The role of bank capital through monetary policy transmission mechanism

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This study examines the role of bank capital in the transmission of monetary policy, considering the bank lending channel (BLC) and financial development. Analyzing bank-level data from nine countries during 2007-2021 with GMM method, the study finds that well-capitalized banks are better positioned to expand loan supply and withstand adverse shocks. However, behavioral patterns differ between developed and ASEAN countries. In developed nations, policy rate changes have inconclusive effects on loan growth, while profitable banks and inflation drive credit expansion. In ASEAN countries, policy rate increases are associated with loan growth, reflecting favorable economic conditions. Financial development impacts credit expansion differently in developed and ASEAN countries, with improved financial systems mitigating shocks in ASEAN. These findings emphasize the importance of bank capital and the need for policymakers to consider bank capital and financial development in designing effective monetary policies.

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Waraluk Rosmontee

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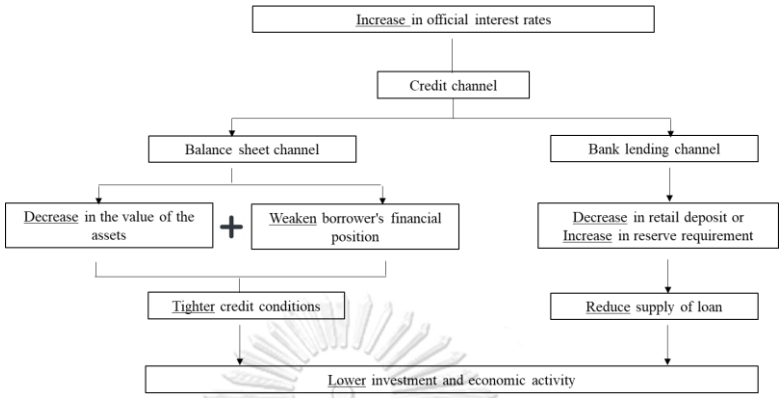
1. Introduction

1.1 Background

Maintaining price stability or a balance between economic activity and maximizing employment is the goal of the monetary system. As a first step, the central banks position a short-term interest rate, which influences economic growth by working through various channels. However, one of the important monetary transmission mechanism channels is the credit channel. It comprises of two sub-channels. The first sub-channel, known as the balance sheet channel, investigates the effect of alterations in the monetary policy rate on the net worth of borrowers (Bernanke & Gertler, 1995). The second sub-channel, known as the bank lending channel (BLC), examines the influence of central bank monetary policy shocks on banks' eagerness to provide loans.

According to the BLC, the banking industry is essential to foster economic growth by providing funding to non-financial corporations. The balance sheet of banks can be shaped by monetary policy action. The mechanism of tightening central bank interest rates through the credit channel is illustrated in Figure 1. When central banks hike, it causes a reduction in deposits (an expansion in reserve requirement), which in turn reduces credit supply. As a result, the dependence on bank lending agents such as businesses and consumers decrease consumption and investment, which adversely affects economic activity. The opposite side happens when monetary policy expands.

Figure 1: The mechanism of tightening short-term interest rate through credit channel

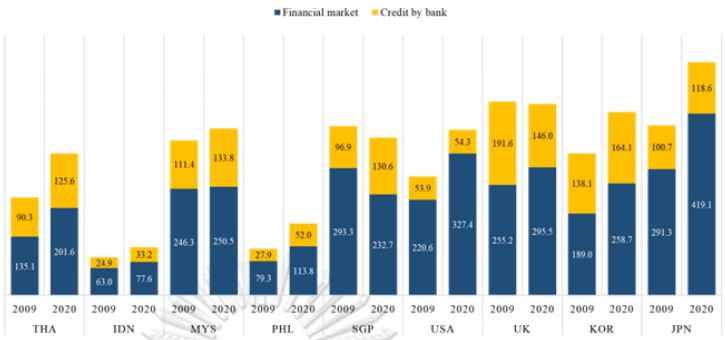


1.2 Motivation and Objectives

The reaction of the BLC may vary between nations, depending on characteristics of banks, economic structure, and financial systems. Concerning the strength of the balance sheet, most studies have found that characteristics of a bank, such as asset size, capitalization, and liquidity, can influence the lending response to monetary policy. However, capital is a crucial factor in bank decisions, serving as a means of absorbing losses and mitigating asymmetric information problems, especially during financial stress periods (Gambacorta & Marques-Ibanez, 2011). During times of monetary tightening, investors may have to pay a "lemon's premium" due to market frictions and the lack of guaranteed non-reservable bank liabilities. Bank capital can thus signal creditworthiness to investors and support the external rating of banks. Banks with low capitalization are seen as riskier by the market and face a higher cost of bonds and CDs because they are more vulnerable to information failure and have less ability to preserve credit relationships (Jayaratne & Morgan, 2000; Kishan & Opiela, 2000). Therefore, it is vital for the central bank to make

certain that sufficient capital is available to support lending activity and unlock the BLC.

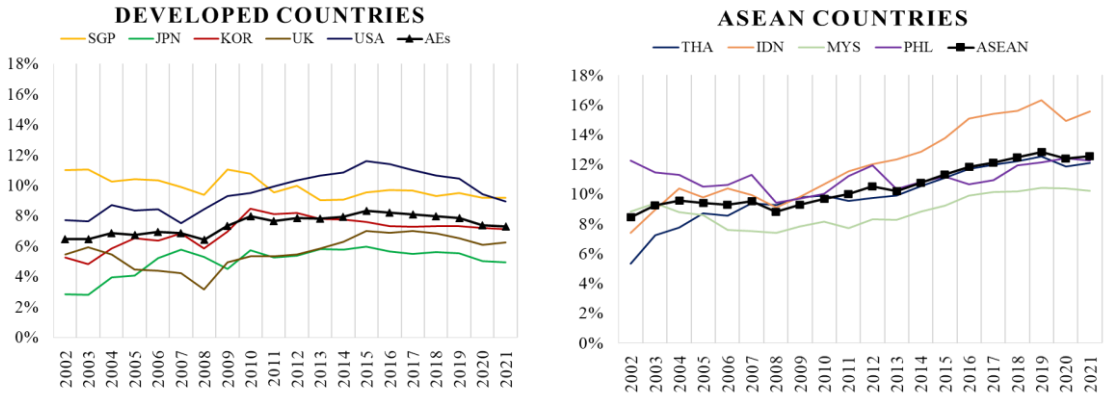
Figure 2: Financial system by countries (% to GDP)



Note: Financial market consists of equity private and public bond
SGP = Singapore, JPN = Japan, KOR = Korea, UK = United Kingdom, USA = United State, THA =Thailand, IDN = Indonesia, MYS = Malaysia, PHL = The Philippines
Source: World bank data: Global Financial Development and Fred economic data

Figure 2 shows that even though the growth of financial markets in ASEAN countries have been rising over the past decade, banks still dominate their financial systems. Thus, the BLC is likely to be more effective in countries that rely heavily on their banking systems (Sanfilippo-Azofra et al., 2018). In contrast, advanced economies tend to place less importance on banks, with the financial market, including bond and stock markets, taking over as the primary source of funding. Additionally, the equity-to-asset ratio of banks in ASEAN countries is observed to be higher than that of advanced countries, which could indicate that these banks are more profitable, as reflected by Net Interest Margin (NIM) and Return on Asset ratio (ROA) in Figures 3-4. This is because the primary source of equity is retained earnings, which is the accumulation of profits.

