylon PLC	Bangladesh
6	Dhaka Bank PLC	Bangladesh
7	Dutch-Bangla Bank PLC	Bangladesh
8	Eastern Bank PLC	Bangladesh
9	IFIC Bank PLC	Bangladesh
10	Jamuna Bank PLC	Bangladesh
11	Janata Bank PLC	Bangladesh
12	Meghna Bank PLC	Bangladesh
13	Mercantile Bank PLC	Bangladesh
14	Midland Bank PLC	Bangladesh
15	Modhumoti Bank PLC	Bangladesh
16	NRB Bank Limited	Bangladesh
17	NRBC Bank PLC	Bangladesh
18	National Bank Limited	Bangladesh
19	National Credit and Commerce Bank PLC	Bangladesh
20	One Bank PLC	Bangladesh
21	Prime Bank PLC	Bangladesh
22	Pubali Bank PLC	Bangladesh
23	Rupali Bank PLC	Bangladesh
24	SBAC Banks PLC	Bangladesh
25	Sonali Bank PLC	Bangladesh
26	Southeast Bank PLC	Bangladesh
27	Standard Chartered Bank Bangladesh	Bangladesh
28	The Hongkong and Shanghai Banking Corporation Limited (HSBC), Bangladesh Branches	Bangladesh
29	The Premier Bank PLC	Bangladesh
30	Trust Bank PLC	Bangladesh
31	Arab Banking Corporation B.S.C.	Bahrain
32	Gulf International Bank B.S.C.	Bahrain
33	Baiduri Bank Sendirian Berhad	Brunei
34	Arab Bank Plc	Jordan
35	Arab Banking Corporation	Jordan
36	Bank of Jordandan Plc	Jordan
37	Investbank	Jordan
38	Jordandan Ahli Bank Plc	Jordan

39	Jordandan Commercial Bank	Jordan
40	Jordandan Kuwait Bank	Jordan
41	Al Ahli Bank of Kuwait K.S.C.P.	Kuwait
42	Commercial Bank of Kuwait K.P.S.C.	Kuwait
43	Gulf Bank K.S.C.P.	Kuwait
44	Affin Bank Berhad	Malaysia
45	Bangkok Bank Berhad	Malaysia
46	Bank of China (Malaysia) Berhad	Malaysia
47	CIMB Bank Berhad	Malaysia
48	Deutsche Bank (Malaysia) Berhad	Malaysia
49	HSBC Bank Malaysia Berhad	Malaysia
50	Hong Leong Bank Berhad	Malaysia
51	Industrial and Commercial Bank of China (Malaysia) Berhad	Malaysia
52	J.P. Morgan Chase Bank Berhad	Malaysia
53	MUFG Bank (Malaysia) Berhad	Malaysia
54	Malayan Banking Berhad	Malaysia
55	Mizuho Bank (Malaysia) Berhad	Malaysia
56	OCBC Bank (Malaysia) Berhad	Malaysia
57	Public Bank Berhad	Malaysia
58	Standard Chartered Bank Malaysia Berhad	Malaysia
59	Askari Bank Limited	Pakistan
60	Bank of Khyber	Pakistan
61	Habib Bank Limited	Pakistan
62	Habib Metropolitan Bank Limited	Pakistan
63	JS Bank Limited	Pakistan
64	MCB Bank Limited	Pakistan
65	Silkbank Limited	Pakistan
66	Sindh Bank Limited	Pakistan
67	Soneri Bank Limited	Pakistan
68	Standard Chartered Bank (Pakistanistan) Limited	Pakistan
69	The Bank of Punjab	Pakistan
70	Ahli Bank Q.P.S.C.	Qatar
71	Doha Bank Q.P.S.C.	Qatar
72	The Commercial Bank (P.S.Q.C.)	Qatar
73	Arab National Bank	Saudi Arabia
74	The Saudi Arabiadi Investment Bank	Saudi Arabia
75	The Saudi Arabiadi National Bank	Saudi Arabia
76	Abu Dhabi Commercial Bank PJSC	United Arab Emirates
77	Al Khaliji France S.A. - United Arab Emirates Branches	United Arab Emirates
78	Arab Bank Plc, United Arab Emirates Branches	United Arab Emirates
79	Commercial Bank International P.J.S.C	United Arab Emirates
80	Commercial Bank of Dubai PSC	United Arab Emirates

