An-Najah National University
Faculty of Graduate Studies

MODERATING EFFECT OF M&A ON THE RELATIONSHIP BETWEEN CREDIT RISK AND BANK VALUE

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This Thesis is Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Finance, Faculty of Graduate Studies, An-Najah National University, Nablus - Palestine.

2024

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Dedication

Dear Dr. Bayan Arqawi,

During my academic journey, where its path seems dark and challenging, your constant support and insightful guidance have been the beacon that illuminated my way. The depth of your knowledge and your genuine kindness have left an indelible mark on my personal development and aspirations.

This thesis stands as fruitful effort and a testament to the enduring value of your influence.

With a grateful heart, thank you for being my friend, my mentor, and my inspiration.

Acknowledgements

This thesis would not have been possible without the enriching academic environment provided by An-Najah National University and the outstanding contributions of its staff. I extend my deepest gratitude to them.

Dr. Islam Abdeljawad, who taught me the intricacies of conducting research, instilling in me the rigor and dedication required to explore and contribute new knowledge to academic field.

Dr. Muath Asmar, for imparting fundamental principles and introducing me to major issues of current concern to investors, enriching my understanding and sparking a deeper curiosity about the financial world.

Dr. Ra'fat Al-Jallad, my esteemed thesis supervisor, whose guidance was the cornerstone of this work. From the initial concept to the final submission, his expertise and insight were critical in navigating the challenges of research. His patience and constructive feedback not only honed this thesis to its current form but also profoundly influenced my approach to scholarly inquiry and critical thinking.

To the rest of my esteemed professors, including Dr. Shatha Qamheih and Dr. Mohammad Talalweh (from Al-Quds Open University), who both added the final touches to this thesis, elevating it to the academic standard it has achieved. Their insights and feedbacks have been instrumental in refining this work.

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

MODERATING EFFECT OF M&A ON THE RELATIONSHIP BETWEEN CREDIT RISK AND BANK VALUE.

I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: **Ahmad Walid Ramadan Tina**

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Date: **07/02/2024**

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Abstract

This thesis explores the moderating effect of horizontal mergers and acquisitions on the credit risk-bank value relationship. The current literature neglects the moderating analysis that can more transparently explain this complex relationship; relies heavily on event studies, which have misspecification issues in capturing long-term value; and exhibits bias in assessing credit risk. Thus, this thesis utilizes moderating analysis, captures value via the market-to-book ratio, a well-theoretically established measurement, and assesses credit risk via the net charge-offs ratio, a metric resistant to managerial discretion. The sample consists 110 bank holding companies over twenty-three years, and it is analyzed via fixed effects regression and the quantile model.

The results show that credit risk negatively affects bank value; however, this effect becomes less pronounced for larger banks. Moreover, horizontal mergers and acquisitions enhance bank value and further intensify the negative credit risk-bank value relationship, particularly in institutions with higher valuations.

When evaluating expected wealth in a banking institution, investors should assess the bank's credit risk profile and size. Practitioners and regulators should be more stringent in managing and monitoring credit risk for smaller banks. Mergers and acquisitions offer growth options; however, investors should target low-valued and sound banks, while practitioners should effectively manage credit risk. Regulators should restrict unsound and high-valued banks from engaging in these events.

Keywords: bank value, credit risk, M&A, moderating, panel regression.

Chapter One
Introduction

1.1 Introduction

Banks are one of the essential financial institutions. They offer various financial services, including deposit taking, loans and credit facilities, currency exchange, and money transfer. Banks core activity inherently exposes banks to credit risk. Saunders et al. (2021) define credit risk as the risk that the expected cash flows from loans held by financial institutions, such as banks, may not be paid in full. When borrowers fail to repay their loans, banks are directly affected, leading to financial losses that may affect their financial performance. Credit losses substantially influence bank performance (Fiordelisi & Molyneux, 2010). Boussemart et al (2019) decompose the bank performance into two components: credit risk efficiency, which is related to the volume of bad loans, and economic efficiency, which is related to income. By decreasing bad loans banks can simultaneously increase their income. Ekinci & Poyraz (2019) suggests controlling and monitoring bad loans due to the inverse relationship between credit risk management and profitability of banks.

The banking industry witnesses extensive and ongoing M&A (Beccalli & Frantz, 2009). According to Statista Research (2023b), the United States (U.S.) recorded various bank M&A deals from 2018 to 2022, with the numbers and total size of these deals varying each year. In 2018, there were 253 deals valued at $29.58 billion; in 2019, 256 deals valued at $55.15 billion; in 2020, 112 deals valued at $27.93 billion; in 2021, 201 deals valued at $76.69 billion; in 2022, 162 deals valued at $8.95 billion. The activities of M&A directly impact the value of participating banks (Hankir et al., 2011; Leledakis & Pyrgiotakis, 2022). However, M&A also affects the credit risk profile of banks, whether by increasing loan losses (Rose, 1987), raising the probability of default risk (Vallascas & Hagendorff, 2011), or heightening the expected variability in bad loans and charge-offs (Knapp & Gart, 2014).

During the Global Financial Crisis (GFC) from 2007 to 2008, banks cut their lending. As well, new loans to large borrowers dropped by more than 75% compared with the pre-crisis credit boom (Ivashina & Scharfstein, 2010). This significant lack of funding explained by García et al (2013), who points out that in times of financial crises, the

banking industry can incur major losses due to unpaid credits. The GFC revealed major shortcomings in adequately identifying credit risk (Laurent et al., 2016). Moreover, the GFC highlighted issues with the accounting standards related to the provisioning of loan losses during the crisis, banks heavily used loan loss provisions to smooth their income (El Sood, 2012).

Basel III framework, introduced in 2010 following the GFC, changed the structure of capital to meet the minimum capital adequacy ratio and increased the capital requirements for risky assets. Moreover, it enhanced the transparency of banks and emphasized the importance of good risk management, especially after the overestimation of the accuracy of risk assessments by credit institutions that are "too big to fall", and the overreliance on assessments provided by rating agencies.

While Boussemart et al (2019); Ekinci & Poyraz (2019) demonstrate how credit risk influences the income or profitability of banks, Handorf (2011) emphasizes the importance of risk and profitability on the value of banks. Hedging credit risk benefits the value of banks (Kim, 2023). Schuster (2000) clarifies value in the context of shareholders, stating that management must establish policies aligned with the interests of shareholders, by increasing dividends and ensuring higher share prices. In the banking industry, Gross (2006) illustrates that maximizing shareholders value is a vital necessity for banks to exist. Unlike non-banking institutions, banks must back their operations with equity capital. As a result, the growth of banks' operations is conditioned upon the provisioning of capital.

Mergers and acquisitions (M&A) is a common phenomenon in the banking industry (Paroush, 1995). Merger indicates that two institutions agree to forfeit their independence to form a single entity, whereas acquisition refers to one institution purchases a majority stake of the equity capital of another and becomes the controlling owner (Hassan et al., 2018). The term M&A is used loosely because it encompasses various structures. Bank-to-bank M&A falls under the category of horizontal M&A. This type of M&A involves merging two institutions that manufacture and/or sale of the same products and/or services (Ramaswamy, 1997). M&A deals between banks cause shifts of billions of dollars and change the market values of involved parties, for better or worse (Hankir et al., 2011). M&A between banks does not only influence their value; Rose (1987)

observes that following M&A, credit availability, particularly to businesses and real estate, and loan losses, tend to increase. In some situations, M&A between banks may be risk-neutral, but it can also significantly increase the default risk, especially for relatively safe banks (Vallascas & Hagendorff, 2011). This increase in default risk post-M&A occurs despite the potential benefits of asset diversification (Furfine & Rosen, 2011).

Montgomery & Takahashi (2014) examine the effect of bank M&A on both value and credit risk. For value creating, some evidence suggests the existence of excess returns; however, those returns do not persist for a full year. For credit risk, it increases after one year following the M&A. Adhikari et al., (2023) also evaluate the impact of M&A on bank value and credit risk, finding positive and negative differences in banks' value, depending on the value creation measurement, between pre-and post- M&A periods; however, the difference in banks' credit risk is insignificant. While both Adhikari et al. (2023) and Montgomery and Takahashi (2014) show how value and credit risk are affected due to M&A, they do not utilize an analytical method to interrelate the influences on value and credit risk, apart from naturalistic observation. Addressing this limitation, Amihud et al., (2002) examine how M&A changes the total risk of acquiring banks and then investigate the stock price response to this change in risk resulting from M&A. Although the stock price reacts negatively to the M&A announcement, the main findings reveal that M&A do not significantly change the risk of acquiring banks. In some cases, an increase in total risk is associated with a weak positive stock reaction. The results are mostly insignificant or weak and only cover a period of ten days before the M&A announcement and one day after. With such a short period of time and using risk and value metrics based solely on the stock prices, like variance and abnormal returns, it is challenging to fully capture the change in risk and value due to M&A, and the relationship between these changes.

The quick pace in the twenty-first century business world increases exposure to risk in M&A, impacting the successful creation of value. Developing a clear logic for value creation is a critical foundational stage of the M&A process (Caiazza & Volpe, 2015). Institutions and banks that have a comparative and coordinated risk management are able to enhance their values (Schrand & Unal, 1998; Stulz, 1996). Regardless of the direction of the relationship between credit risk and bank value as studied in (Simoens

& Vennet, 2021; Calomiris & Nissim, 2014), the importance of this thesis lies in its ability to uncover whether M&A exacerbate or mitigate the negative effect of credit risk on bank value, or alternatively, whether they enhance or reduce the positive effect of credit risk. The findings will guide whether M&A activities should be restricted or permitted based on their approach to managing credit risk in these transactions. This insight is important for investors and regulators, since credit risk and value are both considered crucial determinants for surviving in the banking industry (Imbierowicz & Rauch, 2014; Gross, 2006).

1.2 Problem Statement

Cowan et al (2022) examine the long-term effects of acquisitions of failed banks on shareholders' wealth and default risk, using event study. They find that the value created from M&A does not stem from the increase in default risk associated with acquiring failed banks. Hassan & Giouvris (2020) examine how mergers between banks affect shareholders' value through the event study and observed performance method. They analyze the changes from pre-M&A to post-M&A and discover that cross-border M&A between banks allows for a significant decrease in credit risk that is associated with enhancements in value.

Hassan & Giouvris (2020) neglect to utilize moderating analysis in reaching their findings. The lack of inclusion a moderating variable makes capturing the complex nature of business problems incomplete and less transparent (Namazi & Namazi, 2016). Although Cowan et al. (2022) utilize moderation analysis, they use the buy-and-hold abnormal returns (BAHR) as a benchmark for value and Moody's default probability for modeling credit risk, with their sample focusing specifically on the GFC era and M&A transactions involving failed banks. The BAHR method, characterized by a poorly specified asset pricing model and sensitivity to the problem of cross-sectional dependence (CD) in samples, is thus recommended to be performed across many financial markets and over different time periods; additionally, the issue of misspecification in BAHR is pervasive in nonrandom samples (Lyon et al., 1999). The accuracy of risk assessments provided by credit institutions is found to be overestimated during the GFC (Sbârcea, 2014). In order to address these gaps, this thesis employs moderating analysis, measures value outside the event study methodology, assesses credit risk independently of credit rating agencies, and expands the sample to include

periods both before and after the GFC era, and does not focus on M&A of failed institutions.

1.3 Objectives

This thesis delineates three primary objectives: firstly, to analyze the impact of credit risk on bank value. Secondly, to examine the influence of horizontal M&A on bank value. Thirdly, to explore how horizontal M&A affects the strength and/or the direction of the relationship between credit risk and bank value.

1.4 Research Questions

This thesis poses three questions (Q):

Q1: What is the affect credit risk has on the bank value?
Q2: What is the affect M&A has on the bank value?
Q3**:** How does the occurrence of M&A moderate the relationship between the credit risk-bank value relationship?

1.5 Contribution

This thesis contributes to the existing academic literature related to the relationships between credit risk and bank value, and between horizontal M&A and bank value. It provides additional evidence of these relationships using a different sample and more recent time periods. This offers fresh insights that enable investors and bank managers to evaluate the implications of credit risk and horizontal M&A transactions on bank value.

Additionally, the thesis enriches the academic literature by examining whether horizontal M&A significantly influence the strength and/or the direction of credit risk-bank value relationship. Analyzing the moderating aspect of horizontal M&A in the credit risk-bank value relationship provides various stakeholder with applicable insights. For bank investors, it enables more precise predictions about increasing and/or saving their wealth through engaging in M&A. For risk management, it allows for the development of a credit risk strategy that is harmonized with M&A operations to enhance and/or save bank value. For policymakers, understanding the impact of credit risk on bank value under the conditions of M&A can lead to the enactment of better

laws and controls that protect the economy and/or banks customers from potential consequences of M&A transactions.

1.6 Thesis Structure

Following this chapter, the structure of the thesis is as follows: Chapter 2 reviews the literature to develop the hypotheses. Chapter 3 presents the methodology, from design to data collection and analysis methods. Chapter 4 presents the results of the different analyses. Chapter 5 discusses the results that correspond to the hypotheses. Finally, Chapter 6 concludes the thesis, highlighting its limitations and providing recommendations.

Chapter Two

Literature Review

2.1 Understanding Value

2.1.1 Concept and Importance

Schuster (2000) clarifies the concept of value in the context of shareholders. Financial management must establish institutional policies that align with the financial goals of the shareholders. The primary focus of management is to maximize shareholders' wealth. This involves increasing dividends and ensuring higher share prices as the exclusive targets.

Uyemura et al (1996) point out that maximizing the market capitalization of an institution is not as same as maximizing its shareholders wealth. Wealth creation occurs when management widens the spread between the market value of capital and the historic value of invested capital; the positive amount reflects the realized returns in excess of the cost of the capital being invested.

Maximizing shareholders value is crucial for the survival of banks. In contrast to non-financial institutions, banks are required to support their operations with equity capital. As a result, the growth of banks' operations is fundamentally reliant on the provision of capital. Increasing shareholder value facilitates access to equity capital (Gross, 2006). Banks operate under stringent capital adequacy regulations; even a mistake in a small portion of assets can destroy the majority portion of equity due to its limited capacity of absorbing losses (Boffey & Robson, 1995).

2.1.2 Measurement

Gross (2006) presents the different valuation methods and their applicability to banks. Among the most widely used market-oriented approaches, the market price to earnings per share (P/E) ratio lacks a forward-looking perspective because it relies on historical earnings as an approximate value for future earnings. This method does not consider risk, which plays a crucial role in assessing future bank performance. If this method relies on short-term high earnings growth, a reduction in longer-term earnings can cause the destruction of shareholders' value. Moreover, the P/E ratio tends to overvalue growing banks that generate high interest income. Furthermore, it can be manipulated in

bank risk management, for example, by building up provisions. Another widely used market-oriented approach is the market-to-book ratio (M/B). This measurement relates the market's expectations of a bank's future performance to invested capital, making it forward-looking. Moreover, it has a strong relationship with banks' profitability. Asset-oriented approaches, such as the net asset method based on replacement or liquidation costs, do not reflect the true value of a bank because they exclude intangible assets from the valuation. The discounted cash flow-oriented approaches are good tools for measuring shareholders' value, but they are complex. Similarly, residual income-oriented approaches, such as Economic Value Added (EVA) are effective tools, but calculating one of their components; the cost of capital, is complex.

The standard market value added measure is the ultimate measure of shareholder wealth creation, which is analogous to the M/B (Uyemura et al., 1996). Among the five value creation measures, the Market Value Added (MVA), the market-to-book ratio (M/B), and Tobin's Q ratio are considered appropriate measures of value creation. (Hall, 2018). The Tobin's Q ratio is both a theoretical and empirical measure, equivalent to the M/B in terms of value creation (Varaiya et al., 1987).