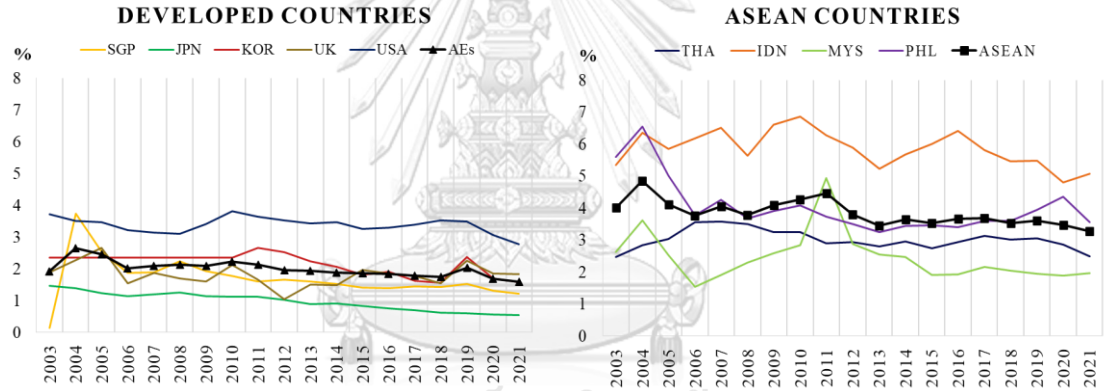
Figure 3: Average equity-to-asset ratio from sample data over 2002- 2021



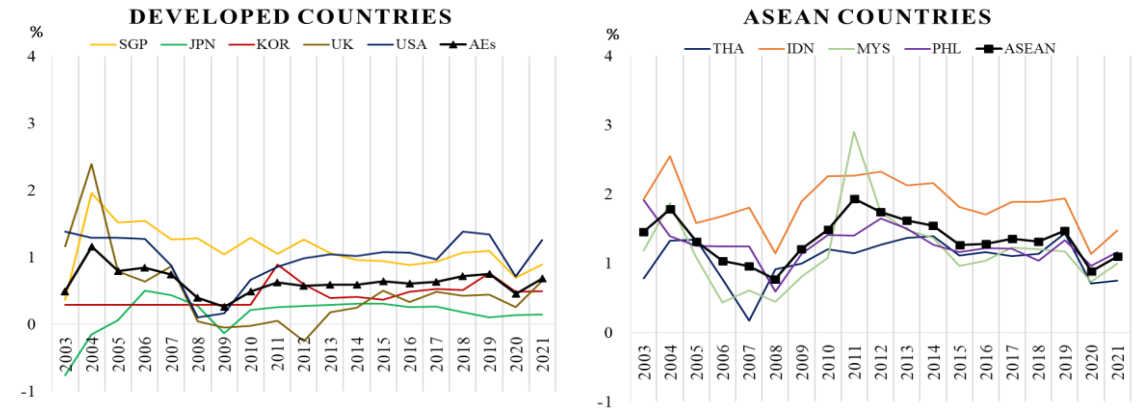
Source: Bank's financial statement from Refinitive and authors' calculations.

Figure 4: Bank profitability from 2003 – 2021

NIM



ROA



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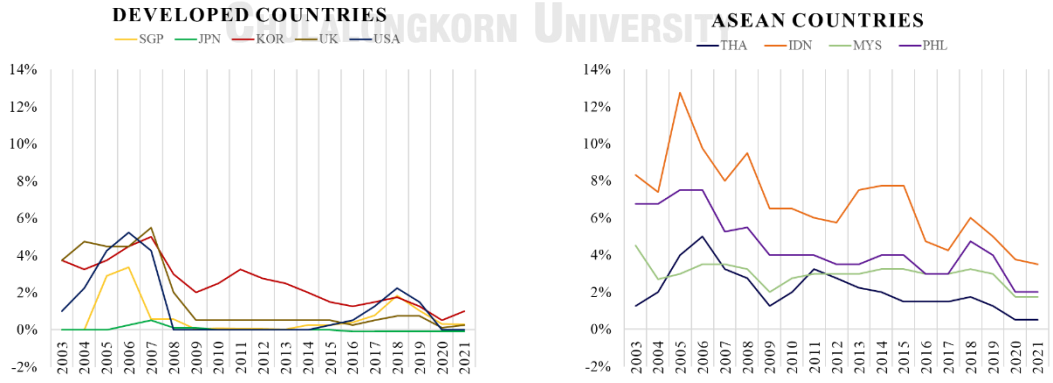
Source: World bank data: Global Financial Development and Fred economic data

A bank's profitability is influenced by the interest rate. Many countries, especially in advanced economies, have maintained a low interest rate nearly a decade after the financial crisis of 2008-2009 (GFC), as shown in Figure 5. A low for long interest rates has a detrimental effect on bank margins. For the liability side, banks are hesitant to reduce deposit rates because depositors can switch to other forms of savings and the bank will lose its main source of funding. Banks must continue to pass on lower rates on the asset side, particularly in contractual repricing terms because borrowers have alternative funding options such as the bond market. Consequently, when the benchmark rate drops, the adjustment of a bank's assets is slower than its liabilities since banks are afraid of losing their customers, which represent the primary means of obtaining funds. The transmission of monetary policy is hindered if imperfect policy rate pass-through occurs. While low interest rates reduce the bank's profitability, they also reduce its willingness to lend as its capital position deteriorates.

Figure 5: Monetary policy rate from 2003 – 2021



Note: SGP = Singapore, JPN = Japan, KOR = Korea, UK = United Kingdom, USA = United State, THA =Thailand, IDN = Indonesia, MYS = Malaysia, PHL = The Philippines
Source: central bank's website; Refinitive; OECD database and Fred economic data

Table 1 exhibits the correlation between capital and credit expansion. The result indicates that banks with low capitalization tend to increase their loan portfolio. Gambacorta and Marques-Ibanez (2011) observed that leverage ratio has a negative correlation during normal times. There are two possible explanations for this: (1) the capital to asset ratio may not accurately reflect the bank's capital adequacy (Gambacorta & Mistrulli, 2004), and (2) the accounting methods used during a financial crisis can distort the ability of the leverage ratio to reflect the risks in bank balance sheet. This discovery is in accordance with Mohammed Amidu (2013) who found that the banks are more likely to stabilize their capital position rather than to provide new credit to borrowers.

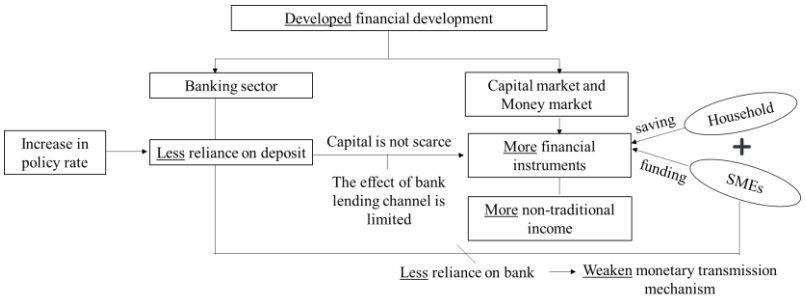
However, the role of the banking industry as a loan provider was questionable during the subprime mortgage crisis in 2008 since monetary policy expansion is conducted in many countries until rate reached a very low level or launched Quantitative Easing (QE). During the crisis, high capitalized banks in some countries are more likely to grant more loans. The outcome corresponds with Carlson et al. (2013), which indicated that bank capital has a positive correlation with expansion of credit portfolio only during crisis. Moreover, Kapan and Minoiu (2018) stated that banks with high capitalization will perform better than those with low capitalization when confront with liquidity shocks or it have more risk-taking behavior, whereas highly leveraged banks may increase monitoring and reduce risk.

Table 1: The correlation between average bank equity-to-asset and average loan growth from sample data over 2002-2021 and during financial crisis

Country	Financial Crisis			Overall 2002-2021
	Before (2002-2007)	During (2008-2012)	After (2013-2021)	
U.S.	0.37	-0.69	0.31	-0.55
U.K.	0.81	0.90	-0.78	-0.29
Japan	-0.52	-0.07	-0.44	-0.56
Korea	-0.65	0.64	-0.58	-0.52
Singapore	0.13	-0.19	-0.27	0.34
Thailand	-0.55	0.31	0.36	-0.37
Indonesia	-0.91	-0.30	0.49	-0.60
Malaysia	-0.89	0.10	0.06	-0.72
Philippines	-0.99	0.56	-0.68	-0.28

Moreover, the evaluation of financial development is considered as one of the influential factors to the BLC. The financial systems in developed countries are more developed regarding size, liquidity, and capital than those in ASEAN countries. Therefore, it would have less impact on the BLC because banks can find a variety of funding sources (Lerskullawat,2017). As shown in Figure 6, the BLC has diminishing effects in developed financial countries. The main reason is the ability to find external funding. When financial development occurs, there are many financial instruments to shield banks from monetary change. For example, when monetary policy increases, banks can find alternative funding to compensate for the decline in household deposits. Moreover, due to financial innovation, it allows banks to make a profit from non-traditional income instead of lending. In addition, households, small and medium-sized enterprises (SMEs) have higher accessibility for funding, reducing their reliance on the banking system (Nguyen et al., 2022; Sanfilippo-Azofra et al., 2018). As a result, lending activity will decrease.