81	Emirates NBD Bank PJSC	United Arab Emirates
82	First Abu Dhabi Bank P.J.S.C.	United Arab Emirates
83	HSBC Bank Middle East Limited	United Arab Emirates
84	Mashreqbank PSC	United Arab Emirates
85	Standard Chartered Bank - United Arab Emirates Branches	United Arab Emirates

APPENDIX 4

Number of Islamic and Conventional Banks in High-Income and Middle-Income Countries

	Islamic Banks	Conventional Banks	Total
High-Income Countries	**32**	**123**	**155**
Bahrain	7	22	29
Brunei	2	7	9
Kuwait	6	14	20
Qatar	4	11	15
Saudi Arabia	5	30	35
United Arab Emirates	8	39	47
Middle-Income Countries	**37**	**112**	**149**
Bangladesh	10	48	58
Jordan	4	16	20
Malaysia	17	25	42
Pakistan	6	23	29
Grand Total	**69**	**235**	**304**

AUTHOR'S PROFILE

Nur Syahirah Rokeman did her foundation in science in 2017 from Universiti Teknologi MARA, Dengkil Campus. Later, she earned her Bachelor in Islamic Banking (Hons.) in 2020 from Universiti Teknologi MARA, Segamat Campus, MSc of Islamic Banking and Finance (2022) from Arshad Ayub Graduate Business School, Universiti Teknologi MARA, Shah Alam Campus and PhD in Business and Management (2025) from the Faculty of Business and Management, Universiti Teknologi MARA, Shah Alam Campus. Her PhD thesis focuses on the capital determinants of Islamic and conventional banks in High-Income and Middle-Income countries in which cost efficiency is seen as one of a potential factor that could influence the relationship between bank diversification and capital level. Throughout her studies, she has actively participated in many extracurricular activities. She joined the Faculty of Business and Management, Postgraduate Student Association during her PhD studies by acting as the treasurer of the association. She also applied in the UiTM Postgraduate Teaching Assistant (UPTA) from 2023 to 2025. At the same time in 2025, she accepted an offer from Universiti Kuala Lumpur Business School as a part-time lecturer, teaching the subject of Introduction to Finance and Personal Financial Management.

LIST OF PUBLICATIONS:

Rokeman, N. S., & Ahmad, W. (2022). Capital Decision of Islamic and Conventional Banks: Evidence from ASEAN Countries. Global Business and Management

Research: An International Journal, Vol. 14, No. 4s., 58-71. https://www.gbmrjournal.com/vol14no4s.htm

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Amran, N. H., Ahmad, W., Rokeman, N. S., Mohd-Zameri, S. N., & Mohamad-Shukri, N. H. (2025). Dynamic Paths to Islamic and Conventional Bank Cost Efficiency: When Size and Profit Collide in HIMI Economies. *Journal of Emerging Economies and Islamic Research*, *13*(2), 8661. https://doi.org/10.24191/jeeir.v13i2.8661

Ahmad, W., Amran. N. H., & Rokeman, N. S. (2026) Capital Resilience in the Carbon Era: Bank Efficiency and Physical Risk Interactions in High-Income and Middle-Income Countries. *Journal Intelek, 21(1),* 125-138. https://doi.org/10.24191/ji.v21i1

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Rokeman, N. S., Amran, N. H., Ahmad, W., Mohd-Zameri, S. N., & Mohamad-Shukri, N. H. (2026). Bank Capital across HIMI Economies over Three Decades: When Profitability Meets the Cycle. *Advances in Business Research International Journal* – Accepted

LIST OF CONFERENCES:

27th Malaysian Finance Association International Conference (MFAIC) 2025 – 26 & 27 November 2025
Bank Capital Resilience in HIMI Countries: The Role of Cost Efficiency under Physical Climate Risk
Curtin University Malaysia, Sarawak

27th Malaysian Finance Association International Conference (MFAIC) 2025 – 26 & 27 November 2025
PhD Colloquium
Curtin University Malaysia, Sarawak

FBM Postgraduate Colloquium 2023 – 18 November 2025
3 Minutes Thesis Presentation
Faculty of Business and Management, UiTM Shah Alam, Selangor

5th Advances in Business Research International Conference (ABRIC 2023) – 27 September 2023
Capital Decision of Islamic Banks: A Study of Developing Countries
Resort World Langkawi, Malaysia

International Conference of Cross Disciplinary Academic Research 2023 (ICAR 2023) – 25 September 2023
Capital Determinants of Islamic Banks in QISMUT Countries
Hotel Perdana, Kuala Lumpur Malaysia

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