

# **The Role of Governance in Mitigating the Effect of Financial Contagion on Bank Bankruptcies: An Empirical Study of ASEAN Banks**

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**Abstract.** This study investigates the moderating role of corporate governance in the relationship between financial contagion and bank failures in five ASEAN countries: Indonesia, Singapore, Malaysia, the Philippines, and Thailand. Using a sample of 145 banks (82 healthy and 63 bankrupt) from 2017 to 2022, we employ logistic regression models to test our hypotheses. Our findings suggest that financial contagion increases the likelihood of bank failures, while effective corporate governance practices can mitigate this impact. Specifically, we find that good corporate governance weakens the positive relationship between solvency and the probability of bank bankruptcy, as well as the relationship between risk management and bankruptcy likelihood. Our study contributes to the literature by highlighting the importance of governance mechanisms in enhancing the resilience of banks to financial contagion. The findings have important implications for bank managers, regulators, and policymakers in the ASEAN region.

**Keywords:** financial contagion, corporate governance, liquidity, profitability, leverage, solvency, risk management, size.

## 1. Introduction

Contagion, characterized by the ripple effects of financial turbulence spanning across borders, has become a growing concern driven by several key factors: Firstly, the seismic shockwaves of the COVID-19 pandemic and other global financial disruptions have amplified the transmission of financial strain across a spectrum of international markets (Wu et al., 2023; Zhang et al., 2021). Secondly, an elevated level of economic policy uncertainty has been identified as a potent catalyst, with research revealing its substantial positive influence on the extent of financial contagion within China's intricate financial market risk network (Wu et al., 2023). Furthermore, the European debt crisis left a lasting imprint by triggering a contagion effect on Saudi Arabia's stock market. Importantly, the main conduit through which this financial crisis impacted Saudi Arabia's economic output was identified as international trade (Benlagha & Mseddi, 2016). Lastly, the advent of the COVID-19 pandemic ushered in a period of remarkable uncertainty within financial markets. Notably, the risk associated with the contagion of COVID-19 emerged as a pivotal explanatory factor for the intricate interconnectedness observed within financial networks (Chu et al., 2021).

The study of contagion involves various dimensions: (1) asset value-based contagion detection, (2) conditional probability of currency crises, (3) transmission of volatility changes, and (4) movement of capital flows (World Bank, 2010). The global financial crisis in 2008, triggered by subprime mortgage defaults in the USA, set off a series of events that affected solvency and financial liquidity (Luchtenberg & Vu, 2015). In this context, financial contagion is defined: firstly, as the occurrence of interrelated influences among several countries, which may happen under normal or crisis conditions. Secondly, the restrictive definition pertains to the fundamental relationships between countries. Thirdly, highly restrictive definition describes a phenomenon where country relationships escalate during a crisis compared to normal economic conditions (Habiba et al., 2020).

Kamaludin et al. (2021) discovered that during the initial stages of the COVID-19 pandemic, Malaysian, Indonesian, and Singaporean stock markets responded swiftly to the rising cases, while Thailand and the Philippines exhibited synchronization in the middle phase. As the pandemic progressed, all ASEAN-5 stock markets aligned closely with the Dow Jones Index during the mid-period. However, by the end of the observation period, there was no discernible correlation between the ASEAN-5 stock markets, local COVID-19 cases, and the Dow Jones index. Aziz et al. (2022) demonstrated that the impact of the COVID-19 pandemic on ASEAN+3 stock market returns and volatility surpassed that of previous economic crises, including the 2008 global financial crisis and the 2009-2012 European debt crisis. According to Altan (2022), the COVID-19 crisis primarily affected the Turkish stock market, while the source of volatility in other stock markets could be traced back to the preceding period. Notably, during the COVID-19 crisis, mutual funds generated additional returns for their investors in response to heightened risk in the Indonesian and Turkish stock markets. Yushairi & Yusoff (2018) revealed significant disparities in Stock Market Development (SMD) among Malaysia, Thailand, and Singapore following the Asian Financial Crisis in 1997-1998. Similar declines in SMD were observed in Malaysia and Singapore after the Global Financial Crisis in 2008. Furthermore, the results from the Random Effects Model emphasized the substantial influence of stock market liquidity on the SMD of ASEAN-5 countries. Regarding the contagion effect, the Seemingly Unrelated Regression (SUR) estimation results pointed out that the performance of the United States stock market had a significant impact on the SMD of Malaysia, Singapore, and Thailand. In contrast, the SMD of Indonesia and the Philippines was influenced by an interplay of factors.

Samsi et al. (2019) conducted an analysis of the repercussions of both the Asian Financial Crisis (AFC) and the Global Financial Crisis (GFC) on the economic growth of ASEAN-5 nations. Their findings pointed to Indonesia, Malaysia, and Thailand as the most affected by the AFC, yet surprisingly, these countries did not display similar vulnerability during the GFC. Furthermore, their research unveiled an intriguing observation: in the cases of Malaysia and Thailand, there was a clear and

significant positive correlation between real output and the shocks experienced in their stock markets. This observation remained consistent with the notion that disturbances in the Kuala Lumpur Stock Exchange had a more pronounced influence on real output compared to other variables, spanning twenty periods. Conversely, shocks in the Bangkok stock exchange left an even more pronounced and enduring imprint on real output, persisting until the tenth period. This underscores the pivotal role of the stock market in propelling economic growth in Malaysia and Thailand. On a different note, Jreisat et al. (2023) pointed to a notable shift. It indicated that Asian financial markets had experienced a reduced sensitivity to global shocks in the wake of the Ukraine crisis, signaling an enhanced resilience of Asian stock indices when faced with external shocks.

### **The Research Holds Significant Relevance for Several Reasons**

Financial contagion, assessed in this study by measuring the correlation of stock indices between countries, signifies the sensitivity of global stock markets. This correlation can affect other ASEAN countries when countries like Singapore influence them, (1) The stronger the bilateral trade relationship between Singapore and other ASEAN countries, the higher the degree of co-movement in the stock market (Karim & Ning, 2013). (2) If the volatility of one market increases relative to the volatility of another market, the return of the first market should also increase relative to the return of the second market. Therefore, the volatility of the Singapore stock market may influence the returns of other ASEAN stock markets (Karim & Ning, 2013). (3) While global and regional risk factors are significant components of systematic risk that explain the risk-return relationship for ASEAN-5 stock markets, regional risk factors have the largest impact, except for Singapore. Consequently, the Singapore stock market may have a relatively smaller effect on the risk-return relationship of other ASEAN stock markets compared to regional risk factors. (4) Cross-market herding in the Singapore stock market is the dominant regional factor affecting other ASEAN stock markets. Hence, if investors in Singapore start herding, it may impact the behavior of investors in other ASEAN stock markets (Muharam et al., 2021).

Financial contagion is a phenomenon where disruptions or crises in one financial institution or country can spread to other financial institutions or countries through various transmission channels. The main difference between financial contagion and other forms of financial interdependence is in the scale and speed of its spread. Financial contagion tends to have a broader and faster impact, affecting the stability of the financial system as a whole. Specific channels that can be used to spread financial contagion between banks and countries include transmission through financial markets, interconnections of financial institutions, cross-border exposures, and interactions between the real sector and the financial sector. For example, when a crisis occurs in one bank, it can trigger market distrust towards other banks, leading to massive withdrawals that can spread to other banks and even entire countries.

The research gap in this study lies in the lack of understanding on how financial contagion affects bank failures in ASEAN, taking into account the specific role of governance. The specific contribution of this research is to explore the impact of financial contagion and the role of governance in moderating the prediction of bank bankruptcies in ASEAN. What sets this research apart from previous studies is its focus on the interaction between financial contagion, governance, and bank failures in ASEAN.

Previous research has primarily focused on financial factors such as liquidity, profitability, and risk without specifically considering the role of governance in the context of financial contagion. Previous studies have highlighted the importance of good corporate governance in reducing vulnerability to financial contagion and bank bankruptcies. However, there is still a gap in understanding how corporate governance can effectively protect financial institutions from systemic risks. This study aims to make a significant contribution to our understanding of how corporate governance can moderate the effects of financial contagion on bank bankruptcy predictions. By focusing on ASEAN countries, including

Indonesia, Singapore, Malaysia, the Philippines, and Thailand, this research will identify mechanisms that can help mitigate the negative impact of financial contagion on regional financial stability.

Research Question:

1. How does financial contagion weaken the negative relationship between liquidity and the likelihood of bank bankruptcy?
2. How does financial contagion weaken the negative impact of profitability on the likelihood of bank bankruptcy?
3. How does financial contagion strengthen the positive relationship between solvency and the likelihood of bank bankruptcy?
4. How does financial contagion strengthen the positive relationship between risk management and the likelihood of bank bankruptcy?
5. What is the negative impact of liquidity on the likelihood of bank bankruptcy?
6. What is the negative impact of profitability on the likelihood of bank bankruptcy?
7. How does solvency have a positive impact on the likelihood of bank bankruptcy?
8. How does risk management have a positive impact on the likelihood of bank bankruptcy?
9. How does good corporate governance strengthen the negative relationship between liquidity and the likelihood of bank bankruptcy?
10. How does good corporate governance strengthen the negative relationship between profitability and the likelihood of bank bankruptcy?
11. How does good corporate governance weaken the positive relationship between solvency and the likelihood of bank bankruptcy?
12. How does good corporate governance weaken the positive relationship between risk management and the likelihood of bank bankruptcy?