Figure 6: The influence of financial advancements on the BLC



The impact of financial modernization can be analyzed by looking at two indicators: (1) the ratio of domestic credit provided to the private sector to gross domestic product (GDP) or CPS and (2) the ratio of market capitalization of listed domestic companies to GDP or SMC. The first indicator represents the depth of the banking system. If the first indicator increases, it could signify that there is an increase in the amount of lending services being offered to customers. This could potentially result in stronger bank balance sheets and reduced financing costs, which, in turn, can enable larger banks to better withstand monetary policy shocks. However, it may also weaken the credit channel.

While some studies use the first indicator to describe the evolution of the money market since it can show the credit quantity of banks and the money market situation. According to theory, there are two ways that the BLC is influenced by the evolution of the money market. First, the interbank and REPO markets help to mitigate the impact of a bank's external funding market failure by making financing more accessible and flexible. This gives a safeguard for banks against the adverse consequences of monetary policy shock on loan portfolios. Second, the money market provides substitute funding such as commercial bills to SMEs, which lessens the demand of bank credit. Therefore, the relationship between lending and monetary

policy shocks will become weaker. However, the effectiveness of this channel will be limited if these bills are predominantly traded between large corporations. For the second indicator, it resolves the external funding market failure for banks when the bank capital is scarce. Over the past 20 years, Figures 7 and 8 indicate that advanced economies have typically achieved a higher degree of financial development compared to ASEAN countries, even though ASEAN's level of financial development has been steadily improving over time.

Figure 7: Domestic credit to private sector (% of GDP)

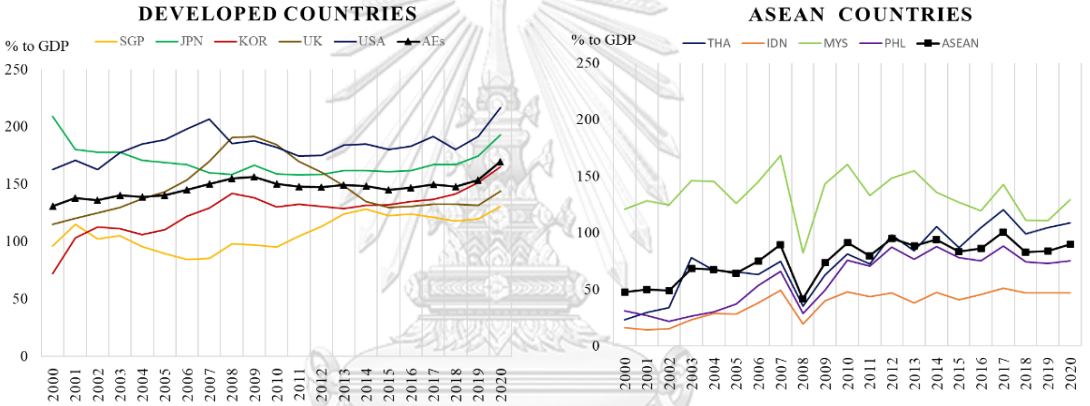
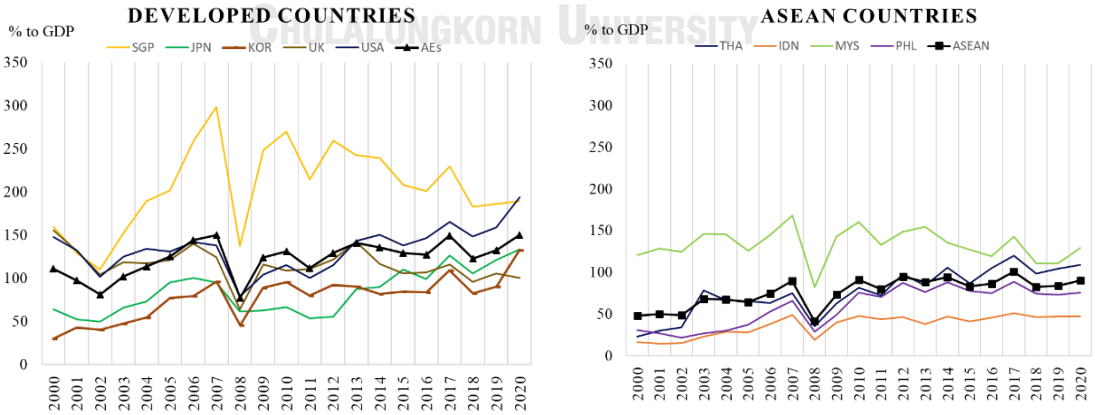


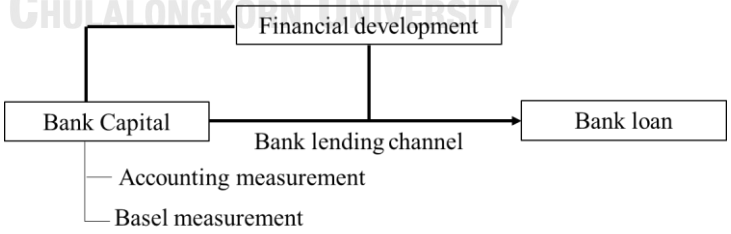
Figure 8: Market capitalization of listed domestic companies (% of GDP)



Note: SGP = Singapore, JPN = Japan, KOR = Korea, UK = United Kingdom, USA = United State, THA = Thailand, IDN = Indonesia, MYS = Malaysia, PHL = The Philippines
Source: World bank data

The objectives of this paper are to (1) reconfirm the existence of the BLC of monetary policy transmission (2) investigate the consequence of bank capital on credit expansion in the monetary transmission mechanism by using accounting and Basel leverage measurement, following Gambacorta and Shin (2018) and (3) examine how financial development affects the link between bank capital and credit provision and thus further investigate the monetary transmission mechanism via the BLC. This research builds on the work of Nguyen et al. (2022), which focused on Vietnamese commercial banks and utilized interaction and cubic-interactive terms among financial evolution indicators, policy rates, and bank capital to examine the influence of financial improvement on the link between loan supply and monetary policy change, depending on the amount of bank capital. The findings suggest that increasing financial development may indicate a weaker transmission mechanism for monetary policy on bank loans. Furthermore, higher levels of financial development are expected to erode the link between loan and bank capital, thus weakening the BLC.

Figure 9: Scope of interest



1.3 Contributions

This study can make significant contributions for the following reasons. First, it undertakes a re-examination of the efficacy of monetary policy transmission by placing emphasis on the influence of bank capital on determining the supply of credit

across various stages of financial development. The existing literature, such as Gambacorta and Shin (2018), mainly look on the link among bank capital and lending; as a result, this findings seeks to address the gap by considering the combined impact of bank capital and financial improvement in the reaction of bank loan supply to monetary policy. Additionally, previous studies on the BLC and financial advancement have mainly focused on a single economy rather than a cross-country dimension, as seen in Nguyen et al. (2022). Therefore, this study utilizes lending microdata and incorporates cross-country analysis to compare less developed financial markets countries with more financially developed countries by introducing a study in ASEAN and developed countries. Therefore, regulators can better understand what factors affect credit growth. Furthermore, this study offers insights into the effect of similarities and differences, helping policymakers determine what works best and what problems are common. Both outcomes allow policy makers to make more effective policies.

