Exploring the nexus among the Macroprudential Policies, Funding Liquidity Risk, and bank risk of Commercial Banks in Leading South East Asian Economies

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Abstract

The present study explains the behavior of liquidity management, and the macro prudential Policies index and their impact on commercial banks’ risk, particularly on the selected conventional banks in ASEAN countries. The MPP are relatively new in the operations of commercial banks. Hence, more information is needed to understand their impacts on commercial banks’ performance, particularly in the selected conventional banks in ASEAN countries. The major issues in the banking sector of ASEAN countries are asset quality, liquidity risk, and the increasing regulatory pressure from the macro prudential perspectives. Moreover, the study takes a recently developed macro prudential index and its sub-indexes to assess the impact of these on the bank’s risk. Therefore, regulators will be able to utilize this study to enhance the quality of bank assets and choose the most lucrative portfolio. It is vital to highlight that the sample consists mostly of ASEAN-typical institutions. This research will shed light on the general and particular effects of this financing liquidity and MPP index on the BR of ASEAN banks. The dynamic panel is recommended over the static with the assumption that the MPP is likely to change slowly with respect to the change in the whole banking sector that’s why the lag length can help in determining the behavior of whole banking system. Our findings are in line with the new Basel III requirements that necessitate banks to utilize long-term funding sources to equal their fund utilization and to capture further capital in the future considering that these steps can help curtail the risk-taking of banks. Our findings present valuable implications for both market participants and policymakers. By understanding the consequences of the banks’ decision to fund LR and their risk-taking behavior, regulators may find ways to enhance banking regulatory frameworks in order to better control the behaviour of bank managers and to improve financial resilience.

Keywords: Macroprudential Policies, Funding Liquidity Risk, ASEAN

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Background

The ASEAN banking sector is comprised of both local and multinational institutions. As a result of ongoing deregulatory and liberalization efforts, this sector is undergoing a period of transition (Hassan, 2020). The major purpose of these initiatives was to increase market participant
competitiveness. Nonetheless, the planned streamlining of banking laws was greeted with significant criticism. There is a substantial degree of overlap amongst ASEAN market frameworks (Basheer, Hidthiir, & Waemustafa, 2019). Numerous watchdogs and authorities monitor the financial systems of these countries. However, central banks often play a substantial role in any reforms to the financial system. There have been several modifications to micro- and macro-level prudential laws across the world’s financial systems during the last two decades. However, the microprudential issues have garnered the greatest attention (Aikman, Bridges, & Kashyap, 2019).

The potential for negative outcomes in financial transactions is referred to as “banking risks” (Hasan, Le, & Hoque, 2021). Due to the sensitivity of banking transactions, financial institutions are particularly susceptible to threats. A bank is a financial middleman; the borrowers it loans money to ultimately bear the risk it assumes. The growth and development of a bank are directly proportional to the risks it takes and the methods it utilizes to manage those risks. The bank’s profit on a particular transaction is proportionate to its risk management. According to Sharifi, Haldar, and Rao’s (2021) research, credit risk (CRR), liquidity risk (LR), insolvency risk, market risk, operational risk, and total risk are all components of banking transactions. According to Trendowski and Russbekov (2017), more risk is associated with both higher returns and a greater likelihood of failure. Rich-country banks, like their counterparts in poor countries, have expanded their product lines and adopted new business models to adapt to the twenty-first century’s competitive environment (Dutta & Saha, 2020). By generating a medium of exchange, allowing the trade of goods and services between unrelated parties, rewarding personal savings, and extending credit to individuals and companies, the banking system helps the market function. Therefore, a healthy financial system is significantly responsible for a functioning economy. Barradas and Amaliawiati (2021) suggest that financial intermediaries enhance the efficacy of economic growth by supplying capital to units that lack such resources. Even if the situation of the global economy is still unclear a decade after the Great Financial Crisis, this is the case.

The recent subprime crisis has raised serious doubts on the effectiveness of the financial market regulations (DeYoung & Jang, 2016), and also opened a debate on BR-taking that has a significant effect on the soundness of banking sector (Nadeem, Ghanı, & Shah, 2017). There are many reasons that have diverted the focus of attention of policy makers, bankers and researchers: First and foremost, the LR, has been argued as a root cause of subprime crisis (DeYoung & Jang, 2016). The poor liquidity management not only affected the banks through systematic channels but also raised questions on their risk management practices (Yang, Ishthiaq, & Anwar, 2018). Moreover, is the funding liquidity (FLR), which has been argued as one of the main factors that drives the risk-taking behaviors of the bank (Yang et al., 2018). Last, the lack of macroprudential oversight also argued as one of the determinates of the subprime crisis, as before the crisis the financial stability was mostly seen as function of micro prudential perspective and the prime objective was to reduce the chances of failure by anu individual banks. Little or no attention has been given on the impact of failure of one bank on the whole financial system. The default of world biggest financial institutions like Lehman Brothers’ have reminded the regulators about the importance of the macroprudential or systemic dimension that cannot be ignored. The banking risk in ASEAN is high and has increased significantly during the course of recent decade (Basheer et al., 2019), and the LR and prudential regulation has played a key role in determining the risk taking behavior of ASEAN banks (Islam & Nishiyama, 2019).

The LR, which has existed for some years, has emerged as a formidable new rival for financial intermediaries and thrift organizations. The LR is a large and pervasive new danger. As a consequence of the challenges generated by the subprime mortgage crisis, financial institutions today understand the need of maintaining a buffer zone in the event of another catastrophe. However, it remains unclear how large a safety margin should be from both a voluntary and obligatory (regulatory) standpoint. According to Bai, Krishnamurthy, and
Weymuller (2018), poor cash flow management exacerbated the subprime crisis of 2007–2009. As evidence, they discovered that LR through nonstandard channels might cause financial organizations to collapse. Even though liquidity issues are often caused by insufficient cash on hand, they may also be brought on by an excess of liquid assets. In 2020, Dang says that if banks have a plenty of liquid assets, they may be enticed to engage in reckless behavior, which might ultimately to their demise. Basel III stipulates that the bank must maintain a specific level of liquid assets to prevent a crisis. The ASEAN region’s banks lack enough cash reserves. Based on the data provided by banks audited reports the percentage of liquid assets to total assets has decreased significantly during the last five years (see figure 2.1).

![Figure 1. Liquidity Ratio](image)

Source. Bank’s Audited Accounts

The LR has been around for a while, and in that time, it has grown into a strong new competitor to traditional financial institutions such as banks and thrift groups. The LR presents a risk that is both serious and broad. Because of the problems that were caused by the subprime mortgage crisis, banks are becoming more conscious of the need to have a safety net in place in the event that anything else goes wrong. On the other hand, it is not quite apparent how broad a safety margin ought to be, either from a voluntary or a regulatory point of view. Poor cash flow management, as stated by Bai, Krishnamurthy, and Weymuller, was a contributing factor in the subprime mortgage crisis that occurred between 2007 and 2009. (2018). In particular, they found that the receipt of LR via nonstandard routes was connected to an increased likelihood of the demise of a financial institution. Being short on cash is one of the most prevalent causes of liquidity problems; yet, having an abundance of liquid assets may also be a component in the situation. Dang believes that if banks have a large amount of liquid assets in the year 2020, they may be enticed to engage in activities that are harmful to the economy. In the event of a financial emergency, Basel III mandates that the bank must have a certain amount of liquid assets on hand at all times. There is not enough cash available in the financial institutions in the ASEAN area. According to the findings of a research carried out by Basheer et al., the proportion of a company’s total assets that are comprised of liquid assets has drastically shrunk over the course of the last five years (2019). *(See Figure 2.1)*
There is a major hole in the research on liquidity due to the lack of consistency in the correlation between financing LR and BR. As a result, studies have reached different conclusions on the significance of various factors that affect LR. Researchers in the United States (Yang et al., 2018), the Middle East (Mairafi, Hassan, and Arshad, 2018), and emerging markets (Basheer, Waemustafa, Hidthiir, and Hassan, 2021) have all examined the liquidity and risk management financing practices of traditional banks. However, to the author’s knowledge, research on the impact of LR on BR in ASEAN countries has received little attention. Researchers have shown that when LR is too high, banks take on too much risk, which drives up BR (Yang et al., 2018). Another group of academics has discovered a negative link between financial uncertainty and BR (Basheer et al., 2021; Mairafi et al., 2018). Meanwhile, the study’s focus is narrowly limited to a few countries, namely those in the Association of Southeast Asian Nations (ASEAN). Furthermore, there is a dearth of data on the subject of finance LR in comparison to other risks (such as CRR). This study is significant because it fills a significant gap in the literature and paves the way for future research into risk management in general, and the foundation LR and BR of ASEAN banks in particular. By delving into the factors that matter most when it comes to liquidity, this study helps make LR management better. The focus on financing LR did not become prominent until after the 2008 global financial crisis, and in this context, fund managers are taught risk management methodologies for controlling the variables impacting the LR of their organizations. The banking industry has always been preoccupied with CRR. Interest rate and CRR regulation have taken a back seat to the LR during times of crisis. Due to the lack of liquidity, LR monitoring has taken over the role of interest rate and CRR management. Basel III places a lot of emphasis on liquidity because of this rising concern after the 2008 financial crisis. Another issue associated with the MPP is their assorted nature, which indicates that for all the MPP approaches there is no one size fit, and the selection an appropriate tool to either the regulate (tightening) and deregulate (easing) the financial system is a challenge. And has significant impact on the BR taking behavior. The purpose of macroprudential policies is to reduce the likelihood of a systemic risk occurring, mitigate the impact of the financial crisis on the whole economy, and fortify the resilience of the financial system (Bussière, Cao, & Hills,
Meanwhile, selection of tool at an appropriate time also matters. In an effort to provide the solution, the literature has argued the two-dimensional approach of systematic risk management with the MPP, namely the time and cross-sectional dimensions. The time dimension basically highlights the importance and necessity of the MPP to contain the financial boom that can originate from the either side of balance sheet (supply side and demand side), in the form of liquidity or the CRR. The cross-sectional dimension of the systemic risk emphasizes the need of MPP to manage the financial system that comprises of interconnected institutions. The MPP is important as just relying on the microprudential policies will cause the trickle-down effect in whole system, as it is evident from the latest incident of subprime crisis. Recently Mustain and Fakhrunnas (2021) found that MPPs are effective in mitigating the BR. However, the effect of these MPPs on BR varies as per bank balance sheet characteristics such as liquidity and CRR. Thus, the risk-taking behavior of banks, thus, could be mitigated by the active use of MPP. Considering this it can be generalized that the BR through MPPs can be mitigated by either creating a strong defense by taking a reactive approach and enhancing resilience, or with a proactive approach by creating a counter-cyclical strategy. Therefore, the regulators to control the risk-taking behavior, eased or tight the MPPs policy as per the market requirements.

The MPP are in their initial stages in ASEAN Banks and placing the significant impact on the BR taking behavior (Scalco, Tabak, & Teixeira, 2021). The central bank is ASEAN have introduced several regulatory measures to increase the resilience of financial system as well encouraging the pro-cyclical behavior. The first decade of the twenty-first century has witnessed the deregulation of financial market. Whereas, in the subsequent decades, following the Basel III regulatory authority are increasing the resilience of banking sector. However, instead of smoothening the credit cycle, increasing the resilience of the financial system through buffer, has been the prime goal of the BASEL III. Therefore, in the ASEAN market the deposit to loan ratio is decreasing (Basheer et al., 2019b), as the non-performing loan are also increasing (Basheer et al., 2019). Thus, the main aim of the ASEAN regulators is seemingly to avoid credit boom. The banks in ASEAN during the course of last two decades has undergone through the phases of regulation and deregulations. In line with this development, researchers of current study have argued that the loosening and tightening of MPP has significant impact on the BR taking behavior (Larionova & Panov, 2021).

Another problem that this article attempts to address is the lack of studies examining traditional banks in ASEAN countries in terms of BR and MPP. The impact of the kind of legislation regulating banks on their liquidity is also crucial. According to Alfouhaili's (2020) research findings, regulations have a major impact on organizations with a high level of risk. Nonetheless, its effects are muted for institutions with a low tolerance for risk. Using factor analysis, the authors quantified the nebulous concepts of banking risk and banking regulation. However, stringent regulatory power over capital management and banking activity caps has a significant impact on this LR. Though regulations have been investigated elsewhere, this is not the situation when it comes to LR. The liquidity position of the bank to large extent depends upon the regulation of the country and implementation in one country, as regulations such as reserve requirements and liquidity requirements, limit the ability of the bank to hold certain amount of the liquid assets which also determines the ability of the firm to fund liquidity crisis (Dang & Nguyen, 2020). These regulations are initiated with the objective that the banks in the time of the crisis will not be able to purchase liquidity from the market, and bank must hold certain amount of the liquid asset to protect them from any crisis. After the subprime crisis, the global regulating authority have started focusing on the macro prudential policy as a solution to manage the excessive risk-taking behavior of the banking industry. The development of macroprudential legislation should be pursued with the goals of lowering the level of systemic risk, reducing the negative impact of financial crises on the economy, and increasing the robustness of the financial system (Bussière et al., 2021).

The liquidity crunch, appeared in limelight after the crisis, as the Claudio Borio wrote on Vox a
decade ago, “We are all macroprudential now. One of the methods adopted by an international regulatory agency such as the Bank of International Settlement (BIS) to control banking risks is the liquidity coverage ratio, often known as the liquidity coverage ratio (LCR). This ratio is a major instrument of liquidity regulation. The main reason behind the LCR, is to encourage the banks to hold excessive liquidity to minimize the Banks’s exposure to LR, and to avoid the stressed condition. Thus, the LCR, basically warn the bank from underinsuring the LR, and also helps in offsetting and managing the moral hazard through the deposit insurance. Nonetheless, being a macroprudential policy standards, LCR does not take into the account the externalities and its application is uniform across the Banks.

Alfouhaili (2020) argued that the liquidity related macroprudential tolls helps in managing the BR. Thus, the macroprudential regulations have significant relationship on the impact of firm’s liquidity decision and their risk. Meanwhile, relationship between the FLR risk and BR is inconstant and inclusion of MPP as a moderator can better explain the impact of FLR risk and BR. The structural changes made in all the four countries therefore it is necessary to address the how the macro prudential regulations in countries with deteriorating liquidity position (Basheer et al., 2019) and increasing BR Basheer et al. (2019) affect the relationship between the bank liquidity and BR.

This need must be filled soon due to the paucity of research in this area and the importance of LR in Basel III capital regulation. The purpose of this research is to examine the effect of MPPs on the BR of traditional banking institutions. For that reason, a cross country study on the effect of the MPPs on the BR using a dynamic panel data is a promising approach, as it not only control the issue of endogeneity but also controlling the exogenous factors that may affect the policies. The dynamic panel is recommended over the static with the assumption that the MPP are likely to change slowly with respect to the change in whole banking sector that’s why the lag length can help in determine the behavior of whole banking system (Scalco et al., 2021). Meanwhile, the there is little or no research available in the banking and risk literature on ASEAN countries which explains the direct and moderating role of MPP on the relationship between the funding LR and BR. The study has following research objectives.

• To examine the impact of FLR on the banking risk of ASEAN Countries
• To examine the impact of the resilience MP index on the bank risk of ASEAN Countries.
• To examine the moderating role of Macroprudential index in the relationship between FLR and BR.

The scope of this study entails the parameters under which the study is carried out. This study seeks to find solutions to the problems being studied which fit certain parameters. This study attempts to find the problems that arise in banks which influence their liquidity decisions. The scope of the study is limited to examining the impact of funding LR, and MPP index on the BR of the conventional banks of the ASEAN countries The BR is conceptualizing as the three-dimensional construct namely the Z-score, CRR and the liquidity creation.

### Literature Review

#### Funding Liquidity Risk (LR)

Recent financial crises have posed substantial risks for LR funding (Muriithi & Waweru, 2017). The terms “FLR,” “finance LR,” “liquidity generation,” and “market liquidity” are defined up front to facilitate understanding. The Funding Availability Rate (FLR) measures the ease with which a certain organization may get financial aid. Another notion is quick cash availability. Finance LR, on the other hand, refers to an institution’s failure to collect sufficient funds to cover its cash withdrawals over a certain time period. Funding LR affects balance sheet liabilities, while LR influences assets. Haroon and Rizvi proved the relationship between market liquidity and FLR (2020). The ease and low cost with which assets may be sold on the market is known as market liquidity. When assets can be sold rapidly through an intermediary at a reasonable price with minimal transaction fees, market liquidity increases. The availability of financing in the real economy is a vital component of the time-honored idea of liquidity creation. Theoretically, this procedure allows financial organizations to generate on-
and off-balance-sheet liquidity after detecting that banks’ balance-sheet assets are inactive (Thakor, 2018). According to some, the only way to produce liquidity is to create a liability on the balance sheet. Depositors and banks may share the risk of an investment’s success by using the banking system to provide liquidity, which protects both parties against market fluctuations caused by shifting consumer spending patterns. Withdrawals may be made at any moment, at the discretion of the depositors.

Both the asset and liability sides of a company’s balance sheet have the potential to generate new liquid assets (Thakor, 2018). Actively participating banks are better suited to turn illiquid assets into liquid ones, resulting in a liquid balance sheet. Except for their own study, Umar and Sun (2016) assert that the majority of liquidity research is qualitative. They alone define FLR, liquidity creation, and stock liquidity (or bank liquidity). The authors used the net stable funding ratio (NSFR) as a proxy for the FLR, with stock liquidity standing in for illiquidity. Between 2007 and 2014, they analyzed 188 BRICS banks using a combination of equation modeling and three-stage least squares estimate. According to the findings, the production of new liquidity has a large and negative effect on the floating interest rate (FLR), such that a rise in liquidity leads to a decline in FLR. FLR has no impact, however, on the production of new money. It was established that a rise in stock liquidity had a negative effect on liquidity creation; in other words, as stock illiquidity increased, so did liquidity creation. In contrast, the variance in the process of creating new liquidity does not mirror the variation in stock liquidity. Nonetheless, stock liquidity may indirectly affect FLR by boosting liquidity.

In addition, Umar and Sun (2016) emphasized that deposit transactions are the only way to prevent this unexpected LR vulnerability. While banks with loan-LR exposure are exposed to high risk even in the absence of a substantial level of deposit transactions, banks with a significant volume of deposit transactions may not be exposed to high risk while having undrawn loan payments on the asset side. During a liquidity crisis, when money is flowing into banks from the securities markets, the deposit-lending hedge gains strength since it aids the firm in weathering the storm.

The FLR, also known as bank-specific liquidity, is defined as “immediate payment of obligations” (Fall & Viviani, 2016). If a bank is illiquid, it cannot meet its commitments when they are due. According to Yang et al. (2018) and Smaoui, Mimouna, and Miniaoui (2018), the deposit ratio is an indicator of a company’s capacity to weather a liquidity crisis (2020). ASEAN governments are very concerned about the “funding LR,” or inability to finance a liquidity crisis. All banking risk theories center on the growth of liquid assets. In recent decades, bank liquidity has gained considerable attention in academic banking journals (Muriithi & Waweru, 2017; Smaoui et al., 2020). The focus of global regulatory actions has shifted to liquidity management and risk management (Basheer et al., 2021). According to Khan et al. (2017), one kind of bank risk is the inability to offer liquidity, and they observed that as a company’s access to capital rises, so does its capacity to provide liquidity. Umar and Sun (2016) concurred with Dang and Nguyen (2020) that commercial banks in emerging nations are more likely to take excessive risks since they depend less on interbank transactions and own more liquid assets. It has been proposed that a high deposit-to-asset ratio encourages banks to boost their capital ratio by assuming higher risk.

Generally, banks are wary of LR for the possibility that depositors will demand an amount of cash that exceeds the amount that the banks have available. Cash demands are random and unpredictable. Additionally, it is uncertain whether the deposits will exceed their maturity date. There is also the possibility that bank customers with credit line arrangements may suddenly draw down a substantial portion of their credit lines (DeYoung & Jang, 2016). Banks tend to prioritize core deposits as they are stable funding sources that provide liquidity securities to fund the banks’ loans.

Many academic works indicate that banks exist due to the dual issuance of loans and deposits. Recent studies had focused on the combined effects of loan-related shocks and deposit-related shocks on bank liquidity. According to Smaoui et al. (2020), although there are no high
positive correlations between deposit withdrawals and credit line takedowns, both elements have a mutual synergy. Bai et al. (2018) also suggest the non-positive correlation between deposit withdrawals and loan takedowns via business cycles such as investors crowding bank deposits and borrowers reducing their credit lines during a period of tight liquidity in credit markets. This suggests common liquidity hedging i.e. when a bank carries out LR management and loan-to-deposit ratio fluctuations moderation during business cycles. However Smaoui et al. (2020) state that the hedging technique is more institutional than natural because it relies on deposit insurance. Still, the correlation between LR and the bank’s risk taking remains vague.

**FUNDING LR AND BR**

It is evident form the aftermath of the crisis that the funding LR is one of the most significant risk on banking sector (Muriithi & Waweru, 2017; Smaoui et al., 2020; Yang et al., 2018). The FLR and FLR are two distinct terms (Smaoui et al., 2020), where earlier defines as firm ability of FLR whereas later denies as her inability of funding LR (Smaoui et al., 2020). According to Smaoui et al. (2020), the funding LR is linked with the liability side of balance sheet, whereas the LR affect the asset side of the balance sheet. In a similar way the market liquidity is different from the FLR (Smaoui et al., 2020). Market LR is the cost arises from the immediate transaction of an asset to raise funds.

According to Khan et al. (2017), bank LR, in the form of institutions’ failure to fulfill liquidity needs (funding LR), has played a significant part in all banking crises, but most notably in the most recent episode of the global financial crisis, also known as the subprime crisis. Smaoui et al. (2020) concur with Khan et al. (2017) that the LR poses a significant and persistent danger to the efficiency and stability of financial institutions. Similarly, a number of prominent past academics have argued that the LR is a solid predictor of bank-wide risk (Bai et al., 2018). Previously, the finance LR was defined as the bank’s inability to repay its debts and was assessed as the bank’s active negotiations with the central bank to get liquidity. They also noted a statistically significant link between FLR and BR.As a result, Basel III has refocused its efforts on solving the LR problem in banks by implementing the net stable funding ratio (a maturity difference limitation that limits the amount of maturing refinancing at each date) and the liquidity coverage ratio (a liquidity requirement) (Basel Committee, 2010).High FLR levels have been linked to economic instability. Higher levels of aggregate liquidity, which contribute to financial crises, are formed, according to Authorea, when financial intermediaries use their surplus capacity resulting from balance sheet expansion to seek out new borrowers, even those without the ability to repay loans. Hassan, Khan, and Paltrinieri (2019) provide a theoretical model demonstrating that only during financial crises can an increase in the liquidity of bank assets contribute to a decline in banking stability.

A key theoretical gap in such research is the inconsistency of the correlation between the funding LR and BR. Although numerous researchers with various theoretical views had attempted to investigate the extent and nature of the said relationship, a consensus has still not been reached. Researchers have been deriving contradictory interpretations of the implications of various factors that affect or are affected by LR. Studies have been conducted on funding liquidity and risk management in traditional banks in several countries such as the US (Yang et al., 2018), the BRICS (Basheer et al., 2021; Mairafi et al., 2018) and developed countries. To the best of the author’s knowledge, however, no studies on the matter had been conducted on ASEAN countries. This study hence attempts to fill that gap and pave the way for future similar studies.

The lack of studies in the context of ASEAN banks concerning BR and MPP was another matter investigated in this study on top of the impact of bank regulations concerning liquidity Alfouhaili (2020) indicated that regulation significantly affects high-risk taking banks but not low-risk-taking ones. Factor analysis was used to measure the multifaceted concepts of banking risks and regulations. Meanwhile, that LR is considerably driven by strict supervisory powers on capital regulation and banking activity restrictions. Despite past studies on regulations, they did not cover the context of LR. To a large extent, a bank’s liquidity standing relies on the regulations
and implementations in the specific country because regulations like reserve and liquidity requirements restrict the capability of the bank in holding certain amounts of liquid assets which also defines the capability of the bank in FLR crisis (Dang & Nguyen, 2020). The regulations were developed with the objective of disabling banks from purchasing liquidity from the market during times of crisis and enabling them to hold certain amounts of liquid assets as a form of protection during crisis.

Similar to the methods applied by Smaoui et al. (2020) and Yang et al., the ratio of total deposits to total assets was used as a surrogate for financing LR in this investigation. According to the present research, the deposit ratio at a bank determines the behavior of borrowers. This research will use the bank z-score (Smaoui et al., 2020; Yang et al., 2018), loan loss provisions (Yang et al., 2018), and the institution's liquidity producing capabilities to represent total banking risks. Several scholars have suggested in the past that LRs may be expected based on the bank's liquidity provisioning capacity (Thakor, 2018; Yang et al., 2018). The Yang et al. (2018) work was specifically used in this investigation. Khan et al. found that these three forms of risk are positively correlated with the FLR (2017). The following sections highlight the significance of the relationships between liquidity provision and FLR and liquidity and CRR. DANG (2020) says that moral hazard forces banks to lower lending rates when cash flow improves and FLR risk goes down. They continued by claiming that the reduced lending rate is being employed to enhance loan sales, which would benefit the salaries of management. According to our sources, banks only conduct the expensive audit if the FLR risk is substantial; in situations with a lesser FLR risk, managers are often overconfident and take excessive risks. Audits will only be conducted if banks have a significant FLR deficit in order to ascertain management's evaluation of loan quality. As a result, bank managers with excess deposits tend to overestimate their own abilities, believing that there is no imminent FLR threat and that their banks' lending practices will go unchallenged. If banks make an excessive number of loans, they risk running out of capital and collapsing. Cheng, Hong, and Scheinkman (2015) found, using the principle agent theory, that managers who are more prone to taking risks must be compensated more to work in risky financial industries. To achieve this objective, managers may be provided more discretion to engage in riskier lending practices during times of surplus cash flow. FLR risk is proportional to market liquidity (Muriithi & Waweru, 2017). The minimum amount of high-quality liquid assets that banks must retain as liquidity reserves is specified by the central bank. There is widespread fear that excessively high levels of liquidity might create a financial catastrophe since the FLR fluctuates over time. According to Correa, Du, and Liao (2020), higher aggregate liquidity levels may contribute to a financial crisis because they let financial intermediaries utilize spare capacity resulting from balance sheet expansion by seeking new borrowers. According to Hassan et al.'s (2019) model of the relationship between bank asset liquidity and banking stability, higher levels of bank asset liquidity may damage banking stability during financial crises but have no effect throughout normal economic cycles. Changing monetary policies that lead to an increase in interest rates is one way to increase liquidity. According to Correa et al. (2020), a rise in risk-free interest rates may result in more risk-taking by banks since more money is put into risk-free bonds, which increases the availability of funds on the interbank market and stimulates extra lending. The extra liquidity encourages other banks to purchase equity market goods. In light of this, both theoretical and empirical research seems to indicate a connection between FLR risk and BR taking. Our first guess validates Dang's forecast (2020).

**Liquidity Creation and FLR**

Liquidity creation is an age-old concept referring to financing provisions for the real economy. It entails the creation of liquidity both on and off the balance sheet (Berger & Bouwman, 2017), which was theoretically established after noticing the inactivity of the balance sheet assets of banks. The theory suggests that liquidity can only be generated from balance sheet liability. Risk sharing between the depositors and the banks are enabled via liquidity creation as the depositors are safeguarded against uncertainties with regards to their preference for
consumption timing; in short, the banks allow the depositors to make simple investments with prearranged profits with the right to make withdrawals at any time.

Another argument states that both balance sheet assets and liabilities can generate liquidity creation (Berger & Bouwman, 2017). This model outlines that active bank can convert more illiquid assets into liquid assets; hence, balance sheet assets provide grounds for liquidity creation. Many previous studies on liquidity are qualitative in nature save for theirs which presented the definitions FLR. The net stable funding ratio (NSFR) is utilized as the proxy for FLR whilst stock liquidity is utilized as the proxy for stock illiquidity; the equations model and three-stage least-square estimations were applied concurrently in examining 188 banks operating in BRICS between 2007 and 2014.

The findings indicate a significantly negative relationship between liquidity creation and FLR whereby increased liquidity creation directly causes decreased FLR. However, FLR has no effect on liquidity creation. Increased stock liquidity negatively affects liquidity creation; in short, increased stock illiquidity causes increased liquidity creation. However, stock liquidity variation is unaffected by liquidity creation variation. Stock liquidity has a direct effect on funding LR, while stock liquidity affects funding LR via liquidity creation.

**Funding Liquidity Risk and Credit Risk**

CRR is defined as the possibility that a borrower or counterparty will be unable to fulfill its obligations according to the set terms. A CRR system aims to maximize a bank’s risk-adjusted return rate by maintaining the CRR exposure within adequate limits. Effective CRR management throughout a certain portfolio and in single credits or transactions is pertinent to banks or as indicated by Alshatti (2015), critically significant (Alshatti, 2015). The most significant risk in the financial institutions is CRR. CRR is a risk of default on loans provided by loans turned to bad debts. This risk shows that a borrower will not be able to repay his loan when due. A decrease in the real value of financial institutions may occur if CRRs are high. Yang et al. (2018), and Smaoui et al. (2020) has used loan loss provision to total asset as a proxy of CRR and both have found that the funding LR has significant impact on CRR.

**Macroprudential policies and Bank risk**

MPP are globally acknowledged as policies that are created to determine and moderate prevailing risks to systemic stability, and hence lessening economic costs due to financial service disruptions that reinforce the financial market mechanisms including credit provision as well as services related to insurance, payment and settlement (FSB/IMF/ BIS, 2009). Nevertheless, there is no direct framework for examining the effects of MPP on systemic risk. The time and cross-sectional dimensions of systemic risk necessitate the requirement for MPP. The time dimension indicates the necessity to restrain financial increases which may result from the supply and demand of agents as well as financial intermediary behavior. The demand side can be exemplified using the amplification mechanism of “financial accelerator”. The model developed by Correa et al. (2020) presents mechanisms that are related to the supply side whereby the preliminary positive shock that increases bank asset values e.g. loans and securities may propel additional debt increases if a certain leverage ratio is targeted by the bank. Leverage decisions made by banks and asset and/or liability compositions heighten exposure to future negative shocks via mismatched balance sheets.

The cross-sectional dimension is primarily associated with the interconnectedness of financial institutions. After GFC, this became the main policy discussion following the amplified shocks experienced by some institutions that spread across financial markets and countries. Negative externalities as a result of interconnectedness are reduced for instance by the Basel III regulatory framework which aims SIFIs or Systemically Important Financial Institutions with certain capital surcharges.

The variations in macroprudential objectives and instruments pose a second challenge. Here, no single approach can be taken as the best. The decision of tools to use as well as their calibration and deployment will be determined by the authorities’ assessment of the vulnerabilities involved and their confidence of their analysis. Also integral are the legal and
institutional setups. The effect of a certain instrument relies on several factors that are evaluated in accordance with the selected objective. The specific objective of improving financial system resilience could be achieved by certain instruments that would otherwise not work in achieving the broader objective of restraining the cycle. Countercyclical capital buffers, for instance, targets to form buffers against total credit exposures whilst loan-to-value ratio caps only relate to new borrowers particularly those with high leverage. This is specifically true for capital buffers when the aim is to increase total resilience. Which means that the countercyclical and resilient nature of tools has significant impact on the banks risk taking behavior (Alshatti, 2015). Smaoui et al. (2020) argued that the countercyclical and resilient index has significant impact on BR, and they place a significant moderating impact on the relationship between banks specific factors and BR.

The regulatory authority set mechanism and formulate regulations for supervision and regulation of financial institutions (Tarullo, 2019). The regulatory authorities do so to ensure that the financial institutions are safe and performing the intermediation role in most effective and efficient manner and will be able to honor their obligations. Traditionally¹ the focus of the regulators were to ensure firm level soundness and regulations that imposed were consisted of firm-level oversight. These micro prudential regulations come under scrutiny, as regulators have observed that during the crisis period, the firm level oversights had allowed the financial vulnerabilities to grow (Tarullo, 2019). Consequently, the global as well as regional financial regulatory authorities have started focusing on more systemic approaches of financial regulations. This holistic approach is called MPP.

According to the Scalco et al. (2021), the prime objective of the MPP is to reduce the banking risk and enhance the financial stability. The microprudential policy with a systemic approach tries to explain the relationship between systemic financial vulnerabilities such as liquidity, crisis and BR. The main difference between the MPP and micro prudential policy, is that the earlier focus on the soundness of banking system as whole by taking a systemic approach, whereas later only focuses on the safety of the individual financial institutions. Meanwhile, with the lens of microprudential policy, the regulators seen the risk as exogenous, i.e the potential shock has origin beyond the banking system. Whereas the with the lens of MPP, the risk is considered as endogenous. In addition to that the MPP see the bank as set of interconnected entities and argue that the change in one bank will bring the change in all other banks.

Andries, Melnic, and Nistor (2017) have used the reserve requirements and capital requirements as only tools to capture the macroprudential policy and unlike Smaoui et al. (2020) have ignored the liquidity and currency-based tools. The researcher has used three tools namely credit related, capital related policy tools and liquidity related policy tools. However, unlike the Andries et al. (2017) have ignored the specific measure for liquidity and currency-based tools. Andries et al. (2017) The researchers have used the reserve requirements and capital requirements as only tools to capture the macroprudential policy and unlike Smaoui et al. (2020) have ignored the liquidity and currency-based tools. The researchers have used a comprehensive measure to capture the macroprudential policies. The researchers have used the non-performing loan as a proxy of BR and Z-score is used to capture the overall risk. However, no attention has been given to capture the LR. CRR and LR remain unaccounted by Mustain and Fakhrunnas (2021).

The MPP policy as moderator

The MPP tools has gained popularity in the post crisis period, and the effectiveness of the macroprudential tool in managing risk becomes a critical issue for policymakers and researchers. The post crisis period has witnessed a burst of literature on role of MPP on the risk-taking behavior of banks. The regulators have argued the introduction of MPPs as a systemic

¹ In literature argued as pre sub-prime crisis period
mechanism to control the BR taking behaviors. In continuing the argument, they also broached that the MPP are proposed to mitigate the BR by enhancing the resilience of financial system during an economic downturn, which in turn helps in the promotion of sustainable growth of financial intermediation, and a central bank can trust on the MPP for the supervision and monitoring of the BR. A part of increasing resilience of the financial system, the MPPs are also aimed to address the cyclical risk arising from any, local, regional or global cycle (Mustain & Fakhrunnas, 2021). The countercyclical capital buffer, dynamic reserve requirements and the loan to value ratio are few of macroprudential tools that aimed to enhance the ability of banks to deal with economic and financial cycles by detecting the BR in advance. Thus, the MPP helps the regulators in enhancing the reliance as well as encouraging the pro-cyclical behavior of Banks.

As an aftermath of crisis, the countries around the globe have started focusing on the MPPs and they have been placed at an extremely important position, and it was also the point when the ASEAN region has started relying on the macroprudential supervision in ASEAN. Considering the importance of MPP and as an aftermath of subprime crisis, the ASEAN financial regulation authorities have started focusing on the more systemic approaches of regulations.

LR has been a constant threat to the management of financial institutions and the stability of the financial system. The general advice for banks is for them to retain a liquidity buffer in managing LR and to protect themselves against slight liquidity jolts. Bai et al. (2018) demonstrated that systematic LR had significantly contributed to banking fiascos throughout 2009–2010 following the 2007–2008 global financial crises. The authors highlighted that LR via systematic and idiosyncratic channels could cause bank failures. In support of this, Dang (2020) and Hassan et al. (2019) who had theoretically predicted the effects of short-term liquidity on BR-taking and stability had proven that high asset liquidity levels can possibly intensify BR; hence, this requires further investigation as risky banks could pose substantial welfare costs as demonstrated in the recent banking crises. Banks are shielded from “run” risk by deposits; banks with more deposits experience lower FLR risk which lessens market discipline and increases risk taking. Deposit insurance also produces a moral threat for extreme BR-taking in response to deposit increases to the detriment of the deposit insurers. Deposit insurance plays a similar role as a put option on the assets of the bank. FLR risk is defined by Muriithi and Waweru (2017) as the failure of the bank to instantly settle commitments and measure FLR risk according to the banks’ extreme bidding to secure liquidity at central bank auctions. We deem banks with higher deposits to have lesser FLR risks as the banks would have sufficient funds to settle their commitments and that there would be less “run” risks with deposit insurance being present. This study aims to determine the effect of various FLR risks on the risk-taking of banks. The adverse correlation between lower FLR risks and BR has been proven in several studies. Dang (2020) presented theoretical support that lower FLR risk as measured by deposits can prompt the engagement of bank managers in extreme lending practices. Likewise, that banks with higher deposit funding access throughout the 2007–2008 global financial crises were more keen on lending more than banks with short-term debt financing. Hassan et al. (2019) introduced a model which indicates that greater liquidity can surge banking system instability and the externalities linked to bank failures. Additionally, Yahaya, Farouk, and Yahaya (2015) showed that extended periods of low interest rates can prompt banks to assume more risks. Meanwhile, the Dang (2020) are also arguing the macroprudential index moderates the relationship between bank specific factors and BR. Principally, macroprudential tools can be utilized for moderating the risk-taking incentives derived from financial decisions. Mairafi et al. (2018) suggested that conservative limits on debt-to-income (DTI) ratios can control the effects of banking decisions constriction on defaults. Meanwhile, macroprudential measures including LTV ratio limitations can mitigate vulnerabilities provided that the accommodative monetary policy is boosting asset prices. On top of that, increases in BRs due to anticipated lax monetary policy can be contained by greater capital requirements (inclusive of countercyclical) or stricter leverage and liquidity ratios. Thus, basing on the literature reviewed the study broached
an argument that the macroprudential policy tools affect the relationship between firms liquidity decision and BR taking behavior.

Regression Models
This paper examines the effects funding liquidity risk, and macroprudential index on the BR of conventional commercial banks of ASEAN. Following the study of Dang (2020), we are also interested in examining the moderating role of macroprudential index, macroprudential resilience index and macroprudential cyclic index on the relationship between funding LR and BR. Basing on the studies of Khan et al. (2017), Basheer et al. (2021), Correa et al. (2020), Mairafi et al. (2018), Liu (2018), Chen et al. (2018), Mustain and Fakhrunnas (2021), Umar and Sun (2016) and Smaoui et al. (2020), Chen et al. (2018), Umar and Sun (2016), Khan et al. (2017), Basheer et al. (2021), Mairafi et al. (2018), Liu (2018), Smaoui et al. (2020), and Mustain and Fakhrunnas (2021) we have drawn the following model. The model 2 to 7 represent the linear model, whereas the models 9 to 11 are representing the moderating effect of MPPI.

Model 1-3: Impact of FLR on the BR
\[ Y_{it} = \alpha_0 + \alpha_1 X_{1t} + \alpha_2 X_{2t} \] (1)

Model 4-6: Impact of MPPI index on the BR
\[ CR_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 PROF_{it} + \alpha_5 MP_{it} + \epsilon_{it} \] (2)
\[ LC_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 PROF_{it} + \alpha_5 MP_{it} + \epsilon_{it} \] (3)
\[ ZSCORE_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 PROF_{it} + \alpha_5 MP_{it} + \epsilon_{it} \] (4)

Model 4-6: Impact of MPPI index on the BR
\[ CR_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 PROF_{it} + \alpha_5 MP_{it} + \epsilon_{it} \] (5)
\[ LC_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 PROF_{it} + \alpha_5 MP_{it} + \epsilon_{it} \] (6)
\[ ZSCORE_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 SIZE_{it} + \alpha_3 CAP_{it} + \alpha_4 PROF_{it} + \alpha_5 MP_{it} + \epsilon_{it} \] (7)

The moderator hypothesis is accepted or rejected on the basis, if outcome of interaction term is significant or insignificant. The linear model of moderated relationship defines by Hair et al. (2006) is as follow:

\[ Y=Y_{it} = \alpha_0 + \alpha_1 X_{1it} + \alpha_2 X_{2it} + \alpha_3 X_{1it}X_{2it} \] (8)

Where:
\[ \alpha_0= \text{Intercept} \]
\[ \alpha_1 X_1 = \text{Linear effect of X1} \]
\[ \alpha_2 X_2 = \text{Linear effect of X2} \]
\[ \alpha_3 X_1 X_2 = \text{Moderating effect of X2 on X1} \]

Moderating effect of MPPI in the relationship between CRR and the funding LR
\[ CR_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 FLR_{it} + \alpha_3 MPPI_{it} \times FLR_{it} + \epsilon_{it} \] (9)

Moderating effect of MPPI in the relationship between liquidity creation and the funding LR
\[ LC_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 FLR_{it} + \alpha_3 MPPI_{it} \times FLR_{it} + \epsilon_{it} \] (10)

Moderating effect of MPPI in the relationship between Z-score and the funding LR
\[ ZSCORE_{it} = \alpha_0 + \alpha_1 MPPI_{it} + \alpha_2 FLR_{it} + \alpha_3 MPPI_{it} \times FLR_{it} + \epsilon_{it} \] (11)

Data and Data Sources
The study used secondary sources of data. The secondary data bank-specific factors will be collected from the annual report of the banks whereas the data of regulatory and economic factors will be collected from the database of Bureau of Statistics and State Bank of country. The study period covers from 2007 to 2020. The descriptive statistics are shown in the table 1 below.
Table 1.
Summary Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Obs.</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>671</td>
<td>0.3543211</td>
<td>0.259242</td>
<td>0.0263217</td>
<td>1.7986210</td>
</tr>
<tr>
<td>LC</td>
<td>671</td>
<td>0.0691539</td>
<td>0.0432303</td>
<td>0.0223461</td>
<td>0.6195135</td>
</tr>
<tr>
<td>ZCOR</td>
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<td>0.0266189</td>
<td>0.0016638</td>
<td>0.1465053</td>
</tr>
<tr>
<td>SIZE</td>
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<td>2.4323162</td>
<td>14.5032153</td>
<td>28.673211</td>
</tr>
<tr>
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<td>0.0182651</td>
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<td>0.1134610</td>
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<td>24.352130</td>
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<tr>
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<td>0.0611248</td>
<td>0.0123114</td>
<td>0.7463214</td>
</tr>
<tr>
<td>FLR</td>
<td>671</td>
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<td>0.1521445</td>
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<td>0.9454320</td>
</tr>
<tr>
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<td>671</td>
<td>5.1513319</td>
<td>1.3612280</td>
<td>3.3261791</td>
<td>8.1543210</td>
</tr>
</tbody>
</table>

We began our analysis by determining whether our variables were stationary. We used the panel Fisher type unit root test with the Philips perron method on all of our variables to ensure that they were stationary and to rule out any erroneous regressions. The findings show that the variables are stationary at all levels (Choi, 2001). We employed the Fisher-type unit root test, which runs the Augmented Ducky Fuller (ADF) test to each cross-section and reports integrated p-values from the unit-root tests for panel data incorporating four of the approaches of Choi (2001). Among the techniques, three employ the inverse-normal, inverse χ2, or inverse-logit transformations to transform p-values, whereas the remaining is a variant of the inverse χ2 transformation that is typically incorporated when N approaches to infinity. Test’s null hypothesis is that all of the panels have a unit root. The findings suggest that the null hypothesis is not supported and that the variables are stationary at all levels. Thus the null hypothesis of the test is; all panels have a unit root. In the test specification, we try several lag lengths, but the significant results remain the same.

Table 2.
Pearson correlation coefficients

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LC</td>
<td>0.1271</td>
<td>1.00</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ZCOR</td>
<td>0.1119</td>
<td>0.3118</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIZE</td>
<td>0.1239</td>
<td>0.0224</td>
<td>0.4113</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>0.2097</td>
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<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MP</td>
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<td>-0.0121</td>
<td>0.0372</td>
<td>0.1217</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ERVOL</td>
<td>0.1213</td>
<td>0.4714</td>
<td>0.8110</td>
<td>0.3521</td>
<td>0.2543</td>
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<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLR</td>
<td>0.1228</td>
<td>0.2265</td>
<td>0.1663</td>
<td>0.1817</td>
<td>0.4281</td>
<td>-0.1009</td>
<td>0.2714</td>
<td>1.00</td>
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</tr>
<tr>
<td>MPP1</td>
<td>0.381</td>
<td>0.12</td>
<td>-</td>
<td>0.688</td>
<td>0.05</td>
<td>0.148</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 2 shows the Pearson correlation coefficients used in this study to assess the strength of correlations among the independent variables. No correlation coefficients among the independent variables show value greater than 0.80, as shown in Table 1. According to Gujarati
and Porter (2009), a benchmark of 0.8 level of correlation is adopted to detect the presence of multicollinearity.

Several diagnostic tests were done to determine the most appropriate estimations (see Table 3). To begin with, we employed the White Heteroscedasticity test in order to know the heteroscedasticity defects in the deployed aggregate model. Null hypothesis is rejected in our aggregate model at the 5% significance level, where the p-value is between 0.0000 and 0.0020, according to the test findings. This shows that there is a problem in aggregate pooled model relevant to heteroscedasticity, and the use of random effect estimates is thus advised.

Table 3: Results of the Diagnostic test

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Hausman test</th>
<th>Breusch and Pagan test/ autocorrelation test</th>
<th>Arrelano-Bond Test</th>
<th>White Heteroscedasticity test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prob &gt;ch2</td>
<td>0.0031*</td>
<td>0.0000</td>
<td>0.621</td>
<td>0.0000**</td>
</tr>
<tr>
<td>Prob &gt;z</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The LM test of Breusch and Pagan is used to select between random effect estimates and pooled OLS (Breusch and Pagan, 1979). This test verifies that the pooled OLS method is an autocorrelation-free "blue" estimator and that the cross-section-specific component is equal to zero. Under the null hypothesis, LM used a chi-square distribution with one degree of freedom. The null hypothesis was manifestly rejected when the estimated value exceeded the tabulated chi-square, indicating the presence of cross-section individual effects and the preference for the random effects model. The results of the LM test shown in Table 1 indicate that the random effects model should be favored over the pooled OLS. Next, either a random effects model or a fixed effects model must be selected. The Hausman specification test is used to differentiate between estimator 1 with a fixed effect and estimator 2 with a random effect. Estimator 2 is an effective and impartial estimator of the true parameters, according to the null hypothesis. There should be no systematic difference between the two estimators in this instance. The null hypothesis is not supported by Table 4, which suggests using a model with fixed effects. As indicated in the table below, the Arellano-Bond test was used to ensure that there was no autocorrelation in the GMM analysis of the research. For each model, the Pearson test was employed to demonstrate cross-sectional dependency. The test results indicate that the cross-sections are dependent on one another. With balanced panel datasets, we may utilize the Panel Corrected Standard Error (PCSE) and Feasible Generalized Least Squares (FGLS) techniques (PCSE). Due to the inconsistency of our panel data, we used the robust and clustering options after each model. The data were arranged in banks (De Hoyos & Sarafidis, 2006). Each endogenous variable has only one instrument if our GMM model is recognizable.

Since our model is an identifiable model with a single instrument for every endogenous variable, we cannot test for over-identification limits in this situation. Consequently, diagnostic tests are conducted following GMM estimation, which employs autocorrelation testing to validate the instrument (Arrelano-Bond Test). In contrast, the Arrelano-Bond Test revealed no indication of autocorrelation. Consequently, the fixed effect and GMM estimates of the aggregate model seem to be the most significant estimates. Table 4 presents the outcomes of the various GMMs. The results demonstrate a statistically significant and positive correlation between financing liquidity risk and bank risk. The MPPI has a negative relationship with bank risk, suggesting that as macroprudential regulation grows, so will bank risk. According to the findings of the research, the MPPI moderates the relationship between financing liquidity risk and bank risk.
Hence, the productive use MPP could mitigate the risk-taking behaviour of banks. Capital-based instruments like capital conservation buffers, for instance, enable institutions to raise capital during positive periods, which in turn could be utilized to cap losses during periods of duress. Likewise, the productive use of the countercyclical capital buffer can be employed to attain the larger macro-prudential aim of safeguarding the banking sector from long episodes of surplus credit growth (BCBS, 2010: pp.5). Furthermore, provisional requirements like the dynamic provisioning tool utilized in Spain also necessitate banks to carry out total loss provision amount adjustments when their profits are rising, with the objective of drawing on these provisions when economic downturns occur. Hence, BRs can be mitigated with the joint use of capital-based requirements whereby higher buffers are required in times of economic upturn. Further mitigation of BRs can be carried out by using other macroprudential tools during economic upturns. For example, BRs arising from re-pricing and liquidity gaps can be minimized by boosting liquidity requirements and enforcing strict currency instruments in addition to exchange rate fluctuations. Hence, the banks’ liquidity Z-score, two measures or the study’s utilized BR are projected to be impacted by the single or multiple utilizations of macroprudential instruments.

Conclusion
The effects of MPPs on BR-taking behavior though affect independently but also sensitive to other factors and one of them is the LR. Most macroprudential actions are stronger in credit booms, when banks normally relax the maturity match assumptions, which in turn affect the bank’s ability of funding the LR as well as its liquidity creation (Mustain & Fakhrunnas, 2021). According to Hassan et al. (2019) CRR is one of the key factors that determine the MPPs implementation, and if the CRR is increasing the MPPs become more relevant. MPPs not only place direct effect on the BR such as CRR but also affect the impact of the bank specific factors on the BR as Liu (2018) argued that the MPPs moderates the BR and particularly CRR for Indian banks.. In line with it the Smaoui et al. (2020) and Mustain and Fakhrunnas (2021) have argued that the easing and tightening of the macroprudential regulations place a significant impact on the BR taking behavior.

Since the Great Financial Crisis drew widespread attention to the reality of liquidity crises, regulatory measures in the financial industry have placed a significant emphasis on banks’ ability to maintain adequate levels of liquid assets. The constant regulatory pressure and the enactment of the Dodd-Frank Wall Street Reform and Consumer Protection Act in 2010 caused US banking giants such as JP Morgan Chase to expand their holdings of liquid securities and cash in order to calm anxieties surrounding LRs. Although the Dodd-Frank Act in the United States and the new Basel III regulations for banks throughout the globe encourage a greater emphasis on FLR requirements, it is uncertain if this will guarantee that banks are less risky and the financial system is more stable. Because of this, it is very necessary to have an understanding of the potential connection between FLR risk and the risk-taking behavior of banks at a time when regulatory adjustments are concentrating on making banks more liquid than they were in the past. The results are consistent with what Chen, Shen, and Kao (2018) demonstrated: that there is a correlation between an increase in financial stability and a reduction in the likelihood of a bank failing. In the most recent version of the Basel III criteria, financial stability was evaluated using the ‘net stable funding ratio. According to Chen et al. (2018), in order for financial institutions to maintain the same level of net stable funding ratio, they would have to pay higher interest rates if they increased the amount of long-term borrowing they did. Therefore, notwithstanding the gains to the public sector from the reduction in the number of societal bank failures, increased liquidity requirements may have a detrimental affect on profitability and lead to a rise in BRs. One way to conceptualize the deposit protection provided by banks is as a put option with a strike price that is equivalent to the liabilities’ face value. This study breaks new ground in the realm of ASEAN banking research by concentrating on the connection that exists between BR and financing liquidity as well as macroprudential laws. This study is beneficial because it provides information on the effect of
asset quality and portfolio optimization of the income structure on insolvency risks in conventional banks in ASEAN. This information is important for the stakeholders of these banks because it reveals the relationship between these factors (such as depositors, bondholders, investors, shareholders, and creditors). Because of this information, potential bank creditors and debtors may profit by depositing their money with financially secure organizations that have successfully minimized the risk of going bankrupt. This paper makes a significant new addition to the body of banking literature by shedding fresh light on the subject of how the LR, MPP, and BR are supported in the banking sector of ASEAN countries.
Table 4. Difference GMM

<table>
<thead>
<tr>
<th></th>
<th>2</th>
<th>3</th>
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<th>5</th>
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<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>$CR_{t-1}$</td>
<td>0.356*</td>
<td>-</td>
<td>-</td>
<td>0.341*</td>
<td>-</td>
<td>-</td>
<td>0.321**</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>$LC_{t-1}$</td>
<td>-</td>
<td>0.427***</td>
<td>-</td>
<td>-</td>
<td>0.421***</td>
<td>-</td>
<td>-</td>
<td>0.212***</td>
<td>-</td>
</tr>
<tr>
<td>$ZSCOR_{t-1}$</td>
<td>-</td>
<td>-</td>
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<td>-</td>
<td>-</td>
<td>0.352***</td>
<td>-</td>
<td>-</td>
<td>0.241***</td>
</tr>
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<td>0.322**</td>
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Macroprudential Policies, Funding Liquidity Risk and bank risk  Mattayaphutron, S., (2022)

References