The academic literature shows that the event study methodology is extensively used to capture the value creation of M&A (Caiazza & Volpe, 2015). However, Hall (2018) finds that stock returns are not an appropriate measure of value creation.

Lyon et al (1999) find that using the event study methodology to calculate long-run abnormal returns is pervaded with misspecification bias in nonrandom samples. This can be due to skewness bias, rebalancing bias, new listing bias, CD, and/or a bad model of asset pricing. The skewness bias occurs when long-run abnormal stock returns are more pronounced on the right side of the distribution. The rebalancing bias occurs when the compound returns of a benchmark, such as a portfolio or index, are calculated assuming periodic rebalancing, while the compound returns of a security are calculated without rebalancing. The new listing bias occurs when including new listing firms in the benchmark, which typically underperform the benchmark, thus decreasing the estimated long-horizon returns. CD can lead to over rejection of the null hypothesis.

2.2 Overview of Credit Risk

2.2.1 Definition and Importance

Koulafetis (2017) describes credit risk as the risk of financial loss due to a borrower, bond issuer, or counterparty failing to meet their financial obligations. Such failures can arise from either an inability to pay or an unwillingness to pay. Financial losses due to the debtors' unwillingness to pay can occur from disagreements about the validity or terms of the financial contract or in highly leveraged transactions without equity participation. In most cases, credit risk arises from the debtor's inability to make payments. This inability to pay is related to the concepts of default, insolvency, and bankruptcy. Insolvency refers to a situation where the debtor's liabilities exceed its assets. Bankruptcy is a legal term that places court supervision over the financial affairs of an insolvent or defaulter and occurs when the court intervenes following the debtor's request for protection. Default refers to the missed or delayed payment of a contractual obligation, a bankruptcy filing, or the legal receivership of the debtor, which may result in one or more missed or delayed payments in the future. Credit risk is associated with nine products and transactions: deposits, loans, leases, bonds, repurchase agreements, derivatives, accounts receivable, prepayments for goods or services, and contingent claims.

Ngo (2019) shows that the terms credit risk and default risk are essentially synonymous, and they can be used interchangeably.

Credit risk reduces bank income (Boussemart et al., 2019); profitability (Ekinci & Poyraz, 2019), and financial performance (Fiordelisi & Molyneux, 2010). The loosening of credit policy and poor management of monitoring and screening borrowers magnify the negative impact of credit risk on bank profitability (Abbas et al., 2019).

The impact of credit risk is not limited to reducing profitability or income; it is also a crucial factor for bank survival. Imbierowicz and Rauch (2014) demonstrate that credit risk significantly affects the probability of bank default. The capacity of banks to absorb loan losses is limited due to their low levels of capital (Boffey & Robson, 1995).

Furthermore, credit risk plays a pivotal role in determining stock returns. Under the credit risk puzzle, institutions with low credit risk realize higher stock returns than those

with high credit risk, contradicting the fundamental risk-return tradeoff principle in finance (Avramov et al., 2009).

2.2.2 Management and Measurement

Boffey & Robson (1995) present various systems for managing credit risk, such as risk rating systems, pricing for risk systems, loan loss prediction systems, and loan portfolio management systems. Risk rating systems essentially assign a grade that provides information about the composition and risks inherent in a bank's loan portfolio. Pricing for risk systems involves pricing loans based on models linked to risk. Loan loss prediction systems are an actuarial calculation for expected losses on loans over a given time period and unexpected losses. Loan portfolio management systems basically involve diversifying the portfolio of loans.

Calomiris & Nissim (2014) utilize and discuss the four credit risk measures that exist in financial statements: allowances for loans and losses, non-performing loans (NPL), provisions for loans and losses, and net charge-offs. Allowances, non-performance and provisions are discretionary in nature, which means they are determined based on the judgment and choices of the bank management. Hence, their meaningfulness as credit risk measures is reduced. Moreover, allowances and NPL do not reflect the entire accounting period. Although charge-offs are also influenced by bank management, net charging-offs are less sensitive to management discretion because charge-off policies are counterbalanced by recoveries.

Wahlen (1994) explains NPL as those overdue by more than 90 days on interest or principal payments. Loan loss provisions are estimates of expected future loan losses for the current period. Charge-offs denote asset write-offs, which are actual losses that measure all loans deemed uncollectible. Although charge-offs are reported in the footnotes of financial statements, they can be derived from the balance sheet and income statement. Calomiris & Nissim (2014) explain that any difference in allowances is a result from subtracting the net charge-offs from provisions.

In empirical studies, Ekinci & Poyraz (2019) use NPL as a credit risk indicator. Kanagaretnam et al (2009) measure credit risk exposure using net charge-offs, which are the difference between loans written off and recoveries on loans previously classified as uncollectible.

Baele et al (2007) utilize loan loss provisions as a proxy for credit risk. These are amounts of cash reserved based on management's evaluation to absorb unexpected losses from bad loans and leases, thereby signaling the quality degree of banks' loan and lease portfolios. Calomiris and Nissim (2014) divide allowances by gross loans to calculate credit risk.

2.2.3 Impact on Bank Value

Handorf (2011) demonstrates that risk and profitability are important determinants of bank value; complementing this, Burke and Wieland (2017) show that financial markets incorporate operating cash flows into share prices more for banks with lower percentages of NPL than for those with higher percentages. Even without establishing a direct link between income and NPL, Kim and Lee (2020) find that NPL are the most informative distress measure for predicting future bank stock returns. Avramov et al. (2009) show that institutions experiencing lower credit risk generate higher stock returns compared to those with high credit risk.

Abedifar et al. (2018) find that, on average, the franchise value of U.S. commercial banks is negatively influenced by credit risk in a study focusing on a sample of banks with assets valued between $100 million and $1 billion. Hughes and Moon (2022) expand this finding by examining a broader range of bank sizes and categorizing them into five distinct groups. Their results show that banks sized from under $1 billion to under $250 billion experience a negative impact of credit risk on bank value. However, this trend does not hold for banks larger than $250 billion, which, despite facing the highest credit risk among the groups, do not show a negative effect. This result is explained by market discipline, which differently rewards risky lending strategies in larger banks compared to smaller ones. In Europe, Cipollini and Fiordelisi (2012) show that credit risk is one of the most influential determinants of distressed shareholder value in European commercial banks. In Spain, Salas and Saurina (2003) observe that banks with lower charter values tend to have higher credit risk. In Japan, Radić (2015) demonstrates that credit risk is an important factor in explaining value creation in both listed and non-listed banks.

Simoens & Vennet (2021); and Beaver et al (1989) find that NPL negatively impact the M/B. Yildirim & Efthyvoulou (2018) also find that NPL reduce the Tobin's Q ratio,

particularly during periods of financial distress. As well, they note that Tobin's Q is an equivalent measure to the M/B.

When value is again represented by the M/B, but credit risk is indicated by the net charge-offs ratio, Calomiris & Nissim (2014) find that this ratio also decreases the M/B; however, during recession periods, such as the GFC, it has a positive influence on bank value, as charging off loans during recessions signals strength through the bank's willingness to recognize more provisions. Deng & Elyasiani (2008) find a positive relationship between the net charge-off ratio and the Tobin's Q ratio, which is an equivalent measure to the M/B.

Provisions for loan losses, serving as a measurement of credit risk, positively influence the M/B (Simoens & Vennet, 2021). Investors interpret the increase in loan loss provisions as good news, signaling strong future expected earnings; furthermore, by increasing these provisions, banks are also able to absorb potential losses (Dimitropoulos et al., 2010). Additionally, Allowances for loan losses positively impact the M/B, which is typically due to the signaling of earning power (Beaver et al., 1989). During good times, banks with more loan loss provisions realize higher earnings and loan growth; however, in periods of distress, such banks experience a significant increase in NPL (Hegde & Kozlowski, 2021).

Despite the prevailing positive impact of loan loss reserves on bank value due to signaling, Docking et al (1997) argue that these reserves are bad news and that simply looking at their announcements results in negative event period returns; however, this negative impact is rare because these reserves are often accompanied by favorable earnings announcements, not reductions in dividends or losses. Additionally, considering provisions as good news is conditioned on changes in NPL and charge-off (Wahlen, 1994).

Empirical findings supporting a positive relationship between credit risk and bank value do exist, but these results are conditional. In general, credit risk negatively influences the value of banks. Therefore, the first hypothesis (H_1) is proposed as follows:

H_1: Credit risk has a significant negative effect on bank value.

2.3 Overview of M&A

2.3.1 Drivers

DePamphilis (2011) explains 11 motivations that drive institutions into M&A activities: operating synergy, financial synergy, diversification, strategic realignment, hubris, Q-ratio, agency problems, managerialism, tax considerations, market power, and misvaluation.

Synergy refers to the shareholder value created by combining two or more businesses, which is greater than if they operated separately, and it can take the form of either operating or financial synergy. Operating synergy arises from improvements in operational efficiency, such as cost reduction. Financial synergy, on the other hand, typically involves reducing the cost of capital for the acquiring or merged institution.

Diversification not only reduces the cost of capital but also increases the growth of the acquiring or merged institution towards new products or markets. However, it should be noted that investors often value more diversified institutions at a discount compared to more focused institutions because the risk of falling short of providing full funding to the most attractive investment opportunities increases.

Strategic realignment relies on acquiring capabilities to better adapt to environmental changes, such as technological, regulatory, and political changes, thereby creating new growth opportunities and eliminating threats.

Hubris occurs when the management of the acquiring institution believes that their valuation of the target is more accurate than the market's valuation, thus leading to overly optimistic projections of potential synergy. Similar to Hubris, but without relying on management projections, the Q-Ratio strategy involves acquiring businesses when their cost of equity is known to be less than the actual cost of the assets, such as the physical buildings.

The agency problem can be remedied by replacing management that does not act in the owners' interests. The threat of M&A puts pressure on managers to take actions that raise the share price. In the absence of agency problem, a managerialism driver tends to increase the size of the acquiring institutions, which, in turn, enhances their power and

earnings growth capabilities. This ultimately leads to an increase in the market value of the acquiring institution.

An acquiring or merged institution can benefit from the unused net operating losses and tax credits of the target company to offset its total taxable income. Moreover, M&A activities can increase the market power of an acquired or merged institution, making it more monopolistic and improving its ability to set prices above those of its competitors.

M&A can benefit from misvaluation in stock markets. When the share price of the acquiring institution is overvalued, the share-for-share exchange method can be used to finance the acquisition transaction, thereby paying less than if the transaction were made using a cash-paying method.

2.3.2 Impact on Bank Value

In the U.S. banking industry, M&A are value-creating events due to accomplished synergy in both expansion and distress periods, although the effect is greater in good periods (DoĞAn & Yildirim, 2017). Cornett & Tehranian (1992) find that banks engaged in M&A outperform the U.S. banking industry, and their created value is significantly correlated with improvements in the growth of loans, deposits, productivity, and profitability. If value is represented by the Tobin's Q ratio, an equivalent to the M/B, and M&A is referred to by a dummy variable set to 1 for a U.S. banking holding companies (BHC) involved in M&A, Deng & Elyasiani (2008) find that M&A increases the value of acquiring or merging banks.

Hassan & Giouvris (2020) distinguish between creating short run value and long run value, and find that bank-to-bank M&As in the same jurisdiction create value for the short run, while cross-border bank-to-bank M&As create value for the long run.

DeLong (2003) finds that, on average, bank M&As do not create value; financial markets reward M&A participants when they maintain their focus on the same earning streams, geography, and activities instead of focusing on diversification. In financial institutions, the diversification strategies of M&A do not influence the shareholders' value for bidders (Hassan & Giouvris, 2020). Madura & Wiant (1994) observe that the valuation effects are more favorable for banks when they make M&A within their market and have relatively poor performance and growth before making the M&A. The

more mature the banking industry in a country, the more difficult it becomes for banks to gain value through M&As operations (Kolaric & Schiereck, 2014). Banks can gain greater value when they acquire failed banks than when they acquire non-failed banks (Cowan et al., 2022); furthermore, acquirers' shareholders can benefit from M&As when acquiring underperforming targets (Goddard et al., 2012). Small bank M&As generate more shareholder wealth compared to larger deals (Leledakis & Pyrgiotakis, 2022). Asimakopoulos & Athanasoglou (2013) observe that acquiring smaller and less efficient banks, which generate more diversified income, creates more value.

Banking participants in M&As may either increase or decrease their value (Hankir et al., 2011). Madura & Wiant (1994) find that banks generally do not create value through acquisitions; their stock prices react strongly and negatively after the acquisition, continuing this trend for over three years. Bozos et al (2013) observe that in large M&A deals, often described with the saying "too big to fail", the acquirers' shareholders suffer from negative abnormal returns over one and two years after the M&A, as well as over prolonged periods. Additionally, Tampakoudis et al (2020) find that completing M&As during the GFC destroys the value of acquiring banks for the Greek financial market.

Goddard et al (2012) find that, on average, M&As in the banking industry do not decrease shareholder value. Kolaric & Schiereck (2014) review over 75 event studies of bank M&As to find that seventeen studies report a significant positive increase in shareholders' value for the combined unit of target and acquirer, and only one study reports a significant negative decline in value. This negative result stems from examining a sample specific to the Asian financial crises for Asian banks.

Bank-to-bank M&A may add value or take it away. Value generation is favored in the majority of M&A literature. Thus, the following is how the second hypothesis (H_2) is put forth:

H_2**:** Horizontal M&A has a significant positive effect on bank value.

2.3.3 M&A's Moderating Role

Vallascas & Hagendorff (2011) find that, on average, bank M&As are risk-neutral. However, safer acquiring banks incur a significant increase in default risk when they engage in M&A deals, which can be justified when the deal involves a riskier target.

Additionally, this significant increase in default risk is prevalent in large M&A deals, which constitute organizational and procedural obstacles, those driven by activity diversification motives, and weak bank regulatory regimes.

Ngo (2019) finds that M&As between banks can be used as a method of risk exposure reduction. This is because bank-to-bank M&As significantly reduce the default risk of acquiring banks. However, this reduction is conditional on the characteristics of the M&A deal. Bidders characterized by higher performance and product diversification before the M&A transaction show a reduction in default risk after the completion of the M&A. On the other hand, M&As increase the default risk of the combined banks when the acquirer is much more leveraged compared to other peers in the industry and the target is a private institution. It is also shown that large M&A deals are associated with an increase in default risk due to the presence of a significant negative relationship between deal size and default risk.

Cowan et al (2022) focus specifically on the GFC era and M&A transactions involving failed banks, finding that the value created from M&A does not come from the increase in default risk associated with acquiring failed banks. Moreover, acquiring a failed bank does not increase the default risk of the acquirer, either in absolute terms or relative to open market M&As transactions, even though these M&A occur during the GFC and with already defaulted institutions.

Knapp & Gart (2014) find a significant shift towards higher-risk loans in BHCs' asset portfolios post-M&As. These types of loans are characterized by a high percentage of charge-offs and NPL, and during periods of distress, they can cause large losses that are enough to threaten the survival of the bank. Additionally, the standard deviation of BHCs' loan portfolios increases significantly post-M&As. This risk increase seems to be intentional. In order to enhance the price of BHC's stock following the M&A, banks take more risk in granting risky loans with higher returns to show higher profitability. The management believes that the risk reduction benefits from M&A diversification can offset the risk coming from granting riskier loans.

Hassan & Giouvris (2020) find that local bank to bank M&As decrease credit risk along with an increase in value. Additionally, European cross border bank to bank M&As decrease the credit risk significantly with improvements in value. This reduction is

particularly due to diversifying the bank's loan portfolio, which enables the bank to advance its credit risk strategies. With the exception of European cross border M&A, the value creation appears to be associated with higher credit risk when banks merge or acquire another bank in a different country or state. This is probably due to cultural and procedural hurdles.

Altunbaş & Marqués (2008) explain how strategic similarities influence the post-M&A performance of bank-to-bank deals. When the parties in M&As have different credit risk and lending strategies, it harms the post-M&A performance of the combined entity. However, this negative influence changes in cross-border M&As. The greater the heterogeneity in credit risk and lending strategies between the acquirer and the target, the greater the improvements in performance. This difference between domestic and cross-border M&As can possibly be explained by the existence of managerial conflicts and higher integration costs in domestic M&A deals, while in cross-border M&A, there is an existence of complementarities between the acquirer and the target.

Shirasu (2018) finds that in Asia, banks show a significant increase in M/B after a year of completion of an M&A, as well as a significant increase in NPL. The increase in value becomes insignificant after that period; however, the increase in NPL remains significant over the three years following the completion of the M&A. This increase in NPL prevents acquiring banks from making profits, though M&A enables them to issue more new loans. Rose (1987) reaches a similar result in the U.S. market; in the years following the M&A, the acquiring banks, on average, show an increase in loan losses along with an increase in loans compared to assets. In Europe, Asimakopoulos and Athanasoglou (2013) find that acquiring banks that are characterized by higher credit risk, in addition to low efficiency and liquidity, is not a value-creating choice.

Knapp et al (2005) observe that the market reacts negatively to the announcements of M&As between BHC. Their profitability post-merger is below the industry average. This poor post-M&A performance is mostly caused by problems with credit quality. It is observed that the credit quality for acquirers is significantly better before the M&A transaction than it is post-M&A. One explanation for this difference between pre- and post-M&A is errors in management decisions.

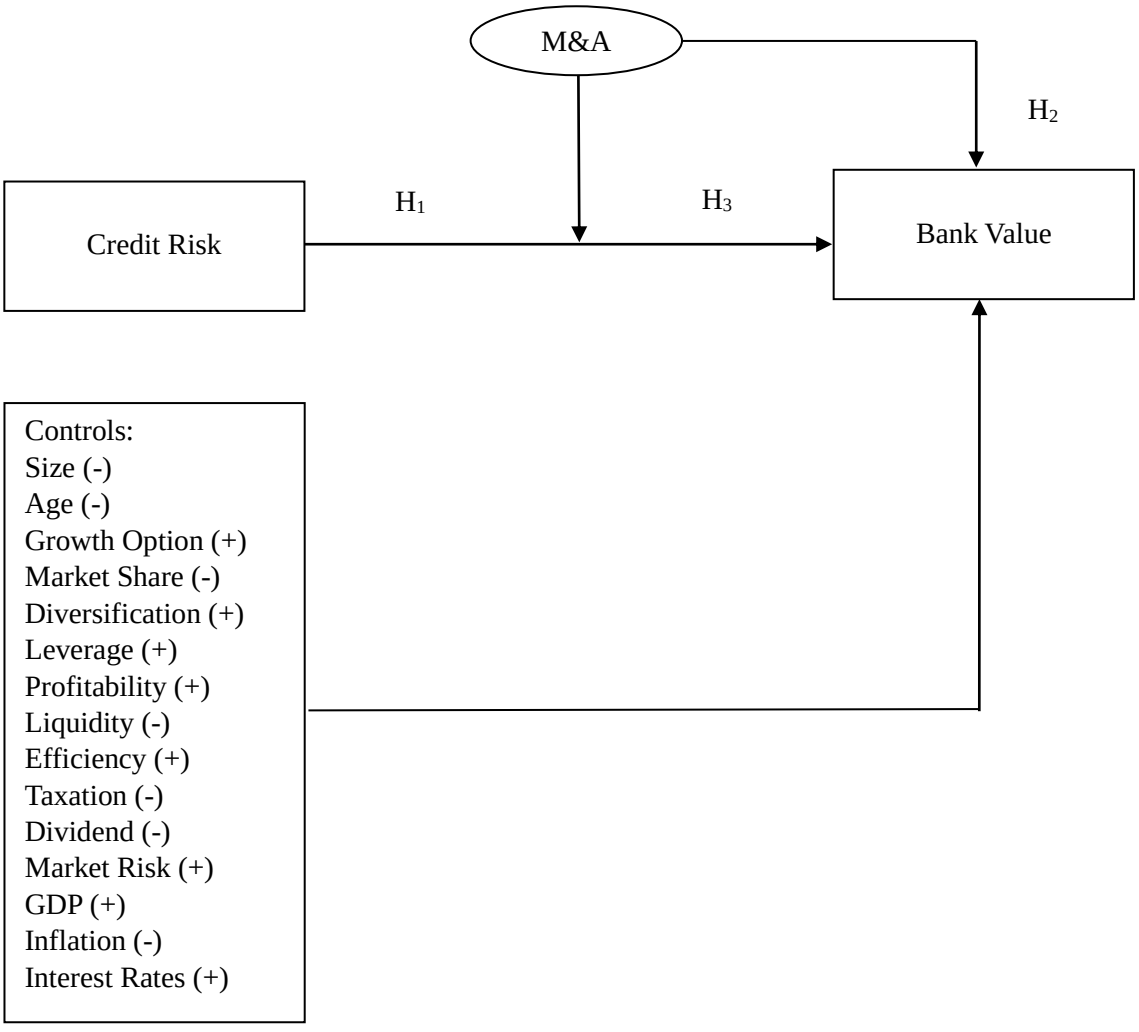
The academic literature shows that horizontal M&As between banks lead to a change in value and credit risk post-M&A. The change in value can possibly be associated with the change in credit risk. Therefore, the third hypothesis (H3) is proposed as follows:

H_3**:** Horizontal M&A significantly moderates the credit risk-bank value relationship.

2.4 Conceptual Framework

Figure 1

Conceptual Framework



Source: by author.

2.5 Controls

2.5.1 Size

Baele et al (2007) measure bank size as the natural logarithm of total assets and find this measure to be negatively related to the franchise value of banks. Deng & Elyasiani (2008) find a negative relationship between bank size and Tobin's Q ratio. Fu et al., (2014) find that bank size positively impacts bank value; however, as time progresses, the effect becomes negative. This change can be explained by the synergy gains that are realized in the early stages of expansion or consolidation.

2.5.2 Age

Pástor & Pietro (2003) find that age is negatively related to M/B. Younger institutions are considered to be highly profitable; as such, they are observed to have higher valuations than older institutions. Additionally, even when controlling current and future profitability along with age, the over-optimistic view of irrational investors about the future profitability of younger institutions leads them to value these institutions higher. Therefore, the importance of age comes from capturing market inefficiency that influences the value of banks.

Moreover, by controlling age, it is possible to more effectively control the diversification driver on bank value; the diversification effect on bank value of older, more experienced banks differs from that of younger banks (Yildirim & Efthyvoulou, 2018).

2.5.3 Growth Option

Avramidis et al (2018) find a positive impact of income growth on the M/B. Financial markets incorporate expectations for future growth, which in turn, is reflected in value. Weak growth opportunities are associated with larger M&As, which are considered an unfavorable signal, leading to a negative response from financial markets. Therefore, the importance of controlling growth option comes from capturing the size of deals and investors' expectations that influence the value.

2.5.4 Market Share

Most expansion strategies in M&A for banks aim to gain market share; even though the relationship between bank market share and bank value is negative (Jones et al., 2011).

Controlling market share of loans captures the competition effects and market power, but the effect of market share on bank value is inconsistent, alternating between positive and negative (Avramidis et al., 2018).

Acquiring market power is one of M&A motivations (DePamphilis, 2011). The importance of controlling the market power and competition is capturing the changes in risk-aversion and return seeking attitudes of banks. These both attitudes are subjected to competition and market power factors (Beck et al., 2007); risk and return are important determinants of value (Handorf, 2011).

2.5.5 Diversification

Avramidis et al (2018) find a negative impact of diversification on the M/B. Baele et al (2007) find that the impact of diversification is positive on value; however, this positive effect does not indicate that the unlimited diversification is optimal.

Diversification is one of the drivers of M&A (DePamphilis, 2011), therefore, it is important to control for it during M&A events. Diversification allows banks to influence both their credit risk and value through co-insurance and internalization effects (Hansen & Lott, 1996; Lewellen, 1971). In financial markets, banks that shift their revenue from lending services to fee services outperform the banking industry. This is because the profitability in making loans is less due to increasing credit risk in lending activates (Jordan et al., 2011).

2.5.6 Leverage

Simoens & Vennet (2021) find that the equity-to-assets ratio shows a negative relationship with the M/B. The equity-to-assets ratio is the inverse of leverage. In other words, the more leveraged a bank becomes, the higher its M/B tends to be.

The importance of controlling leverage lies in its direct effect on the changes in credit risk and returns of banks post-M&A. Acquirers that are more leveraged than their peers incur an increase in credit risk (Ngo, 2019). The expected distress costs are influenced by very high leverage (Baele et al., 2007). In financial markets, bank stock returns are strongly negatively affected by financial distress (Kim & Lee, 2020).

2.5.7 Profitability

Simoens & Vennet (2021) find a positive relationship between profitability, as measured by return on assets, and the M/B. Deng & Elyasiani (2008) also confirms this positive relationship but with Tobin's Q ratio.

Controlling profitability is important because, in general, profitability is a key determinant of bank value (Handorf, 2011). Investors prefer institutions that are currently and are expected to be highly profitable, thus valuing them more (Pástor & Pietro, 2003). In M&A, the positive announcement effect on shareholders' value is linked to improvements in profitability (Leledakis & Pyrgiotakis, 2022).

2.5.8 Liquidity

Fiordelisi & Molyneux (2010) find that increasing exposure to liquidity risk elevates a bank's shareholder value. This implies an inverse relationship between liquidity and value. Deng & Elyasiani (2008) find a negative relationship between liquidity and Tobin's Q ratio.

The reason for controlling liquidity is that exploiting benefits from banks M&A is related to the liquidity position (Tampakoudis et al., 2020). It is observed that when there is value creation in M&A, there is an enhancement in liquidity (Hassan & Giouvris, 2020). Merged banks realize abnormal returns when their loan outstanding percentage increases; this increase in loan outstanding comes from both an increase in deposits and loans due to M&A (Cornett & Tehranian, 1992). Additionally, when low liquidity is associated with high credit risk in M&A, the acquirers' shareholders benefit less and value creation become an unavailable option (Asimakopoulos & Athanasoglou, 2013).

2.5.9 Efficiency

Fiordelisi & Molyneux (2010) find that cost efficiency positively affects the value of banks. Fu et al (2014) confirm the positive relationship between cost efficiency in banks and their Tobin's Q ratio. Abedifar et al (2018) find that inefficiency in banks reduces their franchise value.

Controlling efficiency in M&A is important because the stock market's reaction to the announcements of M&A strongly relies on how much efficiency is expected from the involved banks in these events. Additionally, efficiency is linked with credit risk in creating value; deals with low(high) efficiency and high(low) credit risk offer different value creation options (Asimakopoulos & Athanasoglou, 2013).

2.5.10 Taxes

Tax consideration is one of M&A motives. Institutions by acquiring or merging with a target that characterized with unused net operating losses or tax credits offset their total taxable income (DePamphilis, 2011). Schepens (2016) finds that introduction of a tax shield for equity, leads to higher bank capital ratios due to a rise in common equity. Schandlbauer (2017) finds that an increase in taxes leads to a decrease in financial institutions' book equity value.

The importance of controlling tax is that its ability to adjust the stock's value in markets. Handorf (2011) find that while banking institutions that do not pay taxes resulting from unprofitability are selling at discount market-to-book values, profitable banks that are subjected to income taxation are selling at premium.

2.5.11 Dividend

Pástor & Pietro (2003) find that dividend payouts are negatively related to the M/B. Moreover, younger firms and those that do not pay dividends have higher ratios.

The importance of controlling dividends in M&A events is that they are used as an appeasing tool for shareholders to cover up the adverse consequences of M&A. Merged BHC that experience underperforming, poor post-M&A profitability below the industry benchmark tend to pay higher dividends (Knapp et al., 2005).

2.5.12 Market Risk

Fu et al (2014) find that the greater the exposure of banks to market risk, the higher their Tobin's Q ratio is. Bozos et al., (2013) find that large acquiring bank mergers are exposed to greater market risk. Their betas rise remarkably on the first day of the M&A announcement and remain relatively high two years after the announcement. Interestingly, it is observed that the asset pricing implications for market risk are

negative. Greater exposure to market risk leads to lower returns. As market risk increases, investors sell their positions, putting downward pressure on acquirers' stock prices.

The activities of M&A affect market risk, the importance for controlling market risk is that wealth, specifically, expected returns of BHCs' stocks, are in a linear function of their sensitivity to market movements, stemming from the fact in asset pricing models like the Fama-French three factor model (Fama & French, 1992). Another important factor for controlling market risk is that while credit risk is considered a long-term exposure to NPL, market risk controls the short-term changes in the quality of the loan portfolio (Radić, 2015).

2.5.13 GDP, Inflation and Interest Rates

Demirgüç-Kunt & Huizinga (2010) discuss the inflation rate and the growth rate of real gross domestic product. The first factor can affect bank performance and might compel banks to focus on fee-income-generating operations. The second factor captures business cycle fluctuations and overall economic conditions.

The importance of controlling both real gross domestic product (GDP) growth and inflation is that their direct influence to bank capital. Teixeira et al (2014) find that GDP growth and inflation affect the excess market value and book value of banks' equity capital. While the influence of inflation was consistently negative, the impact of GDP varied between direct and inverse effects, depending on the model description.

Controlling the interest rate as a macroeconomic variable is also important. Simoens & Vennet (2021) find that interest rates positively affect the M/B of banks However, a prolonged phase of low interest rates adversely affects value. Apparently, in a low or negative interest rate economy, banks enjoy a cheap source of funding. However, the zero-lower bound on customer deposits prevents banks passing on the low or negative interest rates to depositors, forcing them to absorb the costs, thereby transforming their initially cheap funding into a costly financial burden.

Another important reason for controlling interest rates is that their influence on bank risk profile. Delis & Kouretas (2011) find that low interest rate environment prompts

banks to reconstruct their asset portfolio to become more riskier and extensively investing in off-balance sheet assets.

2.6 Theoretical Overview

2.6.1 Diversification

Markowitz (1952) lays the foundation of Modern Portfolio Theory (MPT) by developing a mathematical framework that presents the fundamentals of investment diversification. Increasing the number of securities in a portfolio while taking into account the co-movements among securities' returns rather than merely focusing on a security's variance plays a crucial role in the entire portfolio's risk. This insight enables investors to maximize the expected return of their investment portfolio while minimizing the expected risk, and vice versa, in an analysis termed the mean-variance model.

Building on MPT, more profound theories related to diversification and risk emerge. Lewellen (1971) introduces the co-insurance effect. Merging two or more business entities with less-than-perfect earnings correlations reduces the default risk of the newly merged entity, thereby enhancing its debt capacity.

Hansen & Lott (1996) discuss the internalization effect that occurs when shareholders are well diversified and externalities exist. When two business entities are in competitive interdependency, and the actions of one affect the value of the other; an externality occurs. Within the portfolios of such business entities, internalization involves incorporating the effects of such actions on other companies. When a business entity imposes an externality on another in a diversified portfolio, shareholders do not follow the corporate value maximization policy. Instead, they aim for both business entities to maximize their portfolio value. Hence, diversification not only reduces risk but also offers shareholders benefits by internalizing externalities.

2.6.2 Information Asymmetry

Asymmetric information is an essential characteristic of the credit industry. Uncertainty regarding the creditworthiness of borrowers, along with unobservable characteristics and actions of borrowers, can lead financial institutions to increase credit rationing (Dell'Ariccia, 2001).

Chen & Vashishtha (2017) illustrate that M&A activities in the banking industry make borrowers disclose more information. Consolidation alters the core manner in which banks oversee and provide liquidity to borrowers. M&A increases the complexity and hierarchy of banks, reducing their effectiveness in collecting and analyzing soft information. However, it allows them to analyze hard information more efficiently. This shift nudges borrowers towards greater transparency and regularity in their disclosures, enabling banks to access and monitor these pieces of information more effectively. Moreover, M&A actions may prompt banks to recalibrate their loan portfolios to bolster risk management, potentially by reducing exposure to specific sectors or clientele. Banks may even pull back from lending to riskier borrowers who benefit from lenient terms under previous management regimes.

2.6.3 Market Power

Turk Ariss (2010) explores the literature pertaining to market power. The problem of information asymmetry is more likely to be less prevalent in banks with more market power. To improve the quality of their loan portfolios, banks evaluate borrowers to distinguish between low- and high-quality debtors. The availability of appropriate information, obtained from building relationships with borrowers, motivates banks to limit their exposure to risk. However, when banks evolve towards monopolistic dominance, they tend to construct riskier loan portfolios.

Beck et al (2007) contrast the different views on concentration-stability and concentration-fragility that are mentioned in various literature. The views in favor of stability argue that concentration may mean less competition, leading banks to enjoy high profitability and strong market power. These two outcomes are favorable to banks' franchise value and provide them with sufficient resources to build buffers against adverse shocks, which in turn curbs the appetite of banks for taking excessive risk. In addition, the smaller the number of banks, the easier it is for regulators to monitor them, reducing the likelihood of a banking crisis. In contrast, despite the views that favor fragility agreeing with the point that concentration may mean less competition, this type of business environment allows banks to charge higher interest rates for commercial loans, pushing firms to undertake greater risk. These high interest rates increase the expected rate of return for banks and the variability of those returns. Moreover, monitoring a small number of large banks is not easier than monitoring a large number

of small banks because these banks are much more complex. Finally, large banks are protected by implicit policies related to the saying “too big to fail,” which encourages these banks to take excessive risks that threaten the banking system.

Chapter Three
Methodology

3.1 Design

The thesis uses secondary data to support its quantitative design. The moderating analysis is integrated into the quantitative framework to evaluate the impact of a third variable on the direction and/or intensity of the connection between the major independent and dependent variables. In addition, the thesis makes accurate use of both linear and non-linear techniques to analyze and record the connections between variables.

3.2 Data

The data are accumulated annually. They are specific to the U.S. banking industry of three reasons. First, the U.S. banking sector witnesses a high frequency of M&A; from 2018 to 2022, the number of deals reaches 984. Second, there is ease of access to banking data. Third, data are available for an extended period.

The data, exclusive to the U.S. banking industry, are obtained from four sources. Data related to M&A events are sourced from the Federal Financial Institutions Examination Council (FFIEC). Information related to financial statements and BHC's is gathered from the Federal Reserve Bank of Chicago (FRBC), in addition to the FFIEC. Data specific to the banking industry is obtained from the Federal Deposit Insurance Corporation (FDIC). The market-related data are sourced from the YCharts platform. Macroeconomic data are acquired from the International Monetary Fund (IMF) and the Federal Reserve Bank of New York (FRBNY), respectively.

The financial statements data from 1999 to 2015 are sourced from the FRBC, with the remaining data being collected from FFIEC. The data primarily focuses on the FR Y-9C report, which deals explicitly with the consolidated financial statements of holding companies. Unnecessary information that are not related to BHC are weeded out.

The M&A data are retrieved from the FFIEC and encompass a broad spectrum of institutions, including both depository and non-depository institutions, as well as

domestic and foreign institutions. To streamline the data relevant to the research question, all M&A events not associated with BHC and/or banks are excluded.

The market data for BHC are gathered from the YCharts platform using BHC name as the search criterion. This reliance on BHC names may potentially lead to data inaccuracies due to the existence of BHC with similar names. To ensure that the BHC in the FR Y-9C report is the same as the BHC on the YCharts platform, the headquarters' state and city are used as matching criteria between these two different data sources.

3.3 Population and Sample

The population of U.S. commercial banks has been declining since the beginning of 21st century. In 2000, there were 8,198 banks operating in the U.S, but by 2022, the number had dropped to 4,135 banks (Statista Research, 2023a). In U.S., most banking assets are controlled by BHC (Avraham et al., 2012), therefore, the thesis encompasses only BHC.

The initial sample consisted of 115 BHC over a 23-year period, from 2000 to 2022. However, one of the BHC had a missing observation in its financial statements, and four other BHC had missing observations in their market data, all of which were required information for the analysis. Therefore, these five BHC were excluded from the sample, resulting in a final sample of 110 BHC. This gives a total of 2,530 observations. The sample is selected based on specific criteria, as follows:

- The BHC are active during the period from 1999 to 2022.
- The BHC consistently submit the FR Y-9C report for every fourth quarter from 1999 to 2022.
- The BHC consistently submit the FR Y-9C report for every first quarter from 2000 to 2022.
- The BHC maintain a publicly traded stock with recorded prices available for each year from 2000 to 2022.

3.4 Variables

Table 1
Variables List

Variables	Descriptions	Formulas	Sources
Dependent Variable			
LNMB	Market-to-Book Ratio	Natural logarithm of (Share Price / Book Value Per Share)	YCharts & (Teixeira et al., 2014)
Independent Variables			
NC	Net charge-off Ratio	(Charge-offs – Recoveries) / Average Gross Loans and Leases	(Calomiris & Nissim, 2014)
MA	Horizontal M&A	1 if BHC is involved as bidder in Horizontal M&A in a year, 0 otherwise	(Deng & Elyasiani, 2008)
NCMA	Interaction of M&A and NC	NC × MA	By the author
Controls			
SZE	BHC's Size	Natural Log of Total Assets	(Deng & Elyasiani, 2008)
AGE	BHC's Age	Number of years since a BHC was established	(Chen & Vashishtha, 2017)
REV	Interest Income Growth Rate	(Current Year Interest Income / Previous Year's) – 1	(Avramidis et al., 2018)
LMS	Loans and Leases Market Share Growth Rate	[(Current BHC's Loans and Leases / Banking Industry's) / Previous Year's] – 1	(Avramidis et al., 2018)
DIV	Diversification Ratio	1 – | 2 (Total Gross Loans and Leases / Total Assets) – 1 |	(Baele et al., 2007)
ROA	Return on Assets Ratio	Net Income / Total Assets	(Adhikari et al., 2023)
DA	Leverage Ratio	Total Liabilities / Total Assets	(Adhikari et al., 2023)
LIQ	Liquidity Ratio	Cash and Balances Due from Depository Institutions / Total Assets	(Rose, 1987)
EFC	Efficiency Ratio	Total Expenses / Total Revenues	(Simoens & Vennet, 2021)
ETR	Effective Tax Rate	Income Taxes / Income Before Taxes & Discontinued Operations	(Rose, 1987)
POR	Payout Ratio	Common Cash Dividends / Net Income	(Knapp et al., 2005)
BTA	Market Risk – 1 Year HMP	Covariance (Equity Return, S&P 500 Return) / Variance (S&P 500 Return)	YCharts & (Bozos et al., 2013)
GDP	U.S. Real GDP Growth Rate	Annual Percentage Change	IMF & (Teixeira et al., 2014)
INF	U.S. Inflation Rate	Annual Percentage Change	IMF & (Teixeira et al., 2014)
FFR	Federal Funds Effective Rate	Average of daily Rates in Current Year	FRBNY & (Simoens & Vennet, 2021)

Note: more sources for all variables are also included in sections 2.1.2, 2.2.2, and 2.5. HMP denotes Historical Monthly Lookback

3.5 Models

3.5.1 One-Way Fixed Effects Model

The one-way fixed effects (FE) model serves as a fundamental statistical approach of panel data analysis. It is employed to control omitted variable bias in longitudinal analyses, enabling the control of unobserved, time-invariant, individual-specific effects (Baltagi, 2021).

Mathematically, the FE can be presented as in equation (1):

$$y_{it} = \alpha_i + \beta x_{it} + \mu_{it} \quad (1)$$

Where:

- y_{it} denotes LNMB for BHC i in year t.
- α_i embodies the unobserved, constant, individual-specific effect. This means that while all BHC share the same slope, they have different intercepts.
- β is the estimated parameter vector of the independent variables.
- x_{it} comprises the matrix of independent variables for BHC i at year t, which includes: NC, MA, NCMA, SZE, AGE, REV, LMS, DIV, ROA, DA, LIQ, EFC, ETR, POR, BTA, GDP, INF and FFR.
- μ_{it} is the model's error term.

There are two standard methods for estimating the FE model: the within-transformation method and the least squares dummy variable (LSDV) method. The latter adds a binary control variable for every BHC (individual). This method works well when the number of individuals is small; however, when it reaches hundreds or thousands, the LSDV method leads to incidental parameter bias and multicollinearity between dummies. In contrast, the within-transformation method can handle the same task without significantly increasing the number of parameters in the model. This method involves calculating the average of the dependent variable for each individual and then subtracting it. An identical procedure is then applied to all independent variables (Baltagi, 2021).

Mathematically, Cameron & Trivedi (2022) present the FE-within transformation model as in equation (2):

$$(y_{it} - \bar{y}_i + \bar{\bar{y}}) = \alpha + \beta(x_{it} - \bar{x}_i + \bar{\bar{x}}) + (\mu_{it} - \bar{\mu}_i + \bar{\bar{\mu}}) \Rightarrow \ddot{y}_{it} \quad (2)$$
$$= \alpha + \beta\ddot{x}_{it} + \ddot{\mu}_{it}$$

Where:

- ¯ denotes the mean, which is $T_i^{-1}\sum_{t=1}^{T_i} y_{it}$, or $T_i^{-1}\sum_{t=1}^{T_i} x_{it}$, or $T_i^{-1}\sum_{t=1}^{T_i} \mu_{it}$, and T represents the count of t (year).
- ¯¯ denotes the grand mean, which is $(1/N)\bar{y}_i$, or $(1/N)\bar{x}_i$, or $(1/N)\bar{\mu}_i$, and N represents the count of i (BHC).
- α is the average value of the fixed effects.

Following equation (2), the FE-within model for this thesis can be expressed as shown in equation (3):

$$\begin{aligned} L\ddot{N}MB_{it} = \alpha &+ \beta_1 N\ddot{C}_{it} + \beta_2 M\ddot{A}_{it} + \beta_3 NC\ddot{M}A_{it} + \beta_4 S\ddot{Z}E_{it} + \beta_5 A\ddot{G}E_{it} \quad (3)\\ &+ \beta_6 R\ddot{E}V_{it} + \beta_7 L\ddot{M}S_{it} + \beta_8 D\ddot{I}V_{it} + \beta_9 RO\ddot{A}_{it} + \beta_{10} D\ddot{A}_{it} \\ &+ \beta_{11} L\ddot{I}Q_{it} + \beta_{12} EF\ddot{C}_{it} + \beta_{13} E\ddot{T}R_{it} + \beta_{14} PO\ddot{R}_{it} \\ &+ \beta_{15} B\ddot{T}A_{it} + \beta_{16} G\ddot{D}P_{it} + \beta_{17} I\ddot{N}F_{it} + \beta_{18} F\ddot{F}R_{it} + \ddot{\mu}_{it} \end{aligned}$$

3.5.2 FE Model Specification Tests

The essential linear longitudinal data methods are fixed-effects and random-effects (RE) models (Cameron & Trivedi, 2022). However, when choosing between these panel models, there remains a question of whether the data shall originally be pooled in the standard ordinary least squares (OLS) model (Baltagi, 2021).

Moulton & Randolph (1989) find that the significance of FE models can be tested through the analysis of variance using F-distributing (ANOVA F)-test. A significance statistic indicates the importance of FE. Breusch & Pagan (1980) provide the Lagrange Multiplier (LM) test to examine the significance of RE models. A significant statistic suggests the presence of RE.

When both the FE and RE models show superiority over the OLS, the Hausman specification test plays a pivotal role in deciding between these two models (Hausman, 1978). A significance statistic indicates that the FE model is more suitable than the RE.

3.5.3 Quantile Model

In linear models, the existence of outliers can affect the estimated relationship between the dependent and independent variables. The estimated regression coefficients may become biased and inefficient, leading to inaccurate predictions and unreliable inferences. To address the challenges posed by outliers, an alternative approach known as quantile regression (QR) has gained popularity. Unlike linear regression, which focuses on estimating the conditional mean, QR allows for the estimation of conditional quantiles, such as the median. Additionally, quantile regression does not rely on the assumption of normality and provides robust estimates even in the presence of outliers.

One straightforward approach to applying QR to longitudinal data when the fixed effects are relevant is by incorporating the individual effects as dummy parameters in the LSDV model. Unfortunately, fixed-effect QR estimators are subject to incidental parameter bias and will be inconsistent when the number of time periods is fixed. Incidental parameter bias arises when the number of parameters to estimate is directly related to the number of individuals. Consequently, if the number of time periods is fixed, the available observations for estimation roughly equal the number of parameters. This limitation impedes the consistent estimation of common parameters, meaning that the estimates may not converge to the true parameter value, even with a large sample size (Koenker et al., 2017).

To address the drawbacks of the traditional panel QR model, Koenker et al., (2017) propose the penalized FE-QR. The main idea behind this method is to add a penalty term to the quantile regression objective function, which encourages sparsity and helps control model complexity. The penalty term is designed to shrink or regularize the coefficients towards zero, which effectively reduces the influence of irrelevant covariates and voiding overfitting. Thereby, enhancing the robustness and reducing the bias of the estimation. Additionally, there are several methods for estimating panel QR, including smoothing and jacking. However, all of these methods can be complex to implement.

Machado & Santos Silva (2019) introduce the Quantiles via Moment estimator (MM-QR). One of the primary advantages of this method is its ease of implementation. It allows methods valid only for estimating conditional means, such as including fixed

effects, to affect the entire distribution without encountering incidental bias. However, the effectiveness of this QR hinges on a critical condition: the number of individuals divided by the number of time periods must be less than ten. Although the MM-QR estimator requires assumptions regarding the existence of moments, it performs well in situations where the error term exhibits high skewness and kurtosis.

Mathematically, the FE can be presented as in equation (4):

$$Q_y(\tau|x_{it}) = \left(\alpha_i + \delta_i q(\tau)\right) + x'_{it}\beta + z'_{it}\gamma q(\tau) \quad (4)$$

Where:

- $Q_y(\tau|x_{it})$ indicates the quantile distribution of the dependent variable, LNMB.
- $\alpha_i(\tau) = \alpha_i + \delta_i q(\tau)$ is the scale coefficient, indicative of the quantile fixed effect for BHC i.
- $q(\tau)$ represents the sample quantile, where $\tau \in \{0.10, 0.20, \dots, 0.90\}$.
- x'_{it} is a vector of independent variables, which they are NC, MA, NCMA, SZE, AGE, REV, LMS, DIV, ROA, DA, LIQ, EFC, ETR, POR, BTA, GDP, INF and FFR.

3.6 Analyzing Methods

3.6.1 Descriptive analysis.

In order to understand the characteristics of variables, the thesis utilizes descriptive analysis.

Central tendency and dispersion are explored using the arithmetic mean to identify the central location of the data, while the standard deviation is used to quantify the variability around the mean.

The range of the data, defined by the maximum and minimum values, is investigated to identify the extent of data spread.

The shape of the data distribution is examined using skewness, which quantifies the degree of asymmetry, and kurtosis, which measures the heaviness of the distribution's tails.

Percentile analysis is performed to understand the data's heaviness at different percentiles of the distribution, at the 1st, 5th, 25th, 50th, 75th, 90th, 95th, and 99th percentiles.

In addition, the frequency of M&A transactions, along with box plots and scatter plots of bank sizes and values, are presented.

3.6.2 Multicollinearity Analysis

Multicollinearity occurs when two or more independent variables are highly correlated. This high correlation inflates the regression coefficients and makes them confounding. In moderating analysis, the high correlation between the interaction term and its component variables is merely a consequence of interval scaling. Therefore, it does not pose a multicollinearity problem (Disatnik & Sivan, 2016).

To assess the existence of multicollinearity, the correlation matrix and the Variance Inflation Factor (VIF) are employed. The results indicate a high correlation range from 0.60 to 0.79, while a very strong correlation is indicated by values above 0.80. For VIF, a common rule of thumb suggests that values more than five indicate a problematic level of multicollinearity.

3.6.3 Unit Root Analysis

Baltagi (2021) classifies panel unit root tests into two categories: those assuming cross-sectional independence and those allowing for CD. The growing economic and financial integration among countries and financial institutions in recent decades has led to significant CD in longitudinal data (De Hoyos & Sarafidis, 2006).

Assumptions about asymptotic behavior, the number of cross-sectional and time-series dimensions, and the existence or absence of linear temporal trends all have a substantial impact on the power of panel unit root tests (Pesaran, 2007). Furthermore, these tests are susceptible to the existence of structural breakdowns, which might resemble the behavior of unit root tests. As a result, even when the series is stationary, the null hypothesis of a unit root may not be rejected (Perron, 1989).

Usually, line graphs are considered the best choice for visualizing time data. They display the main trends in series (Wang et al., 2018). Therefore, to decide whether to

incorporate a time trend in the panel unit root tests, a line graph is created to display the average trend across all cross-sectional BHC over time.

To demonstrate the existence of CD in variables, specifically when the panel has a short time-series dimension and a long cross-sectional dimension, Pesaran's CD test is utilized (Pesaran, 2021). Monte Carlo experiments show that this test performs well in short panels (Baltagi, 2021).

Pesaran (2007) provides a panel unit root test that considers the assumption of CD, Pesaran's CIPS (cross-sectionally augmented Im, Pesaran and Shin) test. Baltagi (2021) demonstrates the unstandardized pattern of the joint asymptotic limit behavior of Pesaran's CIPS statistic. Different critical values are provided depending on the specific choices of the cross-sectional dimension and the time-series dimension. Pesaran's CIPS test offers advantages in avoiding serial correlations and size distortion problems as it is a modified version of the IPS unit root test (Im et al., 2003).

For the panels that do not exhibit CD, Maddala & Wu (1999) provide the Maddala and Wu (MW) panel unit root test, a grounded Fisher principle unit root test, meaning it does not require any parametric assumptions and places no limits on the sample size.

Pesaran's CIPS and MW panel unit root tests require a lag length specification to give unbiased results due to serial correlation. The optimal lag lengths are chosen based on (Akaike, 1997), the Akaike information criterion (AIC).

Karavias & Tzavalis (2014) provide a panel unit root test that works exceptionally well when the number of cross-sectional dimensions is larger than the number of time-series dimensions. The Karavias and Tzavalis test accommodates up to the second order of serial correlation, can handle non-normality, and allows for structural breaks for intercepts or both intercepts and linear trends of the series.

The structural breaks are considered unknown, and their occurrence is determined through bootstrapping. Efron & Tibshirani (1994) suggest that the minimum threshold for bootstrap replications be 200.

3.7 Residuals Diagnostics and Remedy

3.7.1 Heteroscedasticity Diagnostic

The modified Wald test can check for group-wise heteroskedasticity in FE models. A significant test statistic implies the presence of heteroscedasticity across groups (Greene, 2000).

3.7.2 Serial Correlation Diagnostic

The Wooldridge test can check for first-order autocorrelation in longitudinal data. A significance test statistic indicates the presence of serial correlation in the residuals (Wooldridge, 2001).

3.7.3 Cross-sectional Dependence Diagnostic

Pesaran's CD test can check for the potential presence of CD in panel data. A significant statistic indicates the existence of CD in residuals (Pesaran, 2021).

3.7.4 Normality Diagnostic

skewness and kurtosis can be used to examine whether the residuals follow a normal distribution shape. A skewness close to zero suggests that the residuals are symmetrical. A kurtosis close to three suggests that the tails have characteristics similar to those of a bell-shaped distribution (D'Agostino & Belanger, 1990).

3.7.5 Remedy

Driscoll & Kraay (1998) provide a remedy method that is robust to heteroscedasticity, autocorrelation, and CD issues in FE models.

To handle the autocorrelation, the Driscoll-Kraay method includes a lag length in the remedying process. The chosen lag length is based on a straightforward rule of thumb derived from the preliminary phase in the embedded technique of (Newey & West, 1994), as presented in equation (5):

$$Lag\ Length = floor\left[4(T/100)^{2/9}\right] \quad (5)$$

Where T is the number of time periods.

Since $T = 23$ in the sample, the lag length becomes two, although, this rule of thumb technique provides a simple guide for lag length, it may not be accurate enough to determine the optimal lag length; in some cases, a lag length of one or more than two may be the optimal choice. Therefore, the method of (Andrews & Lu, 2001) is employed to test if a lag length of one is the optimal choice. Though theoretically, lag lengths greater than two can also be examined, the number of regressors in the model of this thesis makes testing for longer lag lengths computationally heavy.

Although the Driscoll-Kraay method is not identified as a robust method against non-normality, it is a nonparametric covariance matrix estimator. Siegel and Wagner (2022) argue that, in general, for hypothesis testing, nonparametric techniques do not require a normality assumption about data distribution.

Chapter Four

Results

4.1 Descriptive Statistics

Error! Not a valid bookmark self-reference. summarizes the frequency of BHC that completed at least one horizontal M&A as a bidder within the sample over a period of 23 years

Table 2

Horizontal M&A Frequency Statistics

Year	BHC that completed at least one Horizontal M&A as a bidder
2000	16
2001	20
2002	11
2003	16
2004	17
2005	19
2006	20
2007	20
2008	10
2009	5
2010	1
2011	9
2012	13
2013	18
2014	22
2015	19
2016	18
2017	22
2018	23
2019	27
2020	14
2021	18
2022	16
Total	**374**

Error! ***Not a valid bookmark self-reference.*** *summarizes the frequency of BHC that completed at least one horizontal M&A as a bidder within the sample over a period of 23 years*

Table 2 summarizes the frequency of BHC that completed at least one horizontal M&A as a bidder within the sample over a period of 23 years. In 2010, the frequency was the lowest, with only one BHC out of 110 completing an M&A deal, while in year 2019 the highest frequency was recorded with 27 BHC out of 110. In total, from 2000 to 2022, there were 374 BHC that completed at least one horizontal M&A as a bidder, regardless of whether the same BHC are counted multiple times across the years.

Table 3 presents descriptive statistics derived from 110 U.S. BHC over 23 years, yielding a total of 2,530 observations. It includes several descriptive statistics for each variable in the model: mean, standard deviation, minimum, maximum, skewness, and kurtosis. Additionally, the table provides percentile breakdowns (1%, 5%, 10%, 25%, 50%, 75%, 90%, 95%, and 99%) to illustrate the distribution of each variable.

Table 3

Descriptive Statistics

Variable	Mean	SD	Min	Max	Skewness	Kurtosis	P1	P5	P10	P25	P50	P75	P90	P95	P99
LNMB	0.394	0.437	-1.651	2.089	-0.317	4.280	-0.874	-0.274	-0.093	0.129	0.376	0.685	0.940	1.087	1.374
NC	0.004	0.007	-0.003	0.085	4.720	35.763	-0.001	0.000	0.000	0.001	0.002	0.005	0.011	0.017	0.034
MA	0.148	0.355	0.000	1.000	1.984	4.938	0.000	0.000	0.000	0.000	0.000	0.000	1.000	1.000	1.000
MANC	0.000	0.001	-0.001	0.024	7.200	78.067	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.006
SZE	22.741	1.766	19.558	28.951	1.182	4.444	20.132	20.562	20.864	21.511	22.384	23.565	25.161	26.327	28.414
AGE	30.800	15.492	1.000	110.000	1.699	7.809	5.000	11.000	15.000	21.000	29.000	37.000	47.000	54.000	91.000
REV	0.070	0.171	-0.432	1.423	1.772	10.578	-0.227	-0.134	-0.099	-0.043	0.042	0.147	0.268	0.357	0.651
LMS	0.052	0.153	-0.419	1.949	3.752	29.358	-0.172	-0.099	-0.069	-0.024	0.023	0.086	0.196	0.285	0.693
DIV	0.658	0.175	0.093	0.999	-0.114	2.594	0.242	0.383	0.436	0.529	0.659	0.785	0.898	0.951	0.989
ROA	0.010	0.007	-0.085	0.037	-4.967	49.596	-0.018	0.002	0.005	0.008	0.010	0.013	0.015	0.017	0.021
DA	0.898	0.022	0.815	0.981	-0.414	3.495	0.839	0.861	0.871	0.885	0.900	0.913	0.925	0.930	0.942
LIQ	0.021	0.014	0.001	0.183	2.722	19.241	0.003	0.007	0.009	0.013	0.018	0.027	0.037	0.046	0.066
EFC	0.702	0.104	0.359	1.618	1.666	14.590	0.467	0.552	0.590	0.640	0.696	0.757	0.812	0.851	1.003
ETR	0.165	3.559	-175.625	8.279	-47.796	2354.507	-0.721	0.095	0.162	0.212	0.283	0.328	0.356	0.384	0.590
POR	0.349	0.736	-20.262	5.386	-16.873	445.426	-0.336	0.000	0.069	0.236	0.359	0.475	0.607	0.789	1.612
BTA	0.861	0.744	-1.870	6.947	0.880	7.570	-0.745	-0.249	0.004	0.383	0.829	1.267	1.723	2.064	2.883
GDP	0.020	0.018	-0.028	0.059	-0.999	4.845	-0.028	-0.026	0.001	0.017	0.023	0.028	0.039	0.041	0.059
INF	0.025	0.017	0.005	0.074	1.566	5.184	0.005	0.007	0.007	0.016	0.021	0.032	0.041	0.066	0.074
FFR	0.017	0.018	0.001	0.065	1.218	3.466	0.001	0.001	0.001	0.001	0.011	0.022	0.050	0.050	0.065

Note: SD denotes standard deviation. Min and Max denote minimum and maximum, respectively. P denotes percentile.

The proxy of value creation, LNMB, has a mean of (0.394), implying that, on average, BHC are valued more in the stock market than their book value. In other words, BHC enjoy value creation. The standard deviation, minimum, and maximum are (0.437, -1.651, and 2.089), respectively, implying a wide dispersion around the mean and extreme values. The skewness is negative, implying non-normality where there is a bulk of BHC with extremely diminished value. The kurtosis is (4.280), implying non-normality, where there is a high probability of outliers, whether BHC with diminished value or enhanced value. The percentile statistics indicate that the bottom (10%) of the data are BHC with diminished value.

The proxy of credit risk, NC, has a mean of (0.004), implying that, on average, BHC have a small percentage of loans and leases that have been written off as losses, net of recoveries. In other words, BHC experience low credit risk. The standard deviation, minimum, and maximum are (0.007, -0.003, and 0.085), respectively, indicating a wide dispersion around the mean and the presence of extreme values. The results of skewness and kurtosis emphasize the presence of extreme outliers. The percentile statistics indicate that the bottom (1%) of the data consists of BHC that recover more funds from previously defaulted loans and leases than they loss from new defaults, which is an unusual situation in the banking industry.

The moderator variable, MA, has a mean of (0.148), implying that (14.8%) of the observations meet the criteria of BHC that completed at least one horizontal M&A as a bidder. Due to the binary nature of the moderator, explaining the other descriptive statistics is meaningless. Furthermore, discussing the statistics of the interaction term, NCMA, is quite diminutive due to the dummy nature of the moderator.

The variable SZE has a mean and standard deviation of (22.741 and 1.766), respectively, implying that the average size of BHC in the sample is around ($7.5) billion with almost negligible dispersion around the mean. The minimum and maximum values are (19.558 and 28.951), respectively, suggesting the existence of both relatively small BHC and very large BHC in the data. The skewness and kurtosis indicate non-normality. The percentile statistics show that (25%) of observations consist of large banks, and only (1%) of BHC have assets valued in the trillions of dollars.

As for the variable AGE, the mean and standard deviation are (30.800 and 15.492), respectively, indicating that the average age in the sample is approximately 31 years, with a dispersion of about 15 years around the mean. The minimum and maximum ages are one year and 110 years, respectively, showing the existence of both newly established and mature BHC in the data. The skewness and kurtosis indicate non-normality. The percentile statistics show that the bottom (1%) of the data consists of BHC aged five years old or younger, and the top (1%) of the data consists of BHC aged 91 years old or older.

The growth measures, REV and LMS, both show similar statistical patterns. On average, BHC achieve growth in both interest income and loan and lease market share, with dispersion around the mean and extreme negative and positive values. They are not normally distributed. The percentile statistics reveal that (25%) of the observations indicate a decline in both growth measures.

The diversification proxy, DIV, has a means and standard deviation of (0.658 and 0.175), respectively, indicating the BHC are diversified on average with some dispersion around the mean. The minimum and maximum values are (0.093 and 0.999), respectively, implying the existence of non-loan-making activities specialized BHC and loan-making specialized BHC. The skewness and kurtosis indicate non-normality. The percentile statistics reveal that (90%) of observations consist of diversified BHC with a variation in the degree of diversification, and (10%) consist of loan-making specialized BHC.

BHC are lucrative on average, with some variance around the mean, according to the profitability proxy, ROA, mean, and standard deviation. The presence of loss is shown by the minimal value. The kurtosis and skewness show that the data are not normal. According to the percentile statistics, losses make up the lowest (1%) of the data.

As for the variable DA, mean, minimum, maximum, and percentiles indicate that BHC are highly leveraged. The standard deviation indicates low dispersion around the mean. The skewness and kurtosis indicate non-normality.

The liquidity proxy, LIQ, mean, minimum, and percentiles indicate low liquidity among BHC. However, the maximum value of (0.183) shows a highly liquid BHC. The

standard deviation indicates low dispersion around the mean. The skewness and kurtosis indicate non-normality.

The efficiency proxy, EFC, has a maximum value of (1.618), and the top (1%) of its data has a value of (1.003), meaning that there are BHC that pay expenses more than they generate income. The skewness and kurtosis indicate non-normality.

As for variables ETR and POR, both show similar statistical patterns. First, they are strongly left-skewed and have heavy tails, suggesting a high probability of outliers and unsymmetrical distribution. The minimum value and the bottom (1%) of the data suggest the existence of BHC that receive more in tax credits or other forms of government incentives, and the existence of BHC that pay dividends even though their net income is negative.

The credit risk proxy, BTA, shows a mean and standard deviation of (0.861 and 0.744), respectively, implying that on average, BHCs' stocks are less volatile than the market with a decent amount of dispersion around the mean. The minimum and maximum are (-1.870 and 6.947), respectively, implying the existence of BHC that are more volatile than the market and BHC that move against the market. The percentile statistics are aligned with the min and max results, in which the bottom (5%) of the data consists of BHC with negative betas and the top (25%) of the data consists of BHC with betas greater than one. The skewness and kurtosis indicate non-normality.

As for the macroeconomic variables, the GDP's minimum and P5 values indicate periods with recessions. Both INF and FFR show a wide range between minimum and maximum values, implying the existence of economic periods with ups and downs. All macroeconomic variables are not normally distributed.

Figure 2 shows that banks within lower percentiles up to P50 have relatively low market-to-book values. However, as the percentile ascends from P70 to P100, the market-to-book values of banks increase. In the 100th percentile, there is a significant presence of highly valued banks, indicating a wide range of values in the sample and the existence of extreme outliers.

Figure 3 illustrates the relationship between the market-to-book values and the sizes of banks. At lower percentiles, up to P50, banks are clustered towards the smaller size threshold, suggesting that smaller banks have lower market-to-book values. However, as the percentile increases towards P100, the sizes of the banks increase, indicating that banks with higher M/B tend to be larger.

Figure 2

Market-to-Book Value Box Plot

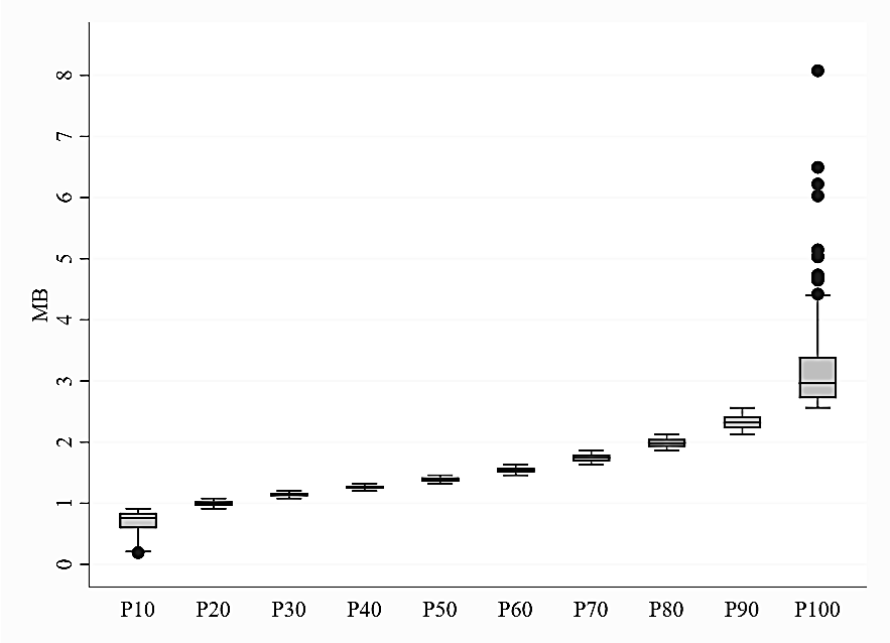
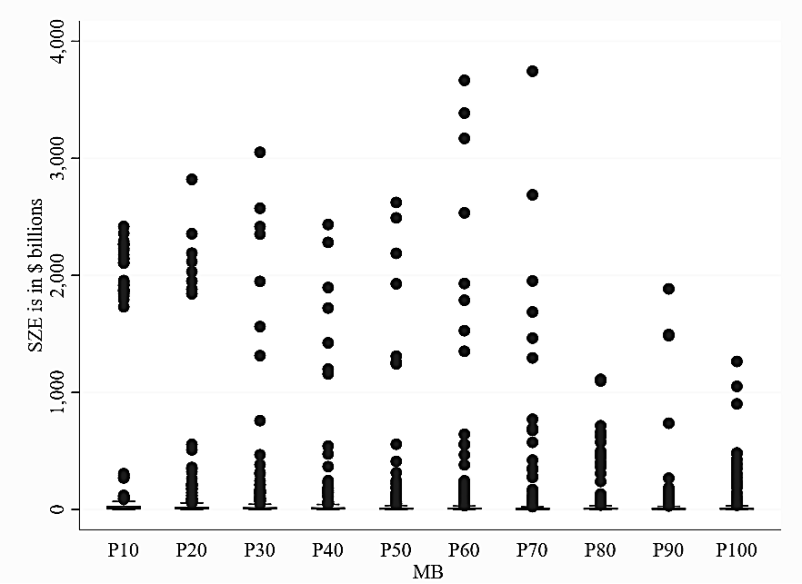


Figure 3

SZE-MB Scatter Plot



4.2 Multicollinearity

Table 4 presents the pairwise correlation among the independent variables, along with the derived VIF values from a multivariate OLS regression.

The correlation analysis reveals that most pairwise variables exhibit weak-to-moderate correlation strengths. However, notable exceptions include the pairs NC-ROA, MA-NCMA, SZE-AGE, and ROA-EFC, each demonstrating a strong correlation.

Regarding the VIF values, all variables exhibit VIFs below five, indicating that all independent variables are free from multicollinearity concerns.

Table 4

Correlation Matrix and VIF

Variable	NC	MA	NCMA	SZE	AGE	REV	LMS	DIV	ROA	DA	LIQ	EFC	ETR	POR	BTA	GDP	INF	FFR
NC	1.00																	
MA	-0.11	1.00																
NCMA	0.05	0.61	1.00															
SZE	0.17	0.05	0.10	1.00														
AGE	0.08	0.00	0.04	0.65	1.00													
REV	-0.29	0.30	0.12	0.03	-0.03	1.00												
LMS	-0.17	0.42	0.24	-0.01	-0.07	0.44	1.00											
DIV	0.04	-0.01	0.00	0.07	0.13	-0.10	-0.06	1.00										
ROA	-0.63	0.02	-0.04	0.02	0.06	0.17	0.00	0.08	1.00									
DA	0.06	-0.15	-0.03	-0.13	-0.13	0.02	-0.04	-0.03	-0.20	1.00								
LIQ	-0.02	-0.01	0.05	-0.16	-0.17	-0.03	-0.05	0.12	0.12	0.19	1.00							
EFC	0.30	-0.01	0.05	-0.19	-0.20	-0.09	-0.03	-0.05	-0.65	0.37	0.15	1.00						
ETR	-0.02	-0.04	-0.06	0.01	0.01	0.03	0.00	-0.01	0.02	0.01	0.01	-0.06	1.00					
POR	-0.10	0.06	0.09	-0.01	0.02	0.03	0.05	0.03	0.09	-0.01	0.02	-0.06	-0.12	1.00				
BTA	0.23	-0.02	-0.03	0.27	0.20	-0.05	-0.01	-0.01	-0.14	-0.15	-0.20	-0.08	0.00	-0.04	1.00			
GDP	-0.23	0.06	-0.02	-0.02	-0.03	0.25	-0.11	0.03	0.26	0.06	0.07	-0.07	0.03	-0.02	-0.20	1.00		
INF	-0.15	0.01	-0.03	0.08	0.09	0.21	-0.09	0.03	0.16	0.10	-0.06	-0.16	0.02	0.02	-0.12	0.46	1.00	
FFR	-0.16	0.05	0.05	-0.16	-0.24	0.35	0.00	-0.10	0.15	0.27	0.42	0.25	0.00	0.06	-0.28	0.22	0.17	1.00
VIF	2.09	1.96	1.68	1.93	1.86	1.82	1.61	1.09	3.53	1.3	1.4	2.68	1.03	1.05	1.25	1.48	1.42	2.01

4.3 Unit Root

Table 5

The Pesaran's CD test

Variable	CD-test	p-value	average joint	mean ρ	mean abs(ρ)
LNMB	188.936	0.000	23.000	0.510	0.540
NC	200.303	0.000	23.000	0.540	0.560
MA	4.327	0.000	23.000	0.010	0.120
NCMA	1.917	0.055	23.000	0.010	0.110
SZE	332.862	0.000	23.000	0.900	0.900
AGE	371.329	0.000	23.000	1.000	1.000
REV	176.074	0.000	23.000	0.470	0.480
LMS	21.658	0.000	23.000	0.060	0.180
DIV	31.715	0.000	23.000	0.090	0.370
ROA	112.164	0.000	23.000	0.300	0.370
DA	115.961	0.000	23.000	0.310	0.420
LIQ	245.232	0.000	23.000	0.660	0.690
EFC	137.137	0.000	23.000	0.370	0.430
ETR	82.134	0.000	23.000	0.220	0.300
POR	13.512	0.000	23.000	0.040	0.250
BTA	116.216	0.000	23.000	0.310	0.340
GDP	371.329	0.000	23.000	1.000	1.000
INF	371.329	0.000	23.000	1.000	1.000
FFR	371.329	0.000	23.000	1.000	1.000

Note: the Pesaran's CD test's null hypothesis (H_0): there is no CD across panel groups. abs denotes absolute. ρ denotes rho, a correlation coefficient across all pairs of cross-sections in the longitudinal data.

Table 5 presents the statistics of Pesaran's CD test along with its significance values, the average correlation coefficients across all pairs of cross-sections, and the absolute values of these coefficients.

Nearly all variables have a p-value less than (5%), implying they exhibit issues of CD. The interaction term, NCMA, is the only variable that fails to provide evidence of CD at the (0.05) level of significance.

All variables exhibit a positive mean rho, indicating a prevalent positive correlation among the cross-sections. The absolute value of the mean rho describes the degree of strength of correlation among cross-sections, which varies from variable to variable. The variables: SZE, AGE, GDP, INF, and FFF show a very strong and perfect correlation due to their common timeline and shared business environment.

Figure 4 presents the visualization of the mean trend line of each variable plotted against time, aiming to examine the existence of a linear time trend in the panel series. Only the variables SZE and AGE display a trend over time.

Figure 4

Time Trend Visualization

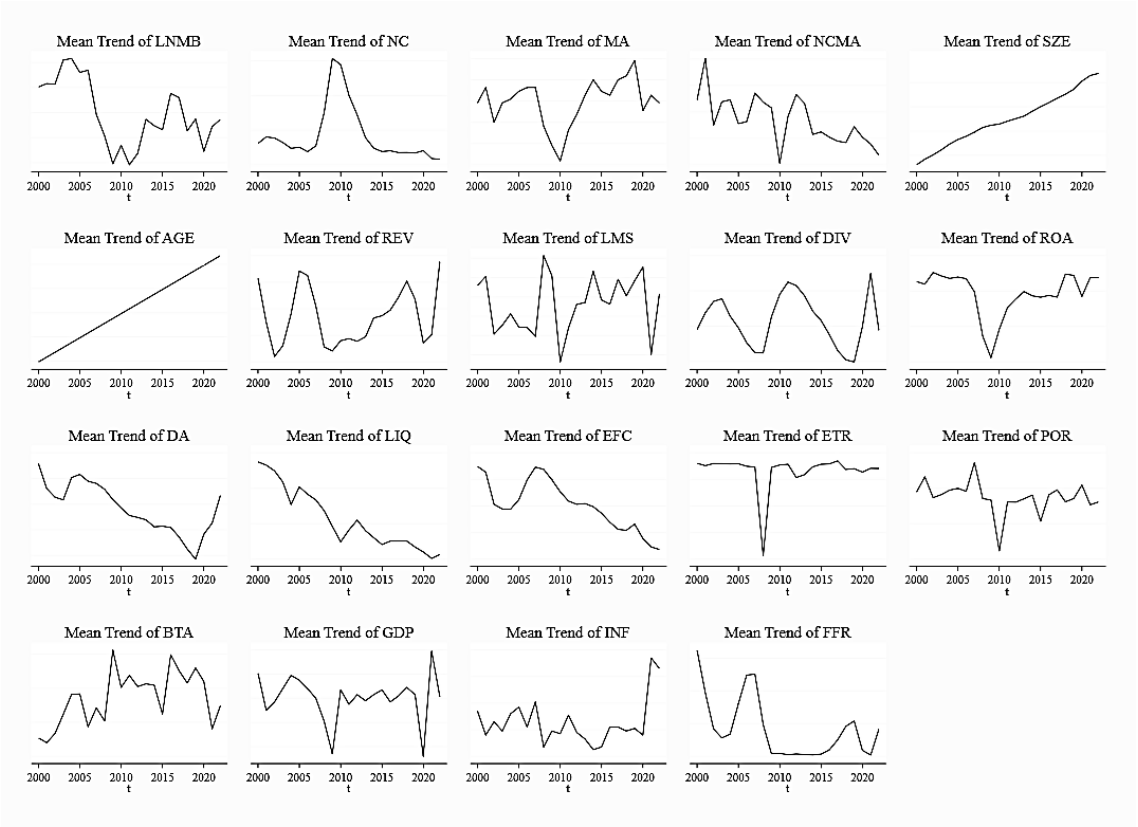


Table 6 presents the results of different unit root tests based on several determinants: the existence of CD, time trends, and structural breaks.

Since the variables LNMB, NC, MA, REV, LMS, DIV, ROA, DA, LIQ, EFC, ETR, POR, BTA, GDP, INF, and FFR demonstrate CD and do not exhibit a linear time trend, they are tested with Pesaran's CIPS test using the constant option. All variables, with the exception of DIV, GDP, INF, and FFR, reject the null hypothesis at the (5%) level of significance, positing the presence of a unit root; hence, the series is non-stationary.

The variables SZE and AGE also demonstrate CD; however, they exhibit a linear time trend. Therefore, they are tested with Pesaran's CIPS test with both constant and trend options. Both variables fail to reject the null hypothesis, suggesting the potential presence of a unit root.

Since the variable NCMA does not exhibit CD and a linear time trend, it is examined using the MW test. The variable rejects the null hypothesis; therefore, it is stationary.

For robustness and to account for potential structural breaks in the data, all variables are examined using the Karavias and Tzavalis test. Surprisingly, all variables, including SZE, AGE, DIV, GDP, INF, and FFR reject the null hypothesis of the test, indicating no unit root process, and hence, the variables are stationary.

The difference in results between Pesaran's CIPS and Karavias and Tzavalis tests can be attributed to the latter's test robustness against structural breaks in the data series.

Table 6

Unit Root tests

	Pesaran's CIPS		MW	Karavias and Tzavalis	
Variable	**C**	**C&T**	**C**	**C**	**C&T**
LNMB	0.000	-	-	0.000	-
NC	0.000	-	-	0.000	-
MA	0.000	-	-	-	-
MANC	-	-	0.000	0.000*	-
SZE	-	0.531	-	-	0.000
AGE	-	1.000	-	-	0.000
REV	0.000	-	-	0.000	-
LMS	0.000	-	-	0.000	-
DIV	1.000	-	-	0.000	-
ROA	0.000	-	-	0.000	-
DA	0.000	-	-	0.000	-
LIQ	0.034	-	-	0.000	-
EFC	0.000	-	-	0.000	-
ETR	0.000	-	-	0.000	-
POR	0.000	-	-	0.030	-
BTA	0.000	-	-	0.000	-
GDP	1.000	-	-	0.000	-
INF	1.000	-	-	0.000	-
FFR	1.000	-	-	0.000	-

Note: C and C&T denote constant, and constant and trend, respectively. The values represent the p-values of tests' statistics. MW and Pesaran CIPS tests' H_0: panel series is non-stationary. Karavias and Tzavalis test's H_0: there is unit root in panel time series. The optimal lag length in Pesaran's CIPS and MW tests is chosen based on AIC, except for AGE, where specified 0 by author choice; the lag length varies from 0 to 2 among the remaining variables; the lags values with decimals ≥ 0.5 round up, while < 0.5 round down. * denotes that the Karavias and Tzavalis is modified to be unrobust to CD. - denotes that the variable is not examined under that test.

4.4 Model Specification

Table 7 presents the results of three different regressions: OLS, RE, and FE. Additionally, the table also includes the model specification tests to choose the most appropriate regression out of the three and presents the residual diagnostics of the FE regression.

Table 7

Model Specification and Diagnostic

Dependent Variable = LNMB	OLS	RE	FE
Independent Variables			
NC	-8.2315***	-9.0572***	-14.1551***
MA	0.0782***	0.0482**	0.0583**
NCMA	-12.9646**	-10.4848**	-15.8227***
Controls			
SZE	-0.0002	-0.0106	-0.0671***
AGE	-0.0004	-0.0049***	-0.0168***
REV	0.0451	0.1164**	0.2245***
LMS	0.0508	0.0553	0.0221
DIV	0.2034***	0.1750***	0.1111**
ROA	11.4633***	10.6487***	4.7711***
DA	5.5001***	5.5048***	4.0169***
LIQ	5.0861***	2.9772***	-0.5422
EFC	-1.1451***	-0.7740***	-0.9487***
ETR	-0.0033*	-0.0030*	-0.0038**
POR	0.0226**	0.0133	0.0091
BTA	0.0105	0.0047	0.0102
GDP	4.0941***	3.9522***	3.2382***
INF	-4.0697***	-3.1813***	-1.2829***
FFR	4.0425***	2.7258***	0.8600*
constant	-4.1212***	-3.9277***	-0.6324
Adjusted R^2	40.66%		
F Statistic	97.26***		108.20***
Chi squared		1747.83***	
Model Specification Tests			
LM test		1447.44***	
ANOVA F-test			11.19***
Hausman test			197.93***
Residuals Diagnostic Tests			
Modified Wald Test for Heteroskedasticity			2365.37***
Wooldridge Test for Autocorrelation			132.25***
Pesaran CD Test for CD			104.93***
Skewness and Kurtosis Tests for Normality			190.28***
Andrews & Lu Test for Lag Length (p = 1)			1159.162***

Note: *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. F test's H_0: the fixed effects are all equal to zero. LM test's H_0: the variance of the individual effects is zero. Hausman test's H_0: the unique errors (fixed effects) are not correlated with the regressors. Modified Wald test's H_0: residuals have constant variance across units. Wooldridge test's H_0: residuals do not exhibit first-order autocorrelation. Pesaran's CD test's H_0: residuals are not cross-sectionally dependent. Normality test's H_0: residuals are normally distributed. Andrews & Lu test's H_0: the current lag length p is appropriate.

The results of the three regressions, OLS, RE, and FE, are similar for the main independent variables. There is a statistically significant negative effect of NC on LNMB, a statistically significant positive effect of MA on LNMB, and a statistically significant negative effect of NCMA on LNMB. The adjusted coefficient of

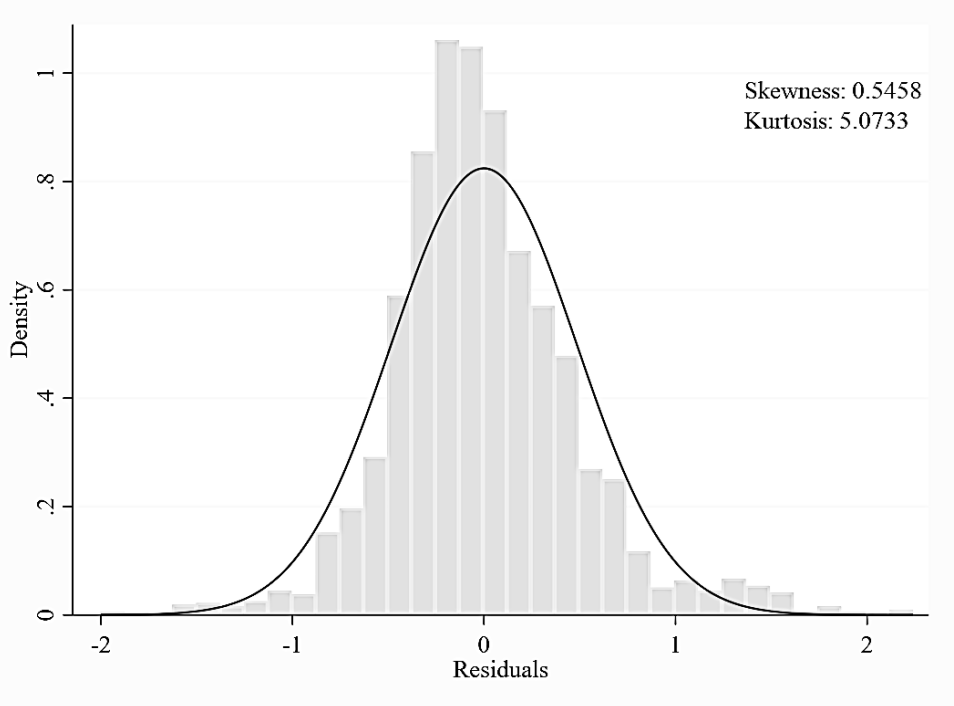
determination (R^2) indicates that the independent variables and control variables in the model explain (40.66%) of the variation in M/B.

The results of the model specification tests indicate that the FE regression is the best, while the Hausman test suggests that the LM test and ANOVA F-test have significant findings suggesting that the RE and FE regressions are more suited than the OLS regression. The RE regression is less consistent than the FE regression due to the correlation between the regressors and the fixed effects.

The effects of controls on the dependent variable in the FE regression are statistically significant for some and insignificant for others. The controls SZE, AGE, EFC, ETR, and INF have a statistically significant negative effect on LNMB, while REV, DIV, ROA, DA, GDP, and FFR have a statistically significant positive effect on LNMB. The controls, LMS, LIQ, POR, and BTA have an insignificant effect on LNMB.

Concerns regarding heteroscedasticity, autocorrelation, cross-sectional dependency, and non-normality in the residuals are raised by the residual's diagnostic tests in Table 7 and Figure 5. Therefore, Table 8 and Table 9, respectively, use the Driscoll-Kraay and MM-QR approaches to overcome these issues and improve the validity of the model.

Figure 5
Residuals Histogram



4.5 Robust Coefficients

Table 8 presents the robust standard errors using the Driscoll-Kraay method, which remedies heteroskedasticity, autocorrelation, and CD issues in the FE regression in Table 7.

The Driscoll-Kraay approach, which corrects for heteroskedasticity, autocorrelation, and cross-sectional dependency in the FE regression in Table 7, yields robust standard errors, which are shown in Table 8.

The primary independent variable results are still statistically significant: LNMB is greatly impacted adversely by NC, favorably by MA, and negatively impacted significantly by NCMA.

The majority of controls continue to have a statistically significant impact on LNMB. But only at the (10%) level do the variables AGE and DIV start to show statistical significance. ROA, INF, and FFR cease to be important factors.

Table 8

Driscoll-Kraay Robust Standard Errors

Dependent Variable = LNMB	**Driscoll-Kraay**
Independent Variables	
NC	-14.1551***
MA	0.0583***
NCMA	-15.8227**
Controls	
SZE	-0.0671**
AGE	-0.0168*
REV	0.2245***
LMS	0.0221
DIV	0.1111*
ROA	4.7711
DA	4.0169***
LIQ	-0.5422
EFC	-0.9487***
ETR	-0.0038***
POR	0.0091
BTA	0.0102
GDP	3.2382***
INF	-1.2829
FFR	0.8600
constant	-0.6324
F Statistic	978.21***

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

The outcome coefficients from Table 8 are included in equation (3) to present the expected model of this thesis, as shown in equation (6) below:

$$\begin{aligned} LN\ddot{M}B_{it} = {} & -0.6324 - 14.1551N\ddot{C}_{it} + 0.0583\ddot{M}A_{it} - 15.8227NC\dot{M}A_{it} \\ & - 0.0671S\ddot{Z}E_{it} - 0.0168A\ddot{G}E_{it} + 0.2245R\ddot{E}V_{it} \\ & + 0.0221L\ddot{M}S_{it} + 0.1111D\ddot{I}V_{it} + 4.7711R\ddot{O}A_{it} \\ & + 4.0169D\ddot{A}_{it} - 0.5422L\ddot{I}Q_{it} - 0.9487E\ddot{F}C_{it} \\ & - 0.0038E\ddot{T}R_{it} + 0.0091P\ddot{O}R_{it} + 0.0102B\ddot{T}A_{it} \\ & + 3.2382G\ddot{D}P_{it} - 1.2829I\ddot{N}F_{it} + 0.8600F\ddot{F}R_{it} + \ddot{\mu}_{it} \end{aligned} \quad (6)$$

Table 9 presents the coefficients of QR that are robust to the non-normality of residuals. The results are divided into continuous intervals, each having equal probabilities ranging from (0.10 to 0.90) of the distribution of the dependent variable, LNMB.

The negative effect of NC on LNMB is statistically significant across all percentiles. However, the magnitude of the coefficients decreases when moving from P10 to P90, suggesting that BHC with lower LNMB are more affected by NC compared to those with higher LNMB.

The positive effect of MA on LNMB is statistically significant only from P30 to P80, with a relatively stable magnitude of coefficients. This implies that the relationship between MA and LNMB is only evident in the middle range of the LNMB distribution.

The negative effect of NCMA on LNMB is statistically significant only from P30 to P90. However, the coefficient result of P90 is meaningless because of the insignificant coefficient of the moderator MA in P90. Therefore, the moderating effect of MA on the relationship between NC and LNMB is only evident for BHC within the middle range of the LNMB distribution. Additionally, the magnitude of NCMA increases as it moves from a lower to a higher percentile, indicating that the moderating effect of MA becomes stronger as LNMB increases.

Figure 2 displays the distribution of MB, the original form of LNMB, before transforming it into logarithmic form. This distribution facilitates understanding of the spreads of BHCs' values within each percentile category. Therefore, when referring to BHC with a middle range of value, it means BHC with MB values ranging from (1.078 to 2.126).

The change in the magnitude of independent variable effects on LNBM in Figure 6, can be justified by the characteristics of BHC in different quantiles of value. Therefore, A two-way scatter plot displaying the size of BHC on the Y-axis and the MB percentiles on the X-axis is shown in Figure 3, illustrating the distribution of BHC according to their size throughout the quantiles of value. The magnitude is expressed in US dollars scaled by one billion, not in logarithmic terms.

Figure 6 provides a quick visual assessment of the magnitudes of control effects on LNMB, regardless of their statistical significance. Table 9 shows that while the effects of AGE and EFC are statistically negatively significant across all percentiles, the effects of DA and GDP are statistically positively significant across all percentiles. While the effect of SZE is statistically negatively significant up to P70, the effect of ETR is statistically negatively significant up to P80. The effect of INF is statistically negatively significant from P20 to P70. The effect of REV is statistically positively significant across all percentiles, except for P60 and P70. The effect of DIV is positively statistically significant from P30 to P70. The effect of ROA is statistically positively significant up to P40. The effect of FFR is statistically positively significant from P60 to P80. The effects of LIQ, LMS, POR, and BTA are insignificant at all percentiles.

Table 9

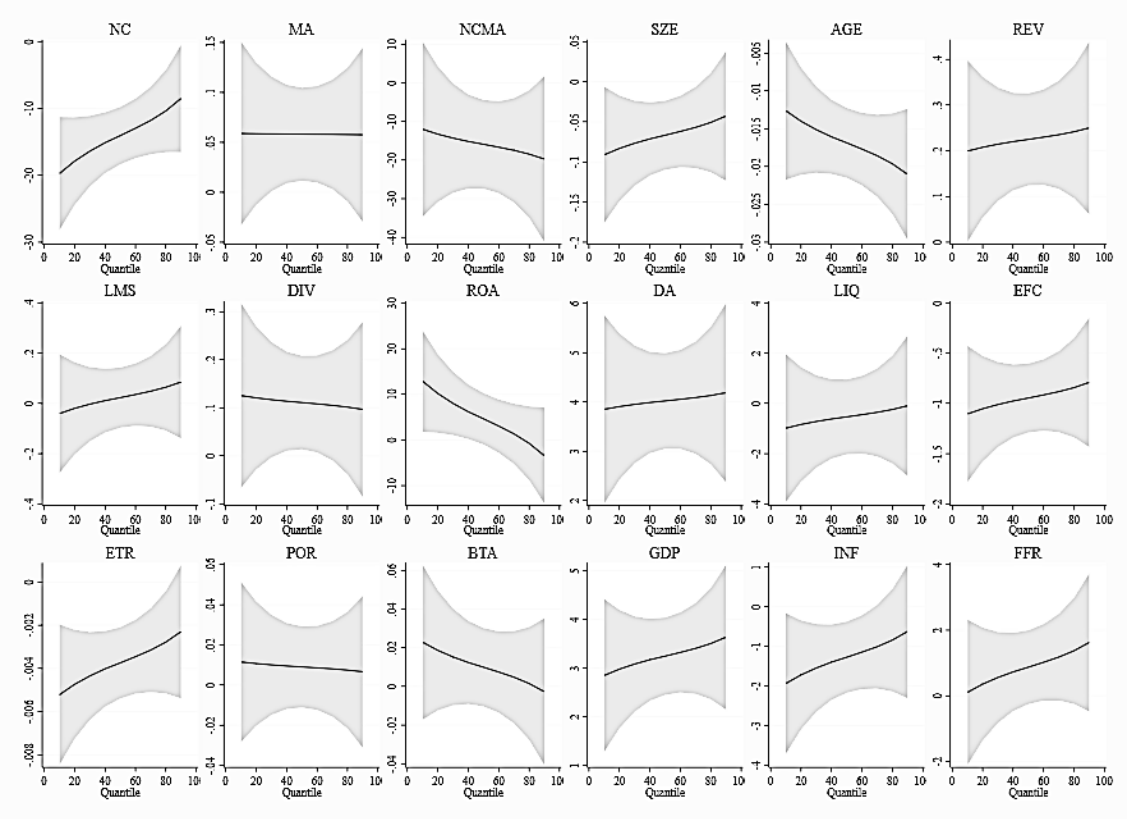
MM-QR

Dependent Variable = LNMB	P10	P20	P30	P40	P50	P60	P70	P80	P90
Independent Variables									
NC	-19.7412***	-17.8833***	-16.3895***	-15.1285***	-14.0646***	-12.9656***	-11.7953***	-10.3655***	-8.4910**
MA	0.0589	0.0587	0.0585**	0.0584**	0.0582**	0.0581**	0.0580**	0.0578*	0.0576
NCMA	-11.9828	-13.2599	-14.2867**	-15.1535**	-15.8849***	-16.6403***	-17.4447**	-18.4276**	-19.7161*
Controls									
SZE	-0.0911**	-0.0831**	-0.0767***	-0.0713***	-0.0667***	-0.0620***	-0.0570***	-0.0508	-0.0428
AGE	-0.0126***	-0.0140***	-0.0151***	-0.0161***	-0.0169***	-0.0177***	-0.0186***	-0.0196***	-0.0210***
REV	0.1993*	0.2077***	0.2144***	0.2201***	0.2249***	0.2298	0.2351	0.2416***	0.2500***
LMS	-0.0406	-0.0198	-0.0030	0.0112	0.0231	0.0354	0.0486	0.0646	0.0857
DIV	0.1254	0.1206	0.1168*	0.1136**	0.1109**	0.1081**	0.1051*	0.1014	0.0966
ROA	12.8777**	10.1815**	8.0137**	6.1838**	4.6397	3.0450	1.3466	-0.7283	-3.4486
DA	3.8495***	3.9052***	3.9499***	3.9877***	4.0196***	4.0525***	4.0875***	4.1304***	4.1865***
LIQ	-0.9854	-0.8380	-0.7195	-0.6195	-0.5351	-0.4479	-0.3550	-0.2416	-0.0928
EFC	-1.1049***	-1.0529***	-1.0112***	-0.9759***	-0.9462***	-0.9155***	-0.8828***	-0.8428***	-0.7904**
ETR	-0.0052***	-0.0047***	-0.0043***	-0.0040***	-0.0037***	-0.0035***	-0.0032***	-0.0028**	-0.0023
POR	0.0115	0.0107	0.0100	0.0095	0.0090	0.0086	0.0081	0.0074	0.0066
BTA	0.0229	0.0187	0.0153	0.0124	0.0100	0.0075	0.0048	0.0015	-0.0028
GDP	2.8473**	2.9773***	3.0818***	3.1701***	3.2445***	3.3214***	3.4033***	3.5033***	3.6345***
INF	-1.9352	-1.7183**	-1.5438***	-1.3966***	-1.2723***	-1.1440**	-1.0073*	-0.8403	-0.6214
FFR	0.1044	0.3557	0.5578	0.7283	0.8722	1.0209*	1.1792*	1.3725*	1.6261

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

Figure 6

Quantile Plotting



Chapter Five

Discussion

Table 8 presents the robust results of the FE regression. The findings indicate that all three hypotheses, as shown in Table 10 are accepted.

Table 10

Hypotheses Summary

Hypothesis	Outcome
H_1: Credit risk has a significant negative effect on bank value.	Accepted
H_2: Horizontal M&A has a significant positive effect on bank value.	Accepted
H_3: Horizontal M&A significantly moderate credit risk-bank value relationship.	Accepted

Table 8 reveals a significant negative effect of credit risk on bank value. Specifically, holding all else constant, a 1% increase in the net charge-offs ratio is associated with an expected (13.20%) decrease in the market-to-book ratio, as $e^{-14.1551 \times 0.01} - 1 \approx (-0.1320)$. This finding is in line with Calomiris & Nissim (2014), who also observe that this ratio decreases the market-to-book ratio. Charge-offs are negatively related to future changes in cash flows and annual returns and inversely affect stock price reactions on the date of earnings announcements; charge-offs provide information about future loan losses (Wahlen, 1994). In financial markets, banks with lower credit risk are observed to more effectively incorporate their operating cash flows into their stock prices compared to those with higher credit risk (Burke & Wieland, 2017). The default and distress in banks are associated with credit risk (Imbierowicz & Rauch, 2014; Kim & Lee, 2020). Therefore, investors value banks with lower credit risk more than those with higher credit risk, which is contrary to the risk-return principle (Avramov et al., 2009).

Table 9 and Figure 6 reveal that the higher the value of the banks, the lower the effect of credit risk on their value, which is an interesting finding. This can be attributed to market discipline, which rewards the risky lending strategies of larger banks differently compared to smaller ones (Hughes & Moon, 2022).

In Figure 3, it is noticeable that, with an increase in the quantiles of market-to-book ratio, the quantile comprises larger BHC. Specifically, this shift is observed moving

from P10 to P30 and from P50 to P70, while the rest of the distribution is a cumulative representation of the previous percentiles.

Table 8 reveals a significant positive effect of horizontal M&A on bank value. Specifically, holding all else constant, BHC involved in horizontal M&A as bidders are associated with an expected (6%) increase in the market-to-book ratio, as $e^{0.0583} - 1 \approx (0.0600)$. This finding aligns with the results indicating that M&A in banks is a value-creating event (DoĞAn & Yildirim, 2017; Deng & Elyasiani, 2008; Cornett & Tehranian, 1992) . The created value may result from operating synergy, financial synergy, diversification, strategic realignment, hubris, managerialism, agency problem, tax considerations, market power, the Q-ratio, or misvaluation (DePamphilis, 2011). This thesis does not examine the synergies that may enhance the bank's value. Therefore, it is not possible to confirm which synergies are responsible for value creation.

Figure 6 shows that the magnitude of the positive effect of horizontal M&A is relatively stable across all quantiles of bank value. However, Table 9 indicates that the effect of M&A is statistically significant only from the (0.30) percentile to the (0.80) percentile of the BHCs' value distribution. This can be justified by the fact that BHC in the upper and lower thresholds of value do not engage in value-creating M&A transactions. DeLong (2003) observes that the financial markets do not reward banks in M&As when they do not focus on targeting banks with the same earning streams, geography, and activities. Another interesting finding in Table 9 is that the largest BHC and decently large BHC are included in the percentiles of BHCs' value distribution from (0.30 to 0.70), as presented in Figure 3. This can be an indicator that large BHC do not engage in empire-building acquisitions. DePamphilis (2011) shows that empire building acquisitions destroy value; however, under the managerialism driver, the purpose of increasing the size of their institutions through M&A is to enhance their earning power and growth capabilities, which in turn increases their market value.

Table 8 reveals a significant moderating effect of horizontal M&A on the credit risk-bank value relationship. Specifically, when a BHC is involved in horizontal M&A as a bidder, holding all else constant, a (1%) increase in the net charge-offs ratio is associated with an expected (14.63%) decrease in the market-to-book ratio,

as $e^{-15.8227 \times 0.01} - 1 \approx (-0.1463)$. This means that the horizontal M&A moderator strengthens the initial negative relationship between credit risk and bank value, as it amplifies the negative effect of credit risk on the bank's value.

In contrast to the findings of Cowan et al (2022), who observe that the value created from M&A does not come from increased default risk, our results provide evidence that the value created from M&A diminishes or arises as a result of credit risk. These results align with the findings of Hassan & Giouvris (2020), who observe that the value created in local horizontal M&A comes along with a decrease in credit risk.

According to the accepted H_2, horizontal M&A events by themselves are value-creating events. However, our results show that financial markets appear to reflect credit risk on stock prices more stringently for banks that engage in M&A than for those that do not. Knapp et al., (2005) relate the negative reaction of markets to M&A announcements between BHC almost entirely to credit quality problems post-M&A.

The theoretical benefits of diversification and the co-insurance effect in reducing loan and lease portfolio risk, as well as the overall merged BHC default risk (Lewellen, 1971; Markowitz, 1952), seem to be offset. BHC significantly increase their portfolio risk, NPL, charge-offs, and credit losses after M&A (Knapp & Gart, 2014; Shirasu, 2018; Rose, 1987).

The increased credit risk in BHC can be either intentional or unintentional. In the U.S., the number of banks has been significantly declining (Statista Research, 2023a); this decline reflects the M&A activity in the banking industry (Avraham et al., 2012). A more concentrated business environment allows banks to take greater risks by charging interest rates with higher expected returns, which are more volatile (Beck et al., 2007). Additionally, BHCs' managements believe that the diversification benefits that come from M&A give them the space to grant riskier loans with higher returns (Knapp & Gart, 2014). An unintentional increase in credit risk can be a result of the heterogeneity in characteristics between the acquirer and the target, including differences in credit risk, diversification and lending strategies, performance, leverage, and the existence of cultural, organizational, and procedural hurdles, or even just the size of the deal (Hassan & Giouvris, 2020; Ngo, 2019; Vallascas & Hagendorff, 2011; Altunbaş & Marqués, 2008).

Figure 6 shows that the higher the value of the BHC, the stronger the amplifying effect of horizontal M&A on the negative credit risk-bank value relationship. This finding can be explained through the significant contributions of (Fama & French, 1992, 1998). Value stocks with higher book-to-market (BM) ratios outperform growth stocks with lower BM ratios. Since the BM ratio is the inverse of the market-to-book ratio, BHC with a lower market-to-book ratio are considered to have higher expected returns. Asset pricing models suggest that investors are compensated for taking more risk. Therefore, lower-valued BHC are seen more risky than higher-valued BHC. This understanding, combined with the observation that safer acquiring banks in M&A face a significant increase in default risk (Vallascas & Hagendorff, 2011) and the observation about financial markets' negative reaction to M&A in banking due to credit risk (Knapp et al., 2005), supports our result: that the higher the bank's value, the greater the moderating effect of horizontal M&A on the negative credit risk-bank value relationship. However, this interpretation is only valid from quantile (0.30) to quantile (0.80), due to the insignificance coefficient of horizontal M&A out of these quantiles.

Chapter Six
Conclusion

The increasing risk exposure in M&A impacts the successful creation of value, eliminating the growth opportunities and destabilizing the financial system. The losses resulting from credit risk erode bank's capital, leading to its financial distress, and the reduction in bank's value impedes its ability to access additional capital. Therefore, investigating how credit risk affects bank value in the context of horizontal M&A is a critical foundational stage of the M&A process that provides a clear logic for value creation.

The existing literature provides significant findings on the relationship between credit risk and bank value in the context of horizontal M&A. Yet, these findings do not clearly and accurately identify this complex relationship either due to disregarding the methodology of moderating analysis that is suitable for such relationships, or by measuring value and credit risk with metrics related to event studies and credit risk agencies ratings that are vulnerable to misspecification issues or have reliability concerns.

After addressing the issues in the existing literature, this thesis presents clear and reliable findings: while credit risk diminishes bank value, horizontal M&A events enhances it. However, despite the benefits of M&A, these events amplify the destructive effect of credit risk, further worsening bank value. Additionally, the thesis delves deeper into analyzing these findings to discover that while the value of small banks is more severely affected by credit risk than large banks, the benefits of M&A are relatively the same for banks regardless of their size. However, the moderating effect of M&A is not static. The destructive effect of credit risk on value for banks that engage in horizontal M&A is more exacerbated for highly valued banks than those with lower values.

The findings reflect the market's attitude in valuing risk differently for larger banks than for smaller banks, and how investors overreact to credit risk in high-valued stocks more than in lower ones in occurrence of M&A. Banks are institutions that are an anomaly to the risk-return principle; the risker the bank is, the lower its expected return. The negative reaction of markets to M&A entirely stems from credit quality problems. In

M&A, safer acquiring banks experience a significant increase in credit risk. In asset pricing models, safer banks are those with growth stocks, which are higher valued.

The results of this thesis offer several recommendations for investors, regulators, and practitioners. Investors should be aware of how credit risk uniquely affects the value of banks of different sizes, and the potential gains from horizontal M&A. However, they should avoid making M&A deals with banks that have credit risk problems or with high-valued banks because these deals may negate the benefits of M&A and destroy banks value. Practitioners, especially those in smaller banks, should implement more comprehensive risk management strategies to safeguard value. These practitioners should include horizontal M&A in their strategic planning as an opportunity for value-boosting, but with the condition of prioritize robust credit risk management. Regulators should devise stringent policies for smaller banks to protect their values from credit risk. Additionally, they should regulate the M&A activities between banks based on credit risk profile, by devising stringent policies and establishing guidelines for mitigating credit risk, especially for highly valued banks.

Building on the limitations of this thesis, future research can delve into several promising directions. The exclusion of unlisted banks from the analysis indicates a significant segment of the banking industry that remains unanalyzed in the context of M&A, credit risk, and value. This points towards an opportunity for researchers to expand the scope of their studies by using non-market-based valuation methods. In addition, the researchers might broaden the scope of this thesis. While the current aim is to explore the moderating effect of M&A on the relationship between credit risk and bank values, they could further investigate how this relationship varies across different acquisition financing structures, such as cash acquisitions and acquisitions through debt, or across different deal sizes.

List of Abbreviations

Abbreviation	Meaning
(P/E)	Market price to earnings per share
AIC	Akaike information criterion
ANOVA F	Analysis of variance using F-distributing
BAHR	Buy-and-hold abnormal returns
BCBS	Basel Committee on Banking Supervision
BHC	Banking holding companies
BM	Book-to-market
CD	Cross-sectional dependence
CIPS	Cross-sectionally augmented Im, Pesaran and Shin
EVA	Economic Value Added
FDIC	Federal Deposit Insurance Corporation
FE	One-way fixed effects
FFIEC	Federal Financial Institutions Examination Council
FRBC	Federal Reserve Bank of Chicago
FRBNY	Federal Reserve Bank of New York
GDP	Gross Domestic Product
GFC	Global financial crisis
H_0	Null hypothesis
H_1	First hypothesis
H_2	Second hypothesis
H_3	Third hypothesis
IMF	International Monetary Fund
LM	Lagrange Multiplier
LSDV	Least squares dummy variable
M&A	Mergers and acquisitions
M/B	Market-to-book ratio
MM-QR	Quantiles via Moment estimator
MPT	Modern portfolio theory
MVA	Market Value Added
MW	Maddala and Wu
NPL	Non-performing loans
OLS	Ordinary least squares
Q	Question

QR	Quantile regression
R^2	Adjusted coefficient of determination
RE	Random-effects
U.S.	United States
VIF	Variance inflation factor

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جامعة النجاح الوطنية
كلية الدراسات العليا

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قدمت هذه الرسالة استكمالاً لمتطلبات الحصول على درجة الماجستير في التمويل، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس –فلسطين.

2024

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الملخص

تستكشف هذه الأطروحة التأثير المعتدل لعمليات الاندماج والاستحواذ الأفقية على العلاقة بين مخاطر الائتمان وقيمة البنك. لقد تجاهلت الأدبيات الحالية التحليل المعتدل الذي يمكن أن يوضح هذه العلاقة المعقدة بشكل أكثر شفافية، واعتمدت بشكل مكثف على دراسات الحدث، والتي تواجه أخطاء في التحديد عند قياس القيمة طويلة الأمد، وتظهر تحيزًا في تقدير مخاطر الائتمان. وبتالي، تستخدم هذه الأطروحة التحليل المعتدل، وتقيس القيمة من خلال نسبة السعر السوقي إلى السعر الدفتري، وهو مقياس ذو أساس نظري قوي، وتقيم مخاطر الإئتمان من خلال نسبة صافي الديون المعدومة، وهو مقياس لا يتأثر بسهولة بالتقديرات الإدارية. تتكون العينة من 110 شركة قابضة مصرفية على مدار ثلاثة وعشرين عامًا، وقد تم تحليلها من خلال انحدار التأثيرات الثابتة والنموذج الكمي.

تظهر النتائج أن مخاطر الائتمان تؤثر بشكل سلبي على قيمة البنك، ولكن يصبح هذا التأثير أقل للبنوك ذات الحجم الكبير. تعزز عمليات الاندماج والاستحواذ الأفقية من قيمة البنك وتزيد هذه العمليات من شدة العلاقة السلبية بين مخاطر الائتمان وقيمة البنك، خاصة في المؤسسات ذات القيمة الأعلى.

عند تقييم الثروة المتوقعة في مؤسسة مصرفية، ينصح على المستثمرين تقييم ملف المخاطر الإئتمانية وحجم البنك. ينصح على العاملين في القطاع المصرفي والمشرعين أن يكونوا أكثر تشددًا في إدارة ومراقبة مخاطر الائتمان للبنوك الأصغر حجمًا. إن عمليات الاندماج والاستحواذ تقدم خيارات للنمو، ولكن ينصح على المستثمرين استهداف البنوك ذات القيمة المنخفضة والسليمة، بينما ينصح على العاملين في القطاع

المصرفي إدارة المخاطر بشكل أكثر فعالية. ينصح على المشرعين تقييد البنوك الغير سليمة وذات القيمة العالية من المشاركة في هذه العمليات.

الكلمات المفتاحية: قيمة البنك، مخاطر الائتمان، عمليات الاندماج والاستحواذ، انحدار البانل.