Lastly, studies about the BLC of monetary policy transmission and financial development are more common in advanced nations including the United States (U.S.) and the Eurozone than in developing countries. Empirical studies have shown that the results may differ depending on the country and time under examination and cannot be directly generalized from one country to another. The study incorporates the ASEAN counties which could lead to better policy design and more integrated implementation in the future. This would help further understand monetary transmission mechanisms in both stable and turbulent situations.

1.4 Research Questions

1. Does the tightening in monetary policy have a negative impact on loan growth?

2. Do well-capitalized banks provide positive impact on loan growth and receive smaller effects from monetary policy contraction, compared to less-capitalized banks?

3. Does financial development and monetary policy shock affect the relationship between a bank's capital and lending activities?

1.5 Research Hypothesis

Hypothesis 1: Monetary policy tightening will reduce credit growth.

Hypothesis 2: Well-capitalized banks will have a positive impact on loan growth and thus smaller effects of monetary policy contraction.

Hypothesis 3: Financial development has weakened the relationship between bank capital and the bank lending and therefore weakened the monetary policy transmission mechanism of monetary policy.

The structure of this paper is outlined as follows: a literature review is provided in the subsequent part. Data and methodology are demonstrated in the third part. Next, the fourth part contains the findings. Finally, a summary is presented in the last part.

2. Literature review

In this section, the literature review is classified by the three-research hypothesis of this paper.

Hypothesis 1: Monetary policy tightening will reduce credit growth.

To begin with the existence of the BLC, single and cross-country literatures are provided. Overall, most studies found that the monetary policy contraction causes the reduction in supply, but to a different degree. In addition, numerous studies demonstrated that the effectiveness of the monetary policy transmission mechanism is distorted by banking sector competition and consolidation (Fungáčová et al., 2014; Mohammed Amidu, 2013; Olivero et al., 2011).

For single countries, Kashyap and Stein (1995) illustrated that from 1976 to 1992, a hike in the rate of interest set by the Federal Reserve has a greater impact on small banks in the U.S., resulting in lower loan amounts. As with the studies in the Europe area from Matousek et al. (2006) suggested that there is a significant BLC in some countries by employing large panel data for individual banks. Nonetheless, several studies conducted in Germany, France, Italy, and Spain found that there are unable to identify the BLC during times of monetary tightening (Giavazzi et al., 1999), as well as in the United Kingdom (U.K.)

In Asian countries, the study in Malaysia demonstrated the presence of the BLC by indicating the negatively and statistically significant level of the interbank overnight rate (Zulkefly Abdul Karim 2011). As in Fathin Faizah Said (2008) study, it used 25 commercial banks in Malaysian from 1994 to 2004 and found that deposits and profits can all have a positive impact on loans, particularly deposits, which can confirm liquid assets and compensate for monetary shock. Regarding to investigate

the impact on bank lending portfolio by sector, Karim et al. (2006) employed the vector autoregression (VAR) technique and used data from 1970 to 2003. They found that there is a negative impact on all eight sectors but manufacturing, agricultural, and mining sectors are the most sensitive to monetary policy. As well as empirical studies in Indonesia, where there is a bank-based financial system. Soedarmono et al. (2021) found the existing of BLC which occurs two quarters after central bank increase policy rate. It indicates that banks need at least two quarters to adjust their lending decisions. Like other countries in Asia, the study in Thailand examined the effectiveness by using bank-level panel data between 1999 Q1 and 2016 Q4 (Lerskullawat, 2018).

For the cross-country results, Nicholas Apergis (2012) found the strength of BLC in European countries over the period of 1999–2009 but the impact depends on the interest rate under the different types. Moreover, Hamid and Yunus (2020) found that even the BLC exists in ASEAN countries, its effectiveness depends on several types of bank loans. The adjustment to the central bank rate has an influence on consumer loans and commercial loans but has no impact on mortgages and corporate loans. Furthermore, commercial banks reduce loans during the restrictive monetary policy, whereas special purpose banks do the opposite.

Hypothesis 2: **Well-capitalized banks will have a positive impact on loan growth and thus smaller effects of monetary policy contraction.**

There is much research about the role of bank capital, such as Altunbaş et al. (2002); Cantu Garcia and Gambacorta (2019); Pungaliya and Naqvi (2022); Zulkhibri (2013) confirmed that better-capitalized banks have portfolio expansion. The contribution is that banks with a higher level of capitalization, as indicated by their

creditworthiness, can access debt financing at a lower cost. This leads to the ability to raise more debt and a tendency to supply more loans (Gambacorta & Shin, 2018). The distinguishing features that some studies considered by using regulatory capital requirements. Gambacorta and Marques-Ibanez (2011) found that, in normal times, the accounting leverage ratio provides an unexpectedly negative sign. As a result, they used the Tier 1 ratio, which can better control banks' solvency and be easy to compare across countries. The study found that during the financial crisis, well-capitalized banks provide more lending.

The next step is to model how bank capital responds to an adjustment in central bank rate's effect on lending behavior. Many studies supported the notion that well-capitalized banks are to be less impacted by alterations in benchmark interest rate. Kishan and Opiela (2000) studied banks in the U.S. by considering two aspects: asset size and capital leverage ratios with thresholds of less than 8%, between 8% and 10%, and greater than 10%. The result showed that the small and under-capitalized banks (< $100 million and capital < 8 %) are the most responsive. The effect is comparable to the study in Italian and eleven G10 nations (Gambacorta & Mistrulli, 2004; Gambacorta & Shin, 2018). In addition, the result from study in Japan which divide the sample into different sectors showed that during times of relaxed monetary policy, the percentage of loans in the manufacturing, commerce, transportation, and communication sectors is higher in banks with sufficient capital reserves compared to those with insufficient capitalization (Hosono, 2006). However, study in the Euro area found that capitalization is not essential for adjusting lending to interest rate changes due to a lower in informational frictions (Ehrmann et al., 2001). To further extent the study, Kishan and Opiela (2006) conducted a study to analyze the effect of monetary

policy on loan growth in the U.S.. They looked at the reaction of loan growth to both expansionary and contractionary monetary policies as well as before and after the implementation of Basel/FDICIA regulations by considering capital-to-asset ratios and asset size. In a regulatory setting where capital requirements are weak, banks with high levels of capital tend to reduce loan growth during periods of expansionary monetary policy but boost it when interest rates rise. However, after the implementation of Basel/FDICIA regulations, banks with unrestricted capital do not decrease lending during contractionary monetary policy but instead increased loan supply in reaction to the increase in policy rate. This demonstrates that adjustments of the capital regulatory environment significantly affect credit provision.

Meanwhile, some papers extend the analysis by employing Basel measurement. For example, Gambacorta (2005) found that excess capital which is identified as the amount of capital above the minimum requirement of 8% can capture the shocks of monetary policy while the capital-to-asset ratio cannot capture credit risk. The result is in line with Hosono (2006), which showed that during the 1990s, Japanese banks whose BIS ratio is higher has a greater increase in loans when monetary policy expand.

For other bank specific characteristics, there are many empirical studies whose findings are consistent with those of Kashyap and Stein (1995); Kishan and Opiela (2006). These studies demonstrated that a strong balance sheet, namely large and more liquid, can influence bank lending. For instance, Abdul Adzis et al. (2018); Zulkhibri (2013) investigated that large banks are perceived as having fewer asymmetric information problems, resulting in holding more available funds to grant

loans. Moreover, the loan portfolios are more diversified, and their customers are highly creditworthy. In contrast with Hou and Wang (2013); Kim and Sohn (2017); Vo (2018), they suggested that smaller banks will grant a higher lending growth rate, since they engage in riskier lending practices. In term of liquidity, Ehrmann et al. (2001) indicated that the significant driver of monetary transmission is liquidity, as does Leroy (2014), who found that banks with highly capitalization and liquidity in the Eurozone easily and quickly get new resources, which in turn allow them to provide more loans. Moreover, Gambacorta et al. (2007) discovered the rise in loan loss provisions results in decreased profits, which would in turn negatively on lending. Additionally, some studies discovered that bank profitability, as indicated by the ROA. The higher ratio results in higher loan growth (Bhaumik et al., 2011; Kandrac, 2012).