## 2. Literature Review

Various theories provide a framework for understanding the dynamics of financial institutions. The first foundational theory or grand theory in this study is:

### a. Agency Theory

Introduced by (Jensen & Meckling, 1976), which serves as the basis for understanding relationships between shareholders (principals) and management (agents). Information asymmetry arises due to the work environment, leading to situations where agents provide misleading information to principals, especially regarding performance (Shelina & Sasana, 2022). In this study, "principals" refer to the owners or shareholders of financial and banking entities listed on the stock exchanges of the selected ASEAN countries (Indonesia, Singapore, Malaysia, Philippines, and Thailand). Principals are parties who delegate decision-making authority to agents (management) to oversee company operations and make decisions on their behalf. In this context, the principal's primary concern is to ensure that management (the agent) makes decisions that maximize the value of their investment. Meanwhile, the "agents" in this study will represent the management and executives of the financial and banking entities under investigation. These individuals are responsible for making decisions on behalf of shareholders (principals). While agents are expected to act in the best interest of the principal, they may also have their own interests and incentives that potentially differ from those of the principal. This study aims to examine how economic contagion and corporate governance impact agents' decisions, particularly in the context of bankruptcy prediction models and financial stability.

### b. Akerlof's Asymmetric Information Theory

(Akerlof, 1970) explores information disparities by examining markets with unequal information. In the banking industry, there exists information asymmetry between bank management and shareholders or regulators. This information asymmetry can result in uncertainty regarding the true financial

condition of the bank. Akerlof's theory can be used to understand how this information asymmetry can impact corporate governance policies and bankruptcy predictions.

#### c. Signaling Theory

Proposed by (Ross, 2019), relates management's incentive to signal information through debt levels. High-value companies might signal their status by undertaking substantial debt. In the aftermath of the global financial turmoil, public debt has risen significantly (Lin & Kueh, 2019). The continuous accumulation of public debt each year leads to an increase in the fiscal deficit. This, in turn, results in additional debt interest payments annually. With the rising annual debt load, coupled with existing debt and interest, the overall debt level continues to soar. A high debt level inevitably impacts the fiscal deficit. A notable development in ASEAN countries is the emergence of a consistent and substantial current account surplus. Current account data indicates declining deficits in Malaysia, Thailand, the Philippines, and Singapore, despite their large public debts. This phenomenon can be attributed to declining output and domestic demand (Šuliková & Tykhonenko, 2017). According to Lin & Kueh (2019), the 2008 subprime mortgage crisis caused Asian stock markets to decline, with Indonesia's bond spreads being the largest among emerging Asian countries. In contrast, Malaysia achieved a peak current account surplus of 16.52% of GDP in 2008 by implementing two stimulus packages involving direct cash injections (Sangkala et al., 2016).

In the same year, the Philippines experienced a sharp decline in its current account, mainly due to negative export earnings caused by the depreciation of the Philippine peso and weak external demand. The peso devaluation, coupled with increased rice and oil imports, led to reduced export growth and higher import costs. Singapore consistently reports a current account surplus, thanks to its ability to generate fiscal surpluses and attract significant capital inflows. Nevertheless, the IMF has advised Singapore to reduce its large current account surplus by increasing public spending on social services and infrastructure. Thailand's current account improved to a surplus in the second half of 2014, following a period of political uncertainty. However, the Thai economy faced challenges in 2016, including weak exports, internal uncertainties, global political dynamics, and volatile global financial markets. Nonetheless, the tourism sector played a crucial role in bolstering the economy. After the 2008 crisis, Vietnam's current account balance steadily improved, eventually reaching a surplus. This was driven by increased production in the manufacturing industry and the signing of free trade agreements with key countries to expand market reach (Lin & Kueh, 2019).

#### d. The Bank's health at the ASEAN

The World Bank, following the previous US Subprime mortgage crisis, emphasized that the role of corporate governance is to safeguard shareholders' interests by strategically organizing companies and overseeing management capabilities. It can be concluded that corporate governance serves as a mechanism to control and supervise management performance, enabling the achievement of company goals and the protection of shareholders' interests. According to Hancock (2015), corporate governance is considered one of the fundamental pillars, along with environmental stewardship and human capital, due to its pivotal role in effective company management, self-regulation, and facilitating access to investment capital through operations.

#### e. Financial contagion

As defined by the Balaga & Padhi (2017), refers to the phenomenon of financial or currency crises in one country causing similar crises in others. Three definitions of financial contagion are presented: (1) broad sense, wherein shocks transmit through cross-border countries under both normal and crisis conditions; (2) transmission of shock across borders resulting in significant correlations beyond fundamental market channels; (3) phenomenon where crises escalate during crisis periods compared to

normal. The Russia-Ukraine war and the COVID-19 pandemic have significantly impacted various aspects of the global economy, including financial contagion. A study by Dias et al. (2022) found that the Russian invasion of Ukraine in 2022 caused extreme volatility in Central and Eastern European capital markets, resulting in significant financial contagion. The study suggests that policymakers and investors should take appropriate measures to prevent or address the adverse effects of the crisis. Another study by Hassen & Bilali (2022) highlights that the Russia-Ukraine War has negative socio-economic impacts that are now being felt internationally and may worsen, especially in terms of global food security. The war has directly and indirectly affected global food security, including hindrances to Ukrainian exports, conscription and population displacement leading to labor shortages, restricted access to fertilizers, and uncertain future harvests.

#### f. Good Corporate Governance

As outlined by Susilo (2017), encompasses “transparency, accountability, responsibility, independence, and fairness.” Transparency involves disclosing relevant information, while accountability focuses on responsible organizational management. Compliance with laws, regulations, and principles of sound banking constitutes responsibility. Independence ensures professional management without undue influence, while fairness underscores justice in stakeholder rights fulfillment according to agreements and regulations.

Corporate governance plays a crucial role in bankruptcy as it can impact board composition, risk-taking behavior, and the financial performance of a firm. Research conducted by Hshieh et al. (2018) has shown that professional relationships between directors and executives/directors of bankrupt firms can decrease the likelihood of finding a new board position within one year of the bankruptcy filing. Network shocks resulting from bankruptcy can also reduce interlocking directorships across industries and alter board composition. This often results in a decrease in the number of independent directors and the appointment of new directors, while director tenure tends to increase (Hshieh et al., 2018).

The importance of robust corporate governance practices cannot be overstated when it comes to upholding public trust in the banking system. This trust is indispensable for ensuring the seamless operation of the financial sector and, by extension, the overall economy (Pereira & Vaz, 2022). Corporate governance cycles exhibit a strong correlation with instances of corporate bankruptcy and board neglect. Such problems tend to manifest with greater frequency when an extended period of economic growth is succeeded by a crisis, underscoring a breakdown in corporate governance (Pereira & Vaz, 2022).

Research conducted by Ajemunigbohun et al. (2020), focusing on the financial performance of specific insurance companies in Nigeria, uncovered a substantial influence of corporate governance practices on profitability. It was evident that inadequate corporate governance could elevate the risk of bankruptcy. Multiple studies have consistently highlighted a noteworthy connection between corporate governance metrics and the susceptibility to financial turmoil (Elshahat et al., 2015; Li et al., 2015). For instance, state control, institutional ownership, independent director compensation, board chair age, CEO education, independent director work location, and CEO concurrency have all been found to be significantly associated with the risk of financial distress (Li et al., 2015). Additionally, higher-quality corporate governance has been linked to lower operational risk incidence rates, improved performance, and a reduced likelihood of credit misconduct (Ko et al., 2019).

#### g. Hypotheses Development

1) Effect of Financial Contagion on Liquidity and Bankruptcy Probability Relationship: Several studies emphasize the importance of understanding liquidity risk in the banking system. One such study involves a mathematical model developed by Mourad et al. (2022). This model utilizes a simulation of the SIR epidemic model to describe the transmission of liquidity risk among vulnerable banks. The

results of this study reveal the impact of various system parameters on the spread of liquidity risk. Additionally, Pacheco et al. (2022) have developed a model to predict the bankruptcy of SME firms in the Portuguese manufacturing industry. This model incorporates various financial and non-financial factors, such as profitability, solvency, and firm size. The results indicate that profitability, solvency, and size are significant variables in predicting bankruptcy, with the logit model achieving an accuracy rate of 82.3%. Furthermore, research conducted by Obradović et al. (2020) focused on the relationship between financial operations in a company's financial statements and the likelihood of bankruptcy. They employed liquidity and solvency as the primary variables and identified distinctions between healthy companies and those experiencing liquidity issues. Lastly, Mokal (2015) delves into the concept of risk contagion in bankruptcy scenarios, which motivates the utilization of repos, swaps, and other derivatives in different countries. The research underscores that elements in the close-out netting process can amplify systemic risk by increasing overall exposure to risk and diminishing market liquidity and financial institutions' stability.

According to the Liquidity Risk Theory, liquidity risk refers to the ability of an entity (such as a bank) to meet financial obligations that fall due without experiencing significant losses. Liquidity risk can affect the likelihood of bank bankruptcy because the inability of a bank to meet financial obligations that fall due can cause serious liquidity problems. Financial contagion is identified as a factor weakening the negative relationship between liquidity and the likelihood of bank bankruptcy. This indicates that when financial contagion occurs, the negative impact of liquidity on the likelihood of bank bankruptcy becomes lower or less significant. This may be due to financial contagion affecting various financial aspects and risks in the banking sector, thereby reducing the direct impact of liquidity on the likelihood of bankruptcy (Mourad et al., 2022; Obradović et al., 2020; Pacheco et al., 2022). Thus, the Liquidity Risk Theory can provide a strong theoretical basis to support the relationship described in H1, where financial contagion is identified as a factor weakening the negative relationship between liquidity and the likelihood of bank bankruptcy. With these insights, the following hypothesis is formulated:

**H1:** Financial contagion weakens the negative relationship between liquidity and the probability of bank bankruptcy.

2) Financial Contagion and Profitability-Bankruptcy Relationship: Financial contagion, the transmission of financial distress from one institution or market to another, has attracted considerable attention in the context of its influence on the interplay between liquidity and bankruptcy likelihood within ASEAN nations. Numerous research endeavors have delved into this subject, shedding light on noteworthy insights. In a study conducted by Yushairi & Yusoff (2018), it was revealed that the performance of the United States stock market exerted a significant impact on the evolution of the Malaysian, Singaporean, and Thai stock markets. However, when examining the development of the Indonesian and Philippine stock markets, the interplay during the interaction period emerged as a key factor. Meanwhile, research by Krisvian & Rokhim (2022) took a closer look at the influence of bank financial risk, including liquidity risk, on the stability of banks in five ASEAN countries that had experienced crises—namely, Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Their findings unveiled a reciprocal relationship between these two financial risks concerning long-term bank stability. In the short term, there was a combined effect of these risks, along with other factors that also influenced each risk and bank stability. Another study by Mourad et al. (2022) employed a simulation of the SIR epidemic model to model the transmission of liquidity risk within the banking system. This study demonstrated that aspects of the extensive netting process exacerbated systemic risk by elevating overall exposure to risk, increasing systemic uncertainty, promoting procyclicality, and amplifying leverage. Concurrently, it reduced lending standards, the utilization of collateral, and regulatory capital buffers. Collectively, these studies underscore the substantial impact of financial contagion on the intricate relationship between liquidity and the probability of bankruptcy in ASEAN countries. Based on the Signal Theory in finance, it refers to the concept that companies or financial institutions send

signals through their financial performance to the market and other stakeholders. Profitability is one of the crucial signals that can provide information to the market about the financial health of a bank. Banks with high levels of profitability are generally considered healthier and more capable of facing financial challenges. Financial contagion is identified as a factor that weakens the negative impact of profitability on the likelihood of bank bankruptcy. This can be interpreted that when financial contagion occurs, the negative impact of profitability on the likelihood of bank bankruptcy becomes less significant. Financial contagion can influence the market's perception of the overall financial performance of the bank, thus reducing the negative impact of profitability that should be a positive signal. Therefore, Signal Theory can provide relevant understanding regarding the relationships described in the hypothesis (Krisvian & Rokhim, 2022; Yushairi & Yusoff, 2018). Financial contagion can be interpreted as a factor that affects how the signal of profitability is understood by the market and stakeholders, thus weakening the negative impact of profitability on the likelihood of bank bankruptcy. In light of these findings, we formulate the following hypothesis:

**H2:** Financial contagion weakens the negative impact of profitability on the probability of bank bankruptcy.

3) Solvency and Financial Contagion's Influence on Bankruptcy: Solvency and financial contagion can significantly influence bankruptcy, especially within the banking industry. The concentration of the banking sector can render it more fragile and susceptible to systemic crises caused by direct balance sheet financial contagion (Eboli, 2019). Without sufficient capital requirements for banks and other financial institutions, initially localized shocks can propagate throughout the system and be greatly magnified through various contagion channels (Ritter, 2019). Furthermore, the failure of significant non-financial corporations (SNFEs) can trigger contagion and result in disruptive consequences, given their substantial role in the national economy and the vital public functions they serve (Kokorin, 2021). However, an analysis of contagion and bankruptcy risks in the US property-casualty (P/C) insurance industry revealed that even if the top 10 reinsurers were to experience 100 percent losses due to default, it would not lead to widespread bankruptcy within the industry (Chen et al., 2020).

The theory of agency in finance refers to the relationship between capital owners (principals) and management (agents) in a company or financial institution. This theory highlights the existence of conflicts of interest between principals and agents, where agents (management) may have incentives to act in accordance with their own personal interests, which may not always align with the interests of the principals (capital owners). Financial contagion is identified as a factor that strengthens the positive relationship between solvency and the likelihood of bank bankruptcy. This can be interpreted as when financial contagion occurs, the positive relationship between solvency (the ability of a bank to meet financial obligations) and the likelihood of bank bankruptcy becomes stronger. Financial contagion can strengthen the aspect of solvency as an important indicator in evaluating the risk of bank bankruptcy, which in turn can be understood through the lens of agency theory (Chernyavskaya et al., 2021; Jensen & Meckling, 1976). Thus, agency theory can provide relevant understanding regarding the relationship described in the hypothesis. Financial contagion can be interpreted as a factor that influences the dynamics of the relationship between solvency and the likelihood of bank bankruptcy, which can be understood through the framework of agency theory that highlights conflicts of interest between principals and agents. The hypothesis is proposed as follows:

**H3:** Financial contagion strengthens the positive relationship between solvency and the probability of bank bankruptcy.

4) Risk Management and Financial Contagion's Impact on Bankruptcy Probability: The study by Zhao et al. (2022) proposes a new framework for inferring corporate bankruptcy, taking into account both intra-risk and contagion risk. As far as our current knowledge extends, this represents the inaugural

endeavor to comprehensively examine both risks and their collective impact on the prediction of bankruptcy. Previous research has identified a mutual influence of these financial risks on the long-term stability of banks, their combined repercussions on short-term bank stability, and the involvement of other variables that shape each risk and subsequently affect the stability of banks. The discoveries emerging from this investigation hold the potential to enrich our comprehension of managing financial risks within banks, offering valuable insights into risk mitigation strategies, particularly when navigating turbulent economic landscapes (Krisvian & Rokhim, 2022). Their study underscored the transmission of shocks and the intricate relationship between lending practices and economic interdependence. Good risk management allows banks to effectively manage risks. However, if investors do not trust the information provided by the bank or are unsure about the bank's ability to manage risks, they may withdraw their investments or increase loan costs. This can increase the probability of bank bankruptcy. This theoretical aspect can also be seen within the framework of agency theory. In agency theory, there is a conflict of interest between the principal (bank owner) and the agent (bank management). The bank owner wants management to minimize the risk of bankruptcy, while management may have incentives to take greater risks to gain higher profits or maintain their positions. In this context, during financial contagion, investors or regulators may doubt the bank management's ability to effectively manage risks, thereby increasing the probability of bank bankruptcy. In light of these insights, we posit the following hypothesis:

**H4:** Financial contagion strengthens the positive relationship between risk management and the probability of bank bankruptcy.

5) Liquidity and Bankruptcy Probability Relationship: The relationship between liquidity and bankruptcy probability is intricate and depends on various factors, such as capital structure, asset illiquidity, and the firm's life cycle stage. Reduced asset liquidity raises the likelihood of default while decreasing equity, debt, and overall firm value (Nishihara & Shibata, 2019). An enhanced model for estimating bankruptcy probability, which considers the influence of the most crucial ratios in financial analysis, has confirmed the substantial impact of liquidity on the probability of bankruptcy (Melikhova et al., 2019b, 2019a; Poliakov & Zayukov, 2023). High liquidity can be seen as a positive signal for shareholders and external parties regarding a bank's ability to meet its financial obligations and debts. Clear and transparent information about liquidity can reduce uncertainty and increase trust, thus reducing the likelihood of bank bankruptcy. In situations where bank liquidity is low, it can create uncertainty and lack of confidence in the market regarding the bank's ability to meet existing financial obligations. This uncertainty can increase the risk of bank bankruptcy as shareholders and external parties may doubt the bank's ability to withstand difficult financial situations. Therefore, in the context of the relationship between liquidity, which has a negative impact on the likelihood of bank bankruptcy, Asymmetric Information Theory can provide relevant understanding. Information imbalance between bank management and shareholders/external parties regarding bank liquidity can influence market perception of the financial risks faced by the bank, which ultimately can affect the likelihood of bankruptcy (Melikhova et al., 2019a, 2019b; Nishihara & Shibata, 2019). Consequently, the hypothesis is formulated as follows:

**H5:** Liquidity has a negative impact on the probability of bank bankruptcy.

6) Profitability and Bankruptcy Probability Relationship: The relationship between profitability and bankruptcy probability is complex and can be influenced by various factors. Research by Khan et al. (2018) demonstrates that profitability has a negative correlation with bankruptcy probability, implying that profitable firms are less likely to go bankrupt. Furthermore, firms with a higher likelihood of bankruptcy may encounter challenges in securing financing, potentially restricting their capacity to invest in growth opportunities and enhance profitability (Poliakov & Zayukov, 2023). Agency Theory highlights the existence of information and interest asymmetry between shareholders who want to maximize their investment value and management responsible for company management. The negative

impact of profitability on the likelihood of bank bankruptcy indicates that the higher the level of profitability of a bank, the lower the likelihood of the bank experiencing bankruptcy. This can be interpreted as efficient management in utilizing assets to generate income (high profitability) can reduce the risk of bank bankruptcy. Therefore, Agency Theory can provide relevant understanding of the relationship between profitability and the likelihood of bank bankruptcy. High profitability can reflect good management performance in maximizing company value, which in turn can reduce the risk of bank bankruptcy. Thus, the research hypothesis is formulated as follows:

**H6:** Profitability negatively affects the probability of bank bankruptcy.

7) Solvency and Bankruptcy Probability Relationship: Assessment and analysis of the probability of bankruptcy offer a comprehensive evaluation of the financial stability of the enterprise, its solvency, and a forecast for the future (Chernyavskaya et al., 2021). The identification and justification of bankruptcy causes in port industry enterprises play a significant role in fostering innovative development (Yarova & Vorkunova, 2022). The likelihood of bankruptcy is primarily attributed to turnover and short-term solvency, with size and turnover having a negative impact on bankruptcy (Somoza, 2021). Based on Asymmetric Information Theory, high solvency can be considered as a positive signal to shareholders and other external parties about the bank's financial condition. Clear and transparent information regarding solvency can reduce uncertainty and increase trust, thereby reducing the likelihood of bankruptcy.. Hence, the research hypothesis is formulated as follows:

**H7:** Solvency positively affects the probability of bank bankruptcy.

8) Risk Management and Bankruptcy Probability Relationship: The results of González et al. (2020) research show that the use of Enterprise Risk Management (ERM) in Spanish companies has no significant influence on these companies' performance. This lack of influence is evident in indicators such as return on equity, return on assets, and Tobin's Q. Furthermore, the adoption of ERM does not reduce the likelihood of a company going bankrupt. Interestingly, having a Chief Risk Officer (CRO) in the firm can actually negatively impact the firm's performance, although it may improve the financial stability of the firm, as measured by the distance to default. When examining the relationship between hedging risk and profitability, and the level of risk, there is evidence that hedging exchange rate risk can enhance firm performance. In the context of Risk Management, if a bank is not effective in managing risks transparently and fails to provide clear information about the risks it faces, it can create uncertainty and lack of trust in the market. When Risk Management is not done well or risk information is not communicated transparently, investors and external parties may not have sufficient understanding of the risks faced by the bank. This can lead to distrust, a decrease in stock value, and an increased likelihood of bank bankruptcy. Therefore, the relationship between ineffective Risk Management and the possibility of bank bankruptcy, the Theory of Asymmetric Information can provide relevant insights. Information imbalance between bank management and shareholders/external parties can influence the market's perception of the risks faced by the bank, ultimately increasing the likelihood of bankruptcy. Thus, the hypotheses are formulated as follows:

**H8:** Risk Management positively affects the probability of bank bankruptcy.

9) Good Corporate Governance and Liquidity-Bankruptcy Relationship: Good corporate governance entails a framework of practices and procedures aimed at ensuring ethical, transparent, and accountable management of a company. Liquidity, on the other hand, pertains to a company's ability to fulfill its short-term financial obligations, while bankruptcy is a legal recourse sought by companies unable to meet their debt obligations, seeking protection from creditors. The intricate relationship connecting good corporate governance, liquidity, and bankruptcy warrants investigation through various research methodologies, including quantitative analysis utilizing secondary data, associative approaches, and empirical testing. Findings from these studies consistently underscore the significantly positive impact of liquidity on financial performance (Taristy et al., 2022). Furthermore, they reveal a

favorable association between the corporate governance index and both financial accessibility and the ability to predict bankruptcy (Iqbal & Masood, 2022). With strong governance practices in place, bank management is more inclined to manage liquidity cautiously, utilize financial resources efficiently, and avoid unnecessary risks. Additionally, strict oversight from independent parties can help prevent detrimental actions that could increase the likelihood of bankruptcy. Through the theory of information asymmetry, we can explain how good corporate governance strengthens the negative relationship between liquidity and bank bankruptcy probability by reducing unbalanced information issues among parties involved in banking transactions. Consequently, we propose the following hypothesis:

**H9:** Good corporate governance strengthens the negative relationship between liquidity and the probability of bank bankruptcy.

10) Good Corporate Governance and Profitability-Bankruptcy Relationship: Good corporate governance and profitability exhibit a complex relationship with bankruptcy risk and firm value. Existing studies indicate that good corporate governance has a notably adverse impact on profitability (Annisa, 2021). Intellectual capital and profitability act as intermediaries, connecting the dots between effective corporate governance and a firm's overall value. Multiple factors, including the size of the board, managerial ownership, institutional ownership, the presence of independent commissioners, and risk management, all contribute positively and significantly to enhancing a firm's value. Notably, institutional ownership bucks this trend by exerting a negative and substantial influence on firm value. It's important to emphasize that profitability does not play a moderating role in the relationship between board size, institutional ownership, managerial ownership, independent commissioners, risk management, and firm value, as revealed in the research conducted by (Sirait et al., 2022). Based on the theory of information asymmetry, Good corporate governance helps reduce information asymmetry by strengthening transparency and accountability in financial reporting and decision-making. As a result, investors and creditors have better access to accurate information about the financial health of the bank. When this information is more easily accessed and understood, the assessment of investment risks becomes more precise. Therefore, a decrease in profitability that may result from poor management or excessive risk-taking will be detected more quickly, reducing the likelihood of bank bankruptcy. This leads us to formulate the following hypothesis:

**H10:** Good corporate governance strengthens the negative relationship between profitability and the probability of bank bankruptcy.

11) Good Corporate Governance and Solvency-Bankruptcy Relationship: An exploration into the performance of sugar sector companies listed on the Pakistan Stock Exchange unveiled intriguing insights regarding the interplay between corporate governance, firm performance, and financial indicators. Notably, a positive correlation was established between corporate governance, as assessed through the corporate governance index, and firm performance when measured by market capitalization. However, a contrasting negative relationship emerged when evaluating firm performance using metrics such as return on assets, return on equity, and net profit margin. Furthermore, the corporate governance index displayed a positive connection with access to finance, as indicated by the KZ index and SA index, while no direct association was observed when measured by the WW index. The results also unveiled a positive linkage between the corporate governance index and bankruptcy prediction when utilizing the Working Capital/Total Assets ratio, but an opposing negative relationship was identified (Iqbal & Masood, 2022). In a separate study conducted by Otero et al. (2020), focusing on banks operating in Middle East and North Africa (MENA) countries, a compelling discovery was made. It was found that governance practices primarily oriented toward safeguarding shareholder interests might inadvertently foster excessive risk-taking behavior. This situation can give rise to conflicts of interest between stakeholders, who are primarily concerned with the solvency of the financial system, and shareholders, who are driven by profit maximization. The degree of risk-taking can be further amplified by country-specific governance factors, and a robust macro governance framework can potentially incentivize

banks to engage in higher-risk strategies. This underscores the profound influence that bank regulation and enforcement exert on the risk profiles adopted by financial institutions. The agency theory considers a situation where asset owners (shareholders) assign managers (bank directors) to manage those assets. In this case, the bank acts as an agent on behalf of the shareholders. In this context, good corporate governance practices, such as increased transparency, accountability, and better supervision, can help reduce the potential agency conflicts between shareholders and bank management. In other words, good corporate governance can enhance management's monitoring and control over bank risks, including solvency risks. In light of these findings, we formulate the following hypothesis:

**H11:** Good corporate governance weakens the positive relationship between solvency and the probability of bank bankruptcy.

12) Good Corporate Governance and Risk Management-Bankruptcy Relationship: Good Corporate Governance (GCG) and Risk Management are two crucial factors that can influence a company's performance and financial stability. The connection between GCG and Risk Management can also have implications for the risk of corporate bankruptcy. GCG and Risk Management can moderate the impact of fraud triangle variables on company financial performance (Loho, 2021). Additionally, Corporate Governance can moderate the relationship between credit risk management and bank deposit stability (Bencharles & Nwankwo, 2021). In the context of agency theory, asymmetric information, and signaling theory, good corporate governance practices (GCG) can play a role in strengthening oversight of management, enhancing transparency of information, and providing positive signals about the quality of bank management. This can reduce agency conflicts, improve information distribution, and decrease uncertainty, thereby weakening the positive relationship between risk management and the probability of bank bankruptcy. Within the context of agency theory, GCG enhances oversight of management to reduce agency behaviors that drive excessive risk. Regarding asymmetric information, GCG increases transparency of risk information, reducing uncertainty for stakeholders. Meanwhile, GCG also functions as a positive signal about management quality, alleviating concerns about bankruptcy. By upholding accountability, companies can mitigate risk to investors. Hence, the hypothesis is formulated as follows:

**H12:** Good corporate governance weakens the positive relationship between risk management and the probability of bank bankruptcy.

### 3. Research Methodology

#### Research Plan

Stock sensitivity to market changes is determined by  $\beta$  and  $\varepsilon$ . Returns:  $R_i = \alpha + \beta RM + \varepsilon$ . Three methods used: logistic regression with financial contagion and corporate governance, logistic regression coefficient, logistic regression with these as independent variables. Study evaluates corporate governance via ASEAN Good Corporate Governance Scorecard Index (185 items). Good governance can mitigate bankruptcy impact, enhance management decisions, curb risk, and reduce information gaps among stakeholders.

"ASEAN-5" represents emerging countries in the Southeast Asian region, and investments are a key driver of their development. These countries include Indonesia, Malaysia, Singapore, Thailand, and the Philippines. The economies of the ASEAN-5, namely "Indonesia, Malaysia, the Philippines, Singapore, and Thailand," collectively grew by an average of 5.3 percent in 2022. Therefore, the analysis unit encompasses banking sector companies in the ASEAN region, covering five countries: Indonesia, Malaysia, Singapore, the Philippines, and Thailand. The data used comprises annual financial reports over a six-year observation period from 2017 to 2022, obtained from sources such as the International Financial Statistics (IFS) and the website: <https://www.bi.go.id>, <http://bankscope.bvdeq.com>.

The period from 2017 to 2022 was chosen because it covers the post-global financial crisis period

before Covid-19, the emergence of Covid-19, and the period after the Covid-19 pandemic, during which many countries have implemented financial reforms and regulatory improvements to enhance the stability of their financial systems. Samples were taken from banks in selected ASEAN countries (Indonesia, Singapore, Malaysia, the Philippines, and Thailand) to reflect variations in the regional context. The selection of these countries may be based on the size of their financial markets, the level of economic development, and their relevance in the ASEAN context. Potential bias may arise if the sample does not represent the entire population of banks in ASEAN. This can happen if the sample only includes large banks or financially stable banks, leading to research results that cannot be accurately generalized to the entire population of banks in the ASEAN region. Sample limitations are related to available data and representations that may not be entirely accurate. The available data may have shortcomings or imperfections, and the representation of each country may be unbalanced, which can affect research outcomes.

We choose a specific formula to measure financial contagion based on the theoretical framework used in the study. The selection of this formula can be based on previous literature or relevant theoretical considerations. The model specification may include control variables such as liquidity, profitability, risk, and other relevant factors. This is done to ensure that the analysis takes into account factors that can influence the relationship between independent variables (financial contagion and governance) and dependent variables (bankruptcy). To address endogeneity issues, alternative estimation techniques, such as instrumental variable methods was used, to examine the reliability of the results. This can help reduce the risk of errors in parameter estimation and increase confidence in the research findings.

1) Liquidity: (Geeta & Nagasivanand, 2021) the amount of cash required by the company to cover a range of due debts or funds available for day-to-day supporters

$$\text{Liquid} = \frac{\text{Cash}}{\text{Current Liabilities}} \times 100\% \dots\dots\dots(1)$$

Profitability reference: (Pankratov, 2022) company's profitability should be seen as a driving factor in monitoring the aspects of liquidity and solvency in the long term. So, the company should make enough profit from its business so that it can pay its debts. Profitability calculates ROA (Return On Asset) which compares net profit with total assets

$$\text{Profit} = \frac{\text{Net Profit}}{\text{Total of Asset}} \times 100\% \dots\dots\dots(2)$$

Solvency reference: (Hertina, 2021) the sociability of a Company's ability to meet long-term debt. Solvency is measured using debt to total assets. This ratio measures the extent to which the company's operating assets with debts derived from creditors and their own capital originating from the company's shareholders will be increasingly easier to obtain third-party financing.

$$\text{Solva} = \frac{\text{Long Term Debt}}{\text{Total of Assets}} \times 100\% \dots\dots\dots(3)$$

Risk Management Reference; (Susilo, 2017) Risk management relationship between problematic loans to total credits. Then risk management is measured by:

Problematic Credit

$$NPL : \frac{\quad}{\text{Total of Credit}} \times 100\% \dots\dots\dots(4)$$

Variable Control references: (Al-Slehat et al., 2020)

$$SIZE : \frac{\text{Total of assets}}{\text{Total of revenue}} \times 100\% \dots\dots\dots(5)$$

$$GROWTH: \frac{EAT_t - EAT_{t-1}}{EAT_{t-1}} \times 100\% \dots\dots\dots(6)$$

$$LEVERAGE: \frac{\text{Short term debt} + \text{Long term debt (Total debt)}}{\text{Total Shareholders' Equity}} \times 100\% \dots\dots\dots(7)$$

The Financial Contagion is measured in three phases:

- a) Firstly, measure the level of correlation between countries
  - b) Secondly, measure the sensitivity of individual stock returns to market changes using stock beta and residual error
  - c) Thirdly, measure the contagion effect of the ASEAN market on the bank and the company, calculated from the correlation of multiplied beta shares (Huyghebaert & Wang, 2010).
1. Between the countries (Babu et al., 2017), the measurement of inter-state correlation is calculated based on the correlation of a country's market return in the same period as Singapore shares. The Singapore stock is used as a reference for detecting the existence of the contagion effect, since empirically it is evident that the Singapore stock market is a sensitive market on the world market (Huyghebaert & Wang, 2010) .

$$\frac{n (\sum XY) - (\sum X) (\sum Y)}{\sqrt{n ( (\sum X^2) - (\sum X)^2 ) (n (\sum Y^2) - (\sum Y)^2 )}} \dots\dots\dots(8)$$

2. The stock return sensitivity is done to test whether the results of the stock return analysis are consistent and applicable to sub-samples with homogeneous characteristics. Sensitivity test using the combined stock price index of each country, i.e., stock return index of 5 (five) countries, Indonesia (IDX), Malaysia (KLSE), Singapore (STI), Philippine (PSE), Thailand (SET). Indices are formed from the entire bank company that goes public. The measurement of Return shares (Pincus, 1993) is formulated as follows:

$$R_{it} = \alpha + \beta RM + \varepsilon \dots\dots\dots(9)$$

3. The Financial Contagion Effect is measured by three phases: first; Measure the level of correlation between countries. Singapore with the ASEAN market, as Singapore is very sensitive to the world market. Second Measure the sensitivity of individual stocks against market changes in use of stock beta and residual errors. Third Measuring contagion effect of the ASEAN market to the company is calculated from the correlation result multiplied by the stock beta and residual error presented with the formula (correlation \* Beta shares and correlation \* Residual error)

$$R_i = \alpha + \beta RM + e \dots\dots\dots(10)$$

Good Corporate Governance Moderating reference: (Luo et al., 2012) “ASEAN Capital Market Forum (ACMF 2014) OECD (Organization for Economic Cooperation and Development) 2014 Good Corporate Governance is measured using a method of disclosure or content analysis in banking based on five principles and concepts using dichotomy which is a score of 1 (one) if yes, and a 100 score of Number of score weights is calculated by formula: value 1: Declare the disclosure; Value 0 (0): Declare no expression ASEAN Capital Market Forum (ACMF), ASEAN Good Corporate Governance scorecard  $n \times 100\%$ ; N.” where; CG: ASEAN Corporate Governance Scorecard, AGS Index:  $(\sum \text{in}/N) \times 100\%$ , AGS: ASEAN Governance Scorecard Index’s  $\sum$  at: 1 score number from the question table (item)N:

Number of 185 item questions and statements..... (11)

**Probability of bankruptcy Status**

Probability of bankruptcy Status of variable banks dependent references: Handad at al., 2004 which categorized dependent variables, where the data is non-metric, with a nominal scale on the dependent variable is the bankruptcy Status of the bank bound to be labeled if: value 0: Declare a healthy bank, value 1: Declare the bankruptcy bank \*) variable probability (categorical). The following are the details to classify a bank as healthy or insolvent including Financial Ratio, Asset Quality, Leverage, Operational Performance, Risk Management, Capitalization, Liquidity Level, and Market Performance.

**Logistic Regression Model**

$$\pi(x) = \frac{\exp(\hat{\beta}_0 + \hat{\beta}_1 x_1 + \dots + \hat{\beta}_p x_p)}{1 + \exp(\hat{\beta}_0 + \hat{\beta}_1 x_1 + \dots + \hat{\beta}_p x_p)} \dots\dots\dots(12)$$

$$g(x) = \ln \frac{\pi}{1-\pi} = \hat{\beta}_0 + \hat{\beta}_1 x_1 + \dots + \hat{\beta}_p x_p \dots\dots\dots(13)$$

**Model 1: First Stage Logistic Regression Coefficients**

In Model 1, the first stage involves a logistic regression coefficient analysis using uncensored independent variables. The logistic regression model (Model 1) aims to demonstrate the capability of the independent variables to fulfill the requirements of being effective predictors (goodness of fit).

The logistic regression equation can be expressed in the following form:

$$\ln(p/1-p) = \alpha_0 + \beta_1 \text{FINCONT} + \beta_2 \text{GCG} + \beta_3 \text{LIQUID} + \beta_4 \text{PROFIT} + \beta_5 \text{SOLVA} + \beta_6 \text{RISK} + \beta_7 \text{SIZE} + \beta_8 \text{GROWTH} + \beta_9 \text{LEVERAGE} + \text{et} \dots\dots\dots(14)$$

**Model 2: Coefficients of Logistic Regression with Financial Contagion and GCG Moderation**

In this model, moderated regression analysis (MRA) is employed with the Financial Contagion and Good Corporate Governance (GCG) variables acting as moderators. The aim of this test is to ascertain whether these moderating variables can strengthen or weaken the relationships between liquidity, profitability, solvency, risk management, and the probability of a bank's bankruptcy.

The logistic regression equation can be expressed in the following form:

$$\ln(p/1-p) = \alpha_0 + \beta_1 \text{LIQUID} + \beta_2 \text{PROFIT} + \beta_3 \text{SOLVA} + \beta_4 \text{RISK} + \beta_5 \text{SIZE} + \beta_6 \text{GROWTH} + \beta_7 \text{LEVERAGE} + \beta_8 \text{FINCONT} * \text{LIQUID} + \beta_9 \text{FINCONT} * \text{PROFIT} + \beta_{10} \text{FINCONT} * \text{SOLVA} + \beta_{11} \text{FINCONT} * \text{RISK} + \beta_{12} \text{GCG} * \text{LIQUID} + \beta_{13} \text{GCG} * \text{PROFIT} + \beta_{14} \text{GCG} * \text{SOLVA} + \beta_{15} \text{GCG} * \text{RISK} + \text{et} \dots\dots\dots(15)$$

**Model 3: Financial Spreads and Good Corporate Governance**

In Model 3, the financial spreads and good corporate governance are integrated. The logistic regression analysis is conducted with three independent variables: contagion variables, Good Corporate Governance (GCG) treated as independent variables, and additional variables.

The logistic regression equation can be expressed in the following form:

$$\ln(p/1-p) = \alpha_0 + \beta_1\text{FINCONT} + \beta_2\text{GCG} + \beta_3\text{LIQUID} + \beta_4\text{PROFIT} + \beta_5\text{SOLVA} + \beta_6\text{RISK} + \beta_7\text{SIZE} + \beta_8\text{GROWTH} + \beta_9\text{LEVERAGE} + \epsilon \dots\dots\dots(16)$$

**Sensitivity testing**

Serves as a critical step in assessing the resilience of the research model. Its primary objective is to scrutinize potential divergences in the results of relationship testing between variables, with careful consideration of measurement fluctuations within a particular variable. The measurement of Financial Contagion utilizes certain items adapted from Meyer and Gilbert's research (2009). In the assessment of effective corporate governance through disclosure (Lee and T.J. Wang, 2010), the ASEAN Corporate Governance Scorecard Index is employed, rooted in the OECD and ACMF 2014 requirements.

$$R_{it} = \alpha + \beta RM + \epsilon \dots\dots\dots(17)$$

The use of stock market correlation and the sensitivity of each stock as measures to gauge financial contagion can be justified because changes in the stock market can reflect the transmission between financial markets. The correlation between stock markets can indicate the extent to which changes in one market affect another, while the sensitivity of stocks to certain factors can depict the magnitude of the impact of those changes on individual stocks. However, an alternative approach that can be considered is the use of financial network models to analyze the relationships between financial assets in a more comprehensive manner.

Diagnostic tests that can be conducted to evaluate the validity of a logistic regression model include multicollinearity tests to identify multicollinearity issues among independent variables, model adequacy tests such as the Hosmer-Lemeshow test to measure the model's fit with the data, and goodness-of-fit tests to evaluate the overall quality of the model.

**4. Result and Discussion**

**Description of Research Object**

The research focused on analyzing the financial statements of banks in ASEAN countries, specifically covering five nations: “Indonesia, Singapore, Malaysia, Philippines, and Thailand.” The analysis period for financial statements spans from 2017 to 2022. An overview of population counts, and distribution is provided for each country. The samples were selected using the purposive sampling method, resulting in a sample size of 145 banks, comprising 82 healthy banks and 63 bankrupt banks. The distribution of bankruptcy banks in each country varies from the population profile, as obtained from the financial statements published by the Asia Pacific Consensus between 2017 to 2022. However, the ranking of bankruptcy banks in the sample is consistent with the population, with Malaysia having the highest count, followed by Indonesia and Thailand.

The dataset for healthy bank financial statements consists of 656 data points, derived from the financial statements of 82 healthy banks over an 8-year observation period. The dataset for bank bankruptcy comprises 320 data points, obtained from the financial statements of banks before they were declared bankrupt. For instance, if Bank X was declared bankrupt in 2013, the financial report data used would be from 2011 and 2012. As a result, a total of 976 financial statements were included in the analysis and hypothesis testing. Descriptive statistical analysis of variables included calculations for

minimum, maximum, mean, and standard deviation values.

Model 2: Logistic Regression Coefficient with Financial Contagion and Good Corporate Governance Moderation The second stage of the analysis involves a logistic regression analysis (Model 2) using independent variables with the addition of a moderation variable. The objective is to demonstrate that the moderation variable strengthens the impact of the independent variables on the probability of bankruptcy. If the value of the Nagelkerke R Square and the classification accuracy in the second model surpasses that of the first model, it could indicate evidence of the contribution of financial contagion and Good Corporate Governance (GCG) variables as moderation variables.

**Moderating Regression Analysis Model**

**Logistic Regression Coefficients with Financial Contagion and Good Corporate Governance as Moderators:**

$$\alpha_0 + \beta_1 LIQUID + \beta_2 PROFIT + \beta_3 SOLVENCY + \beta_4 RISK + \beta_5 SIZE + \beta_6 GROWTH + \beta_8 FINCONT * LIQUID + \beta_9 FINCONT * PROFIT + \beta_{10} FINCONT * SOLVENCY + \beta_{11} FINCONT * RISK * LIQUID + \beta_{13} GCG * PROFIT + \beta_{14} GCG * SOLVENCY + \beta_{15} GCG * RISK + et$$

Table 1: Variables in the Equation

	Variable	B	S.E.	Wald	df	Sig One Tailed
Step 1 <sup>a</sup>	Liquidity	-,528	,485	1,186	1	0,138*
	Profitability	-,683	,330	4,275	1	0,019**
	Solvability	5,154	2,171	5,636	1	0,009**
	Risk Management	1,166	1,490	,612	1	0,217
	Size	1,152	,256	20,200	1	0,000***
	Growth	,849	,247	11,794	1	0,005***
	Leverage	,754	,232	10,556	1	0,005***
	Fincont*Liquid	-1,652	1,702	,942	1	0,166*
	Fincont*Profit	-1,286	1,378	,870	1	0,175*
	Fincont*Solva	1,789	,989	3,274	1	0,023**
	Fincont*Risk	,749	1,930	,151	1	0,349
	GCG*Liquid	,607	,592	1,050	1	0,152
	GCG*Profit	,047	,277	,029	1	0,433
	GCG*Solva	-6,944	2,761	6,325	1	0,006**
	GCG*Risk	-2,948	1,910	2,383	1	0,061**
		Constant	-1,375	,270	25,961	1

\*\*\*)Significant at the 1% level, \*\*)Significant at the 5% level,\*)Significant at the 10% level

Source: Processed Data

Description: Table 1 presents the Coefficient Model for logistic regression estimation of Test Tests. The estimates are generated using panel data analysis and pooled time series analysis. The included variables encompass the probability of a bank experiencing bankruptcy, such as liquidity, profitability, solvency, risk management, moderate financial contagion, and good corporate governance. Control variables include Size, Leverage, and Growth. The variables entered in Step 1 are: Liquidity, Profitability, Solvency, Risk, Fin\_Con, Size, Growth, Leverage, Fincont \* Liquidity, Fincont \* Profitability, Fincont \* Solvency, Fincont \* Risk, GCG \* Liquidity, GCG \* Profitability, GCG \* Solvency, GCG \* Risk.

**Model 2:** This model investigates the results of logistic regression analysis with the moderation of Financial Contagion and Good Corporate Governance. The analysis of liquidity before moderation reveals a negative outcome towards potential bankruptcy. However, with liquidity moderation, a

significant change in the liquidity ratio is observed, which does not influence the bankruptcy effect. The coefficient value weakens for good corporate governance, indicating the influence of the relation between GCG and liquidity on the probability of bank bankruptcy. Empirically, it is proven that the implementation of good corporate governance reduces the risk of bank bankruptcy.

**Model 3:** This model focuses on the improvement of logistic regression with “Financial Contagion and Good Corporate Governance as independent variables.” Financial contagion and good corporate governance yield positive results as independent variables. The financial contagion variable can be employed as an independent variable in the test result model shown in Table 2. It positively predicts the impact of bank bankruptcy, with a significant positive value. Thus, empirical evidence suggests that the effect of contagion strongly contributes to the occurrence of bankruptcy, influenced by the financial ratios of the bank company. Good corporate governance, as an independent variable, possesses a significant negative coefficient value. Consequently, it can be concluded that good corporate governance variables can function effectively as independent variables. Empirically, the good corporate governance scorecard index is associated with a lower probability of bank bankruptcy.

**Summary of Model Comparison:** This study compares the classification strengths of three models for logistic regression coefficients: (1) The main independent model, (2) The model with moderation of financial contagion and good corporate governance, and (3) Logistic regression coefficients with financial contagion and good corporate governance as independent variables. The results of each model are presented in Table 2 as follows:

Table 2: Summary comparison of each model's coefficients

Dependent variable	1: Bank Failure 0: Bank Non-Failure		Logistic Regression Model	
	Coefficient			
Variable	Model I	Model II	Model III	
Constant	-1,334***	-1.375***	2,001	
Financial Contagion	-	-	1,004**	
GCG	-	-	-4,447**	
Liquidity	-,326	-,528	-,241	
Profitability	-,810**	-,683**	-,826***	
Solvability	-,085	5,154**	-,111	
Risk Management	-1,078***	1,166	-1,034***	
Size	1,120***	1,152***	1,116***	
Growth	,839***	,849***	,859***	
Leverage	,754***	,754***	,770***	
Fincont*Liquid	-	-1,652	-	
Fincont*Profit	-	-1,286	-	
Fincont*Solva	-	1,789*	-	
Fincont*Risk Management	-	,749	-	
GCG*Liquid	-	,607	-	
GCG*Profit	-	,047	-	
GCG*Solva	-	-6,944**	-	
GCG*Risk	-	-2,948	-	

Nagelkerke R Square Test and Classification Accuracy Table<sup>a</sup>

Nagelkerke R Square	0,051	0,132	0,117
Classification Accuracy Table <sup>a</sup>	67,7	70,5	68,9
N	976	976	976

\*\*\*) Significant at 1% level, \*\*) Significant at 5% Level, \*) Significant at 10% Level

Source: Data Processed

## Research Hypothesis Results

The study utilizes secondary data in the form of bank financial statements, specifically financial statement ratios published by public banks. By examining the moderating effects of financial contagion and good corporate governance on the prediction model for banking bankruptcy in ASEAN, the results of the hypotheses are as follows:

### 1) The Effect of Liquidity on the Probability of Bank Insolvency

The hypothesized test results provide evidence that liquidity's coefficient of -0.528, with a significant value of 0.138, is greater than 0.05. Consequently, it can be inferred that liquidity does not have a significant effect on the probability of bankruptcy. Liquidity cannot be considered an indicator of short-term bank bankruptcy. The research findings support the notion that operating cash flow negatively impacts liquidity, where the reduction in operating cash flow (cash) leads to this effect. With a significance value above 0.05, it becomes evident that liquidity is not the primary factor that can be utilized as a robust indicator of a bank's probability of bankruptcy. This suggests that liquidity cannot serve as an indicator of long-term bankruptcy probability. The findings indicate that liquidity itself may not be a strong indicator for predicting bank bankruptcies in ASEAN countries. It also suggests that financial contagion plays a crucial role in altering the traditional relationship between liquidity and bankruptcy, possibly by introducing systemic risk factors. Previous studies supporting this hypothesis include research by Mokal (2015) discussing the concept of bankruptcy risk contagion. Mokal highlights the importance of understanding the risk contagion in bankruptcy scenarios, which is also relevant to the current research findings on the influence of financial contagion on the relationship between liquidity and the probability of bank bankruptcies in ASEAN countries.

### 2) The Effect of Profitability on Bankruptcy Probability

The hypothesis testing results regarding profitability reveal a significant coefficient value of -0.683 ( $p = 0.019$ ), which is smaller than 0.05. This indicates that profitability indeed affects the probability of bank bankruptcy. Empirically, high profitability leads to a lower likelihood of bank bankruptcy. This implies that profitability serves as a strong and significant indicator of banking bankruptcy probability in ASEAN. The profitability ratio demonstrates how effectively a bank employs its assets to generate earnings. In practice, the extent of profitability is influenced by the quality of investment management in revenue-generating assets. The discovery supports the hypothesis that profitability is indeed an important indicator of the probability of banking bankruptcy. However, financial contagion weakens this relationship, indicating that during financial contagion periods, the protective effect of profitability may be diminished.

The primary income for a bank is derived from interest income, which is the difference between interest received and interest expenses (cost of loanable funds). This net interest income is combined with productive assets (earning assets) to determine the profit margin derived from interest. Prayitno (2019) supports this assertion, highlighting that companies reporting high profits aim to expedite the financial reporting process to promptly convey positive news to investors and stakeholders. Higher profitability leads to more efficient utilization of existing resources within the company, ultimately reducing the likelihood of banks experiencing bankruptcy.

### 3) The Impact of Solvency on Bankruptcy Probability

The result concerning solvency reveals a coefficient value of 5.154 ( $p = 0.009$ ), which is significantly smaller than 0.05. Solvency significantly influences the probability of banks experiencing bankruptcy. Increased solvency raises the likelihood of banking bankruptcy in ASEAN. Solvency reflects a bank's ability to repay external funding sources, such as debt or bond financing. While leveraging capacity can offer benefits, its misuse can escalate the scale of a bank's operations and trigger financial distress due to fixed costs. This, in turn, can lead to the actual occurrence of financial distress and subsequently the bankruptcy of the bank. The discovery supports the hypothesis that solvency is a critical factor in

determining the probability of banking bankruptcy. Furthermore, financial contagion strengthens this relationship, indicating that during contagion periods, the impact of solvency on the likelihood of bankruptcy increases.

#### 4) The Effect of Risk Management on Bankruptcy Probability

The results of the risk management hypothesis test yield a coefficient value of 1.166, which is significant at 0.217, greater than 0.05. This implies that risk management does not significantly affect the probability of banking bankruptcy in ASEAN. These findings align with Pantalone and Platt's research (2010), which elucidates that previous bank failures can be attributed to poor management decisions, including excessive risk-taking. Companies aim to minimize non-performing loans through accounting policies to lower Non-Performing Loan (NPL) rates. This implies that while risk management practices are crucial, they may not be the sole determinants of bankruptcy risk. Other factors such as management decisions, economic conditions, regulatory environment, and market dynamics may also play a significant role. Furthermore, mentioning companies striving to minimize non-performing loans (NPLs) through accounting policies highlights a common strategy used by banks to manage risk.

#### 5) The Financial Impact of Contagion on Liquidity and Bankruptcy Probability

Based on the hypothesis test results concerning the financial contagion's influence on the relationship between liquidity and the probability of bank bankruptcy, the coefficient is -1.625 with a significance value of 0.166, greater than 0.05. This suggests that financial contagion weakens the link between liquidity and the probability of bank bankruptcy. With a negative coefficient, increased financial contagion corresponds to a decreased likelihood of banking bankruptcy in ASEAN. This relationship is further influenced by systematic risk or market risk, where credit risk's positive effect on bank bankruptcy diminishes the relationship between liquidity and bankruptcy probability. The value of the deviation indicates that  $\text{Fincont} * \text{Liquid}$  is not the primary factor or strongest indicator in determining bankruptcy probability, as it weakens the relationship between liquidity and the likelihood of bank bankruptcy. The findings indicate that risk management may not be a determining factor in predicting bank bankruptcies in ASEAN countries. Furthermore, financial contagion does not strengthen the relationship between risk management and the probability of bankruptcy, suggesting that risk management practices may not be effective in reducing the impact of financial contagion.

#### 6) The Financial Influence of Contagion on the Relationship between Profitability and Bankruptcy Probability

The coefficient value resulting from the hypothesis test concerning the impact of financial contagion on the relationship between profitability and the probability of bank bankruptcy is -1.286, with a significance value of 0.175, greater than 0.05. This suggests that financial contagion weakens the relationship between profitability and the likelihood of bank bankruptcy, indicating that higher  $\text{Fincont} * \text{profit}$  values will lower the probability of bankruptcy. High profitability remains a factor in lowering bankruptcy rates, even during a global recession (AM Al-Rjoub & Azzam, 2012). The discovery supports the hypothesis, indicating that during the financial contagion period, the protective effect of profitability on bankruptcy probability diminishes. This highlights the destabilizing effect of contagion on financial indicators.

#### 7) The Financial Impact of Contagion on the Relationship between Solvency and Bankruptcy Probability

The hypothesis testing results show that financial contagion strengthens the relationship between solvency and the probability of bank bankruptcy. The coefficient value is 1.789, with a significance value of 0.023, smaller than 0.05. This signifies that  $\text{Fincont} * \text{Solva}$  strengthens the impact of solvency

on the likelihood of bank bankruptcy. A stronger relationship between  $\text{Fincont} * \text{Solva}$  indicates a greater influence of solvency on the probability of the bank's bankruptcy. This aligns with research by AM Al-Rjoub & Azzam (2012), where the general crisis negatively impacts share returns across sectors. Additionally, strengthening the financial contagion effect enhances the link between macro and micro markets, further contributing to the probability of bank bankruptcy. The findings support the hypothesis, indicating that during financial contagion periods, the influence of solvency on the likelihood of bankruptcy increases. This highlights the systemic risk posed by contagion to the financial stability of banks.

8) The Financial Influence of Contagion on the Relationship between Risk Management and Bankruptcy Probability

The result of financial contagion moderation on risk management reveals a coefficient value of 0.749, with a significance value of 0.349, greater than 0.05. This suggests that financial contagion weakens the relationship between risk management and the likelihood of bank bankruptcy. The deviation value indicates that  $\text{Fincont} * \text{risk management}$  is not the primary factor or strongest indicator in determining bankruptcy probability. This suggests that financial contagion does not significantly affect the probability of bank bankruptcy in ASEAN countries. Therefore, this hypothesis is not supported by the research findings, which indicate that financial contagion does not weaken the relationship between risk management and the probability of bank bankruptcy. However, relevant previous studies have shown that bank risk mismanagement can contribute to bank bankruptcy, even though financial contagion may not be the main factor in this context.

9) The Effect of Good Corporate Governance on the Relationship between Liquidity and Bankruptcy Probability

Hypothesis testing regarding the moderation of liquidity by good corporate governance yields a coefficient value of 0.607, with a significance value of 0.152, greater than 0.05. This implies that good corporate governance weakens the relationship between liquidity and the probability of bank bankruptcy. The deviation value indicates that  $\text{GCG} * \text{Liquid}$  contradicts the hypothesis, as it is not the main determinant or strongest indicator in determining bank bankruptcy prediction. The implementation of good corporate governance is expected to reduce the impact of bankruptcy on the bank. This implies that the implementation of good corporate governance has a positive impact on the relationship between liquidity and the likelihood of bank bankruptcy. In other words, when corporate governance is well implemented, the possibility of bankruptcy in banks can be reduced. This is due to the liquidity moderation carried out through good corporate governance, indicating a significant decrease in the correlation between the bank's liquidity levels and bankruptcy predictions. Therefore, adopting the principles of good corporate governance can be an effective strategy in managing bankruptcy risks for banks.

10) The Effect of Good Corporate Governance on the Relationship between Profitability and Bank Insolvency

The hypothesis testing results show a coefficient value of 0.047, with a significance value of 0.349, greater than 0.05. This implies that good corporate governance weakens the relationship between profitability and the probability of bank insolvency. This finding contrasts with Bai et al. (2004) classification of two mechanisms of good corporate governance. Internal mechanisms are structured to align managers' interests with shareholders', yet the significance of GCG moderation on profitability indicates that it is not the main determinant or strongest indicator in determining bankruptcy probability. Good corporate governance alone may not be sufficient to strengthen the bank. Good Corporate Governance (GCG) refers to best practices in corporate governance, including transparency, accountability, information disclosure, and effective risk management. In the context of banking, the

implementation of GCG can have a significant impact on financial performance and financial institution stability. Research has shown that institutions with good GCG practices tend to have higher profitability levels and are less likely to experience insolvency issues. Strong GCG practices can enhance operational efficiency and lead to better decision-making, ultimately boosting bank profitability. Additionally, good GCG can also promote better risk management, reducing the likelihood of financial problems that could lead to insolvency. In other words, banks that adhere to good GCG practices are likely to have stronger internal and external oversight systems, which can identify and address risks more effectively, thereby reducing the chances of insolvency.

#### 11) The Effect of Good Corporate Governance on the Relationship between Solvency and Bank Insolvency

Hypothesis testing results suggest that good corporate governance strengthens the relationship between solvency and the probability of bank bankruptcy. A coefficient value of -6.944, with a significance value of 0.006 smaller than 0.05, indicates that good corporate governance enhances the impact of solvency on the likelihood of bank bankruptcy. This aligns with Luo et al. (2012) research, which highlights the significant negative impact of institutional ownership on ASEAN's Corporate Governance Scorecard Index in relation to the disclosure of bank insolvency probabilities. GCG moderation on Solva strengthens the negative impact of solvency on bank bankruptcy probability. Improved corporate governance enhances the bank's ability to withstand the risk of bankruptcy. This finding suggests that a robust GCG framework plays a vital role in improving the efficiency of risk management mechanisms and decision-making processes, ultimately reducing the risk of bank insolvency due to insufficient solvency levels. Essentially, by fostering transparency, accountability, and prudent risk management, GCG serves as a safeguard against financial difficulties and bankruptcy.

#### 12) The Effect of Good Corporate Governance on the Relationship between Risk Management and Bank Insolvency

Based on the results of hypothesis (H12), good corporate governance weakens the relationship between risk management and the probability of bank bankruptcy. The coefficient value is -2.948, with a significance value of 0.061, greater than 0.05. This finding corresponds to research by Macey & O'Hara (2016) and Solomon (2020), highlighting the checks and balances of corporate governance systems internally and within the company. Although GCG moderation on risk management does not appear to be the primary determinant or strongest indicator in determining bankruptcy probability, it still contributes to weakening the relationship between risk management and bank bankruptcy likelihood in ASEAN. Good corporate governance practices, such as transparency, accountability, and effective board oversight, are crucial in mitigating risks in financial institutions. By fostering a culture of risk awareness and wise decision-making, a strong corporate governance mechanism can enhance a bank's resilience against adverse events, thereby reducing the likelihood of bankruptcy. This hypothesis suggests that when banks implement a robust risk management framework and strong corporate governance practices, the impact of risks on the possibility of bankruptcy will decrease. In other words, the effectiveness of risk management in safeguarding against bankruptcy will increase with good corporate governance. These findings underline the importance of a holistic governance structure in protecting financial institutions from systemic risks and reinforce the notion that regulatory efforts to promote good governance can provide tangible benefits in strengthening financial stability.

## 5. Conclusion

This study investigates the role of corporate governance in moderating the impact of financial contagion on bank failures in five ASEAN countries. Our findings suggest that effective governance practices can help mitigate the adverse effects of contagion on bank stability. Specifically, we find evidence that good corporate governance weakens the positive relationship between solvency and bankruptcy risk, as well

as the link between risk management and the likelihood of failure. These results highlight the importance of strong governance mechanisms in enhancing the resilience of banks to financial shocks and crises.

Our study contributes to the literature by providing new insights into the interplay between financial contagion, corporate governance, and bank stability in the ASEAN context. The findings have important implications for bank managers, who should prioritize the implementation of sound governance practices to mitigate the risk of failure during contagious times. Regulators and policymakers should also focus on promoting effective governance standards across the banking sector to enhance the overall stability of the financial system.

However, our study is not without limitations. Future research could explore alternative measures of financial contagion and governance quality, as well as investigate the potential heterogeneity in the impact of contagion across different types of banks and countries. Additionally, researchers could examine the role of other factors, such as macroeconomic conditions and regulatory frameworks, in shaping the relationship between contagion, governance, and bank failures.

Based on research insights, it is recommended to implement good corporate governance practices to mitigate the risk of bank bankruptcy. Strengthening transparency, accountability, and risk management oversight can enhance overall financial institution stability. Additionally, improving liquidity management strategies is also crucial in reducing the likelihood of bank bankruptcy. Maintaining clear and transparent information regarding liquidity levels can build trust among stakeholders and minimize uncertainty in the market. Furthermore, focusing on increasing profitability can significantly decrease the possibility of bank bankruptcy. Efficient management practices that maximize profitability can contribute to reducing the financial risks faced by banks and enhancing their resilience in challenging economic conditions.

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