Hypothesis 3: Financial development has weakened the relationship between bank capital and the bank lending and therefore weakened the monetary policy transmission mechanism of monetary policy.

As securitization becomes more widespread, its effects on the banking sector are expected to become increasingly significant. This is because securitization involves transforming financial assets that were previously considered illiquid, such as loans, into liquid assets that can be sold in the secondary market to global investors. Therefore, banks continue to serve as credit providers with access to credit risk, while their primary function of holding illiquid assets declines. Gambacorta and Marques-Ibanez (2011) concluded that securitization activity is positively correlated to bank loans which significantly reduces the importance of the BLC. The reason is that during monetary tightening, securitization allows banks to obtain CDs or bonds

easily and in unlimited amounts because these funds can substitute for the reduction in reserve requirements. Furthermore, banks can transfer the credit default to the market, which in turn supports regulatory capital requirements and further increases in lending.

However, there are some empirical studies in ASEAN countries or developing nations where the financial improvement is less advanced. To start with Lerskullawat (2017), this paper looked at how the banking sector and capital markets affect the BLC over the period 1999 to 2011. It documented that the rise in the size and activity of the banking sector as well as the capital markets caused the rise in loans, resulting in a lower effect of the BLC. The main reason is that development allows a bank's balance sheet to be more reinforced, and the financial market has more liquidity, making it easier for banks to find external funding. Another study which analyzes emerging economies is conducted by Sanfilippo-Azofra et al. (2018). The main finding portrayed that different levels of financial advancement influence the impacts of monetary policy changes on credit varyingly. In very underdeveloped financial systems, monetary policy has negligible significance on loan growth, whereas bank loans in countries with sophisticated financial systems have a contrary effect from contractionary monetary policy only after a crisis. Moreover, the more developed financial systems are, the greater the negative results because the primary source of funds for banks is bank deposits. The financial development level is inadequate to offset the monetary policy restrictions. Conversely, Zhan et al. (2021) investigated the consequences of money market improvement on the BLC in China. The study showed that financial development cannot solve the failures of the external funding market for banks. Moreover, this study delved deeper into the issue by examining sub-markets

including mutual funds, the interbank market, and bills which illustrated that monetary policy mechanism is less effectual on the asset side. As banks' reliance on the interbank market and bank bills has grown up, banks can quickly compensate for capital shortages through this market.

Furthermore, both Zhan et al. (2021) and Nguyen et al. (2022) introduced a cubic interactive term to describe the link between bank characteristics and financial progress on the BLC. The finding from Zhan is that money market expansion diminishes the effects of liquidity on the BLC. It suggests that the advancement of the money market allows banks to substitute convenient external and internal financing. While the finding from Nguyen showed that the BLC in Vietnam is less effective due to financial development; moreover, it weakens to the influence of bank capitalization and credit risk on the BLC.

3. Data and methodology

3.1 Data

The study's sample is composed of listed commercial banks, while nonbank financial institutions are excluded due to their low reliance on deposit-taking and bank loans. Annual financial statements of commercial banks are collected from Refinitiv, Bloomberg databases, and the banks' websites to address any missing information in the dataset. The period under study covers a 15-year period, from 2007 to 2021, encompassing economic cycles and the global recession. This study examines the impact of the BLC under various financial development contexts, so the focus is on countries with mature bond and capital markets, including the U.S, U.K, Japan, Korea, and Singapore, where interest rates have remained at a low level. In addition, emerging countries such as Thailand, Malaysia, Indonesia, and the Philippines, which have substantial financial markets following the Asian financial crisis, are also part of the focus. The macroeconomic data such as policy interest rate, real GDP, consumer price index (CPI), and financial development indicators are gathered from World Bank and central bank websites. The summary of variables can be found in table 2.

Table 2: Summary of the variables

Name	Description
Dependent Variable	
Bank loan	Growth rate of lending
Independent Variables	
Monetary policy rate	Change in three-month interbank interest rate
Bank capital	Common equity to asset ratio
	Tier 1 and Tier 2 to risk-weighted asset (CAR)
	Tier 1 to risk-weighted asset
Financial development	Domestic credit to private sector to GDP (CPS)
	Stock market capitalization to GDP (SMC)
Bank specific characteristic	
ROA	Return on asset
Rescued	Dummy variable that is set to 1 if the bank has public capital on its balance sheet and 0 in any other situation.
Non-performing loans	Non-performing loans to the total loan in percentage
Macro control	
RGDP	Growth rate of real GDP
CPI	Consumer price index
Other controls	
Basel	Dummy that is set to 1 if a bank adopts Basel III, and 0 in all other cases.

Sources: Refinitive; Bloomberg; Financial reports; World bank data and Authors' calculations.

3.2 Methodology

Hypothesis 1: Monetary policy tightening will reduce credit growth.

To analyze the effectiveness of the BLC, I start with Equation 1. The empirical model introduces (1) the one lag period of dependent variable to obtain white noise residuals and mitigate possible endogeneity and (2) the growth rates to solve the non-stationary problem. Moreover, bank and time fixed effect are

introduced as α_i and θ_t to capture individual and time-specific factor. And ε_{ijt} is a random error term.

$$\Delta \ln(\text{loans})_{ijt} = \alpha_i + \theta_t + \alpha_1 \Delta \ln(\text{loans})_{ijt-1} + \alpha_2 \Delta MP_{jt} + \alpha_9 Y_{jt} + \alpha_{10} Basel_{ijt} + \varepsilon_{ijt} \quad (1)$$

with i represents individual banks, t represents the year, and j represents the countries, where:

$\Delta \ln(\text{loans})_{ijt}$ indicates the annual growth rate of loan as a dependent variable.

ΔMP_{jt} indicates change in three-month interbank rate as monetary policy changes consistent with Borio and Gambacorta (2017); Gambacorta et al. (2007); Olivero et al. (2011).

Y_{jt} indicates country-level control variables as exogenous variables including real GDP growth and CPI, following Gambacorta and Mistrulli (2004). These indicators control loan demand effects and capture cyclical movements.

To indicating the presence of the BLC, the coefficient of a change to the three-month interbank rate (α_2) is supposed to be a negative sign.

Hypothesis 2: Well-capitalized banks will have a positive impact on loan growth and thus smaller effects of monetary policy contraction.

The empirical model used is based on the work of Ehrmann et al. (2001); Gambacorta and Mistrulli (2004). The aim of the model is to determine if banks with varying capital ratios react differently to monetary policy changes to test hypothesis 2.

$$\Delta \ln(\text{loans})_{ijt} = \alpha_i + \theta_t + \alpha_1 \Delta \ln(\text{loans})_{ijt-1} + \alpha_2 \Delta MP_{jt} + \alpha_3 \text{Bankcapital}_{ijt-1} + \alpha_4 \Delta MP_{jt} * \text{Bankcapital}_{ijt-1} + \alpha_8 X_{ijt-1} + \alpha_9 Y_{jt} + \alpha_{10} Basel_{ijt} + \varepsilon_{ijt} \quad (2)$$

where $Bankcapital_{ijt-1}$ include (1) common equity to asset (2) capital adequacy ratio (CAR) following Kapan and Minoiu (2018) and Carlson et al. (2013) and (3) Tier 1 over risk-weighted assets (RWAs)

I take into account two approaches of methods for determining the capital charge associated with credit exposure: the standardized approach (SA) and the internal rating based (IRB) approach. When using the SA, banks rely on a fixed risk weight established by rating agencies. Consequently, the risk weight does not vary depending on the level of risk posed by the borrower. In contrast, the IRB approach involves banks utilizing their internal models to assess the risk of each exposure. This approach entails the estimation of four parameters, which include the probability of default (PD), the loss given default (LGD), exposure at default (EAD), and the effective maturity of the loan. If any of these parameters are estimated to be higher, the assigned risk weight for the loan will also be higher. As a result, the risk weights and associated capital charges for individual exposures may vary over time. To compare with SA, a lower amount of capital would be required for less risky assets under the IRB approach.

According to Behn et al. (2016) found that German banks utilizing the IRB approach faced a greater reduction in the amount of loans granted in react to the shock triggered by the Lehman Brothers' collapse in September 2008, in comparison to those employing the SA approach.

X_{ijt-1} indicates bank specific characteristic as control variables to determine the capital buffer, including (1) ROA (2) bank asset risk, measured by non per forming loans to total loans (NPL ratio) following Jokipii and Milne (2008) and (3) rescue dummy which indicate for government intervention. During the analysis period, only

banks in the advanced countries are intervened by the government.

For ROA and NPL have been normalized by taking their mean across the entire sample period as below.

$$\mathrm{NPL}_{ijt} = \frac{\frac{NPL_{ijt}}{Total\ Loan_{ijt}} - \left(\sum_t \frac{\sum_i NPL_{ijt}/Total\ Loan_{ijt}}{Number\ of\ bank_{ijt}}\right)}{T}$$

$$\mathrm{ROA}_{ijt} = \frac{\frac{Net\ income_{ijt}}{Average\ Total\ Asset_{ijt}} - \left(\sum_t \frac{\sum_i Net\ income_{ijt}/Average\ Total\ Asset_{ijt}}{Number\ of\ bank_{ijt}}\right)}{T}$$

Basel_{ijt} indicates dummy to represent the adoption of Basel III guidelines, which were first introduced by the Bank for International Settlements (BIS) in 2010. The main objective of Basel III was to improve the regulatory capital by imposing stricter requirements. This was accomplished by raising the minimum ratio of total capital to RWAs from 8% under Basel II to 10.5% under Basel III. Additionally, the minimum ratio of Tier I capital to RWAs was raised from 4% to 6%. Most countries adopted these new requirements in 2013, following an introduction date and phase-in arrangements, with the exceptions of the Philippines in 2014 and Indonesia in 2016.

To evaluate whether there are any asymmetric impacts attributable to bank capital, incorporating in the Equation 2:

$$\mathrm{Bankcapital}_{ijt} = \frac{Capital_{ijt}}{Asset_{ijt}} - \left(\sum_t \frac{\sum_i Capital_{ijt}/Asset_{ijt}}{Number\ of\ bank_{ijt}}\right)$$

When bank capital is standardized by the average of all samples to acquire a variable that aggregates to zero over whole observations. This normalization has two consequences. Firstly, the sums of the interaction terms ($\Delta \mathrm{MP}_{\mathrm{jt}} * \mathrm{Bankcapital}_{\mathrm{ijt-1}}$) equal to zero for the average bank. Secondly, the coefficients of change in the three-month interbank rate can be interpreted directly as the average effect of monetary

policy. So, the coefficient of interaction terms, or α_4 should be positive, which means the large-capitalized banks mitigate the negative correlation between monetary policy change and the BLC. Similarly, it is anticipated that the α_3 will be positive, indicating that banks with bigger capitalization typically offer credits.

Hypothesis 3: Financial development has weakened the relationship between bank capital and the bank lending and therefore weakened the monetary policy transmission mechanism of monetary policy.

Following the footsteps of Nguyen, this step examines the link between financial development and the BLC. I analyze hypothesis 3 by transforming to the Equation 3.

$$\begin{aligned}\Delta \ln(\text{loans})_{ijt} = \alpha_i + \theta_t + \alpha_1 \Delta \ln(\text{loans})_{ijt-1} + \alpha_2 \Delta \text{MP}_{jt} + \\ \alpha_3 Bankcapital_{ijt-1} + \alpha_4 (\Delta \text{MP}_{jt} * \text{Bankcapital}_{ijt-1}) + \alpha_5 \text{FD}_{jt} + \\ \alpha_6 (\text{FD}_{jt} * \Delta \text{MP}_{jt}) + \alpha_7 (\Delta \text{MP}_{jt} * \text{Bankcapital}_{ijt-1} * \text{FD}_{jt}) + \\ \alpha_8 \text{X}_{ijt-1} + \alpha_9 \text{Y}_{jt} + \alpha_{10} Basel_{ijt} + \varepsilon_{ijt} \qquad (3)\end{aligned}$$

According to this step, FD_{jt} measures financial market development that is indicated by two indicators, namely CPS and SMC. For the first one represents money market development, following Zhan et al. (2021) since it is almost including all the development of financial intermediary. These two coefficients (α_5) are expected to be negative. The motivation behind this is that commercial banks can benefit from a wider range of non-traditional sources of revenue, due to the diversity of financial instruments available in the financial market. This leads banks to rely less on traditional sources of interest-based income, such as bank loans, and gives them more options for alternative funding because of advancements in the capital market. This, in turn, makes the BLC less influential. Consequently, the sign of the interaction term's

coefficient ($FD_{jt} * \Delta MP_{jt}$) is estimated to be positive. The coefficient of cubic interaction term ($\Delta MP_{jt} * Bankcapital_{ijt-1} * FD_{jt}$) is predicted to be negative which can suggest that financial development reduces the sensitivity of bank capitalization to the BLC. Table 3 provides the summary of expected correlations.

Panel data is employed in this study. Due to two disadvantages, pooled ordinary least square (pooled OLS) is not employed in this study. First, pooled OLS has a problem with omitted variable bias, as there exists a correlation between the control variables and the error term. In addition, as country fixed effect is not considered in pooled OLS, there is unobserved heterogeneity, which indicates that there are unobserved hidden individual characteristics that can influence the dependent variable. Second, simultaneity occurs when a model's dependent variable and independent variable influence each other simultaneously. To tackle the problem, the dynamic Generalized Method of Moments (GMM) panel methodology suggested by Arellano and Bond (1991) is considered as it provides a consistent and unbiased estimator. Lagged variables are used as instruments to mitigate endogeneity concerns, which reduces the likelihood of second-order serial correlation and validates the use of instruments. Additionally, the presence of serial correlation in the differenced error term is examined to ensure the correct specification of moment conditions, where the null hypothesis indicates the absence of second-order serial correlation. Furthermore, the Sargan-Hansen test is conducted to verify the overidentifying restrictions for instrument validity, where the null hypothesis is not rejected to ensure the sufficiency of valid instruments. These two tests are important because they allow the results of the analysis to be considered reliable and accurate.

Table 3: Expected Correlation

Proxy	Expected correlation	Explanation
$\Delta ln(loans)_{ijt-1}$	+	Growth rate in loan in the previous year produces momentum for credit growth in the next year.
ΔMP_{jt}	-	Increased interest rate reduces the credit growth.
$Bankcapital_{ijt-1}$	+	Well-capitalization banks encourage to increase in lending.
ΔMP_{jt} * $Bankcapital_{ijt-1}$	+	Well-capitalization banks get smaller effect when monetary policy contract.
FD_{jt}	-	The higher financial development induce bank to supply less loan.
$FD_{jt}*\Delta MP_{jt}$	+	Higher financial expansion diminishes the adverse consequence of tightening monetary policy on credit issuance.
$FD_{jt}*\Delta MP_{jt}*$ $Bankcapital_{ijt-1}$	-	The linkage between bank capital and the BLC has become weaker as financial development has grown. This has made the monetary policy transmission mechanism less effective.
GDP_{jt}	+	Economic expansion causes higher demand for loans, resulting in positive loan growth.
CPI_{jt}	-	The fluctuation of inflation rate could lead to uncertainty on investment returns. As a result, businesses delay their investment plans, hence lowering the need for finance.
ROA_{ijt-1}	+	Banks that demonstrate higher levels of profitability and operational efficiency are more inclined to augment the volume of credit they provide to borrowers.
NPL_{ijt-1}	-	Banks experiencing a high NPL ratio are more likely to reduce their lending activities.

4. Empirical results

4.1 Descriptive statistics

Table 4 presents descriptive statistics for the entire sample and two distinct country groups, namely developed and ASEAN countries. The data on loan growth ranges from a decline of 27.11% to an increase of 44.49%, with an average growth rate of 6.80%. Meanwhile, the average change in the three-month interbank rate is -0.30%, with a standard deviation of 0.94%, indicating notable fluctuations in monetary policy during the analyzed period. The wide range of bank capital, including the equity to asset ratio, CAR, and Tier 1 ratio, suggests the presence of firms with extremely low or high bank capital ratios. In terms of financial development, private credit to GDP ranges from 59.37% to 222.60%, while capital market development ranges from 46.72% to 297.99%. This demonstrates the varying degrees of financial development. The implication is higher levels of both CPS and SMC indicate a robust and easily accessible financial system, contributing to economic growth. On the other hand, lower levels of these indicators suggest limited financial access, which may have implications for economic activities and investment opportunities.

Additionally, a comparison between the two country groups reveals that the bank capital in ASEAN countries is higher, with average ratios ranging between 12% to 17%, compared to developed countries with ratios ranging from 8% to 15%. In contrast, the average values of financial development indicators are higher in developed countries compared to ASEAN countries. Furthermore, the maximum value of CPS in developed and ASEAN countries is observed in the U.S. and

Thailand, respectively. Similarly, the highest value of SMC in developed and ASEAN countries is observed in Singapore and Malaysia, respectively.

Table 4: Data Summary

ALL	Mean	Std. Dev.	Min	Max
Loangrowth	6.8038	10.8665	-27.1108	44.4851
Δ MP rate	-0.3044	0.9426	-4.2978	2.4942
Equity to asset	10.0636	3.3442	2.2244	23.7441
CAR	16.1516	3.0700	10.0574	29.8612
Tier1 ratio	13.4996	3.3421	6.3753	27.8177
Private Credit	113.5479	59.3665	25.1635	222.6000
Stock Market	101.3748	46.7169	19.3562	297.9832
ROA	1.0314	0.7425	-2.6000	4.1000
NPL	2.5023	1.7999	0.1200	11.4185
RGDP	2.8703	3.3149	-11.0000	14.5000
CPI	110.1767	13.7075	82.6657	156.4846

Developed	Mean	Std. Dev.	Min	Max
Loangrowth	4.2559	9.2177	-27.1108	44.4851
Δ MP rate	-0.2420	0.8380	-4.2978	1.1530
Equity to asset	8.4012	2.5482	2.2244	14.1122
CAR	15.1366	2.5368	10.0574	24.5000
Tier1 ratio	12.4547	2.5706	6.3753	21.4000
Private Credit	152.9481	38.5603	85.3517	222.6000
Stock Market	124.2777	43.9549	44.9518	297.9832
ROA	0.6925	0.5774	-1.8600	3.9900
NPL	1.9741	1.4041	0.1200	9.1012
RGDP	1.6366	2.8639	-11.0000	14.5000
CPI	106.8592	7.7392	90.3173	124.2664

ASEAN	Mean	Std. Dev.	Min	Max
Loangrowth	9.6376	11.8266	-25.6141	44.2152
Δ MP rate	-0.3739	1.0434	-3.4350	2.4942
Equity to asset	11.9195	3.1464	4.8756	23.7441
CAR	17.2940	3.2155	10.7587	29.8612
Tier1 ratio	14.6732	3.7024	8.3086	27.8177
Private Credit	69.6448	46.2345	25.1635	170.0340
Stock Market	75.8544	35.0373	19.3562	168.0671
ROA	1.4100	0.7237	-2.6000	4.1000
NPL	3.0934	2.0006	0.2332	11.4185
RGDP	4.2450	3.2438	-9.5000	7.5000
CPI	113.8734	17.4622	82.6657	156.4846

Note: The statistical description of bank capital and bank characteristics is presented in their original, unnormalized form. ASEAN group includes Thailand, Malaysia, Indonesia, and the Philippines while developed group includes U.S, U.K, Japan, Korea, and Singapore.

The correlation matrix is present in table 5. The diagonal line, which exhibits perfect correlation between each variable and itself (with a correlation coefficient of 1), serves as a baseline for assessing the strength of pairwise correlations. Most of the pairwise correlation coefficients are found to be significantly lower than the widely accepted threshold of 0.8, implying a relatively low risk of multicollinearity. However, the correlation between the CAR and Tier 1 ratio is relatively high. This could potentially create issues with multicollinearity in the estimation results, and thus, these variables were not included in the same model. Similar considerations were applied to the financial development indicator.

Table 5: Table of Correlation

ALL	**Loangrowth**	**Δ MP rate**	**Equity to asset**	**CAR**	**Tier1 ratio**	**Private Credit**	**Stock Market**	**ROA**	**NPL**	**RGDP**	**CPI**
Loangrowth	1										
Δ MP rate	0.0165	1									
Equity to asset	0.0492	-0.0835***	1								
CAR	-0.1492***	-0.1208***	0.4409***	1							
Tier1 ratio	-0.1227***	-0.0913***	0.5582***	0.8957***	1						
Private Credit	-0.2654***	0.0433	-0.324***	-0.3423***	-0.3717***	1					
Stock Market	-0.0629***	0.1148***	-0.2132***	-0.213***	-0.2023***	0.6602***	1				
ROA	0.2942***	0.0325	0.524***	0.208***	0.3006***	-0.3310***	-0.1791***	1			
NPL	-0.0385	-0.2105***	0.1357***	0.1358***	0.0236	-0.2049***	-0.2727***	-0.0646**	1		
RGDP	0.3073***	0.2297***	0.2374***	0.0509*	0.0555*	-0.3925***	-0.1136***	0.3574***	-0.0027	1	
CPI	-0.2416***	0.0751**	0.5056***	0.4606***	0.5647***	-0.1880***	-0.0659*	0.1467***	-0.1262***	0.0186	1
Developed	**Loangrowth**	**Δ MP rate**	**Equity to asset**	**CAR**	**Tier1 ratio**	**Private Credit**	**Stock Market**	**ROA**	**NPL**	**RGDP**	**CPI**
Loangrowth	1										
Δ MP rate	0.0972**	1									
Equity to asset	0.0666	-0.0184	1								
CAR	-0.2299***	-0.0530	-0.1246***	1							
Tier1 ratio	-0.1687***	0.0264	0.0110	0.8675***	1						
Private Credit	-0.0532	-0.2163***	0.5576***	-0.1735***	-0.1416***	1					
Stock Market	0.2183***	0.0646	0.4697***	0.0709*	0.1991***	0.2950***	1				
ROA	0.2464***	0.2276***	0.4859***	-0.2326***	-0.1059***	0.3144	0.4053	1			
NPL	-0.298***	-0.1715***	-0.0690*	0.1970***	0.0202	-0.0344	-0.2508***	-0.3398***	1		
RGDP	0.1248***	0.4038***	0.1985***	-0.0377	-0.0106	-0.0057	0.2938***	0.2874***	-0.1471***	1	
CPI	-0.0154	0.1741***	0.221***	0.2828***	0.4328***	0.2880***	0.4231***	0.1902***	-0.288***	0.111***	1
ASEAN	**Loangrowth**	**Δ MP rate**	**Equity to asset**	**CAR**	**Tier1 ratio**	**Private Credit**	**Stock Market**	**ROA**	**NPL**	**RGDP**	**CPI**
Loangrowth	1										
Δ MP rate	-0.0063	1									
Equity to asset	-0.2143***	-0.0850*	1								
CAR	-0.2810***	-0.1423***	0.6441***	1							
Tier1 ratio	-0.2601***	-0.1387***	0.7769***	0.8942***	1						
Private Credit	-0.1923***	0.1475***	-0.293***	-0.1239***	-0.2518***	1					
Stock Market	-0.0689	0.1280***	-0.3569***	-0.1653***	-0.2729***	0.7333***	1				
ROA	0.1776***	-0.0310	0.2718***	0.2433***	0.3400***	-0.2157***	-0.2491***	1			
NPL	-0.0205	-0.2157***	-0.0124	-0.0748*	-0.1461***	0.0527	-0.0388	-0.2084***	1		
RGDP	0.3231***	0.1834***	-0.0868**	-0.1536***	-0.1424***	-0.3203***	-0.1036**	0.1487***	-0.1390***	1	
CPI	-0.4623***	0.0705	0.5657***	0.4797***	0.5732***	-0.1375***	-0.1151***	-0.0366	-0.2111***	-0.1874***	1

Note: The statistical description of bank capital and bank characteristics is presented in their original, unnormalized form. *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively.

4.2 Empirical results

The result of determining the impact tightening of monetary policy on growth rate of credit is shown in table 6 to test hypothesis 1 that monetary policy tightening will reduce credit growth. For all samples, the first indicator is loan growth from the previous period, which displays a significant positive relationship at a 1% level with the loan growth from the current period. All else being equal, the change in the three-month interbank interest rate shows an unexpected positive sign which means the increase in policy lead to an increase in loan growth. The result is similar with Zhan et al. (2021) who explain that an increase in the monetary rate can signal a positive outlook for the economy, which can lead to increased confidence among firms and households. This confidence may encourage more borrowing, further driving up loan growth. And higher interest rates may also encourage banks to increase lending to generate additional revenue. This may occur because banks may face a trade-off between the higher borrowing costs and the potential profits from lending at higher rates. Furthermore, the study found that the growth rate of real GDP had a statistically significant positive impact on bank loan supply at the 1% level, suggesting that an expansion in the economy is associated with an increase in loan supply. On the other hand, the CPI variable yields a negative coefficient, indicating that a 1% increase in CPI led to a decrease in loan growth of approximately 0.29-0.40%. The CPI serves as a proxy for inflation and uncertainty because inflation's implications on economic conditions, investment decisions, and policy choices can lead to increased uncertainty and affect demand for loans. Higher inflation rates cause rapid and unpredictable price fluctuations, creating challenges for planning and decision-making. Furthermore, central banks and policymakers often implement measures to control

inflation, but this introduces uncertainty regarding future monetary policy. The effectiveness and timing of these measures become uncertain, resulting in volatility in financial markets and economic conditions. As a result, household agents might delay their investment plans.

Additionally, the study's findings suggest that when the sample is divided into developed and ASEAN countries, the relationship between loan growth from the previous period and loan growth in the current period exhibits a positive coefficient in developed countries but is inconclusive. However, in ASEAN countries, a statistically significant positive relationship was observed at a 1% level. When examining the relationship between the tightening of monetary policy and the growth rate of credit in developed countries, the results indicate a negative coefficient. However, it is important to note that this negative coefficient alone does not provide conclusive evidence that an increase in the policy rate directly leads to a reduction in loan growth. But the result is the opposite in ASEAN, it shows the positive coefficient with loan growth at 5% significant.

Furthermore, the results of CPI exhibit a statistically significant positive relationship in developed countries. This finding aligns with research conducted by Gambacorta and Mistrulli (2004), indicating the presence of a demand-side effect. Borrowers may perceive that the value of borrowed money will diminish in the future due to inflation, making borrowing more attractive in the present. Moreover, elevated inflation levels may lead to increased loan demand as businesses and households seek to hedge against inflationary pressures by investing in physical assets or other income-generating activities. The examination of bank characteristic variables indicates that in developed countries, there is a positive correlation between loan

growth and ROA. This implies that banks with higher levels of profitability and efficiency are more likely to expand their credit supply. The reason is from the data, it shows that ROA in developed countries is higher than ASEAN. Because developed countries typically have more mature and advanced financial systems compared to ASEAN countries. Developed countries often have well-established banking sectors with larger and more diversified financial institutions. This can result in higher ROA due to economies of scale, better access to funding sources, and more efficient operations.

Table 6: Impact of tightening of monetary policy on growth rate of credit

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1.Loangrowth	0.1481***	0.1665***	0.1786***
	(0.0448)	(0.0474)	(0.0485)
Δ MP rate$_t$	1.0951*	1.3950**	1.5212**
	(0.6184)	(0.6177)	(0.6417)
Bankcapital$_{t-1}$	1.2741***	1.2005**	1.0365***
	(0.4287)	(0.2793)	(0.3244)
RGDP$_t$	0.4495**	0.3406***	0.3550***
	(0.1097)	(0.1064)	(0.1027)
CPI$_t$	-0.2976**	-0.3289***	-0.4028***
	(0.1198)	(0.1135)	(0.1144)
ROA$_{t-1}$	0.5036	1.2050	0.8059
	(0.9583)	(0.9587)	(0.9318)
NPL$_{t-1}$	0.3324	0.4821	0.5025
	(0.3664)	(0.3413)	(0.3579)
Year	0.1874	0.2037	0.2540
	(0.2871)	(0.331)	(0.3302)
Rescued	7.6160*	8.1662*	8.3764*
	(4.2593)	(4.197)	(4.2941)
Basel	-3.6343**	-3.9375***	-4.0753***
	(1.4058)	(1.3758)	(1.3758)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.8770	0.7420	0.6550
Hansen J	0.6460	0.7220	0.7740

Developed group			
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1.Loangrowth	0.0098	0.0257	0.0149
	(0.0496)	(0.0506)	(0.0512)
Δ MP rate$_t$	-1.1611	-0.4020	-0.7873
	(1.0982)	(1.0239)	(1.0453)
Bankcapital$_{t-1}$	2.3317**	1.5112***	1.2714***
	(0.891)	(0.3524)	(0.3284)
RGDP$_t$	0.2174	0.0135	0.0679
	(0.164)	(0.1679)	(0.1684)
CPI$_t$	0.7545***	0.6417**	0.7022***
	(0.2201)	(0.2524)	(0.2513)
ROA$_{t-1}$	2.2715*	3.0291*	3.1061*
	(1.1342)	(1.5192)	(1.558)
NPL$_{t-1}$	0.6407	0.1583	0.0999
	(0.6663)	(0.6505)	(0.646)
Year	-0.8823***	-1.0072***	-1.2067***
	0.2684	0.3652	0.3746
Rescued	4.2758	5.7347	4.6345
	4.2148	4.5481	4.5620
Basel	-5.0472**	-5.1471***	-5.1449***
	1.8798	1.8329	1.8554
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.0870	0.3640	0.2940
Hansen J	0.1440	0.1650	0.1670
ASEAN group			
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1.Loangrowth	0.1996***	0.2439***	0.2354***
	(0.0656)	(0.0598)	(0.0595)
Δ MP rate$_t$	1.4710**	1.9283**	2.0155**
	(0.673)	(0.7505)	(0.7511)
Bankcapital$_{t-1}$	1.4496**	1.6999***	1.8395***
	(0.6498)	(0.465)	(0.4847)
RGDP$_t$	0.6330***	0.5841***	0.5949***
	(0.1298)	(0.1178)	(0.1162)
CPI$_t$	-0.3190**	-0.203	-0.2967**
	(0.1516)	(0.1325)	(0.1276)
ROA$_{t-1}$	-3.4197*	-2.701	-2.452
	(1.7347)	(1.7122)	(1.6521)
NPL$_{t-1}$	0.3679	0.4386	0.4829
	(0.505)	(0.4367)	(0.4651)
Year	0.094	-0.343	-0.313
	(0.5667)	(0.5105)	(0.5472)
Rescued			
Basel	-6.8067**	-6.1320*	-6.0216**
	(2.963)	(2.5654)	(2.4652)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.8370	0.8030	0.8170
Hansen J	0.1930	0.1820	0.2020

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, NPL ratio, ROA, CPI and RGDP. The rescued and Basel dummy is included in the estimation. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of observations in Developed and ASEAN subset is 39 and 35 banks respectively. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

Table 7 presents the bank capital impact on the monetary policy mechanism, using equity to asset, CAR, and Tier 1 ratio as measures. The purpose is to examine hypothesis 2, which suggests that well-capitalized banks will have a positive influence on loan growth and therefore experience smaller effects from contractionary monetary policy. For all samples, loan growth from the previous period displays a significant positive relationship. All else being equal, the three-bank capital ratio yields a statistically significant positive result at the 1% level, indicating that larger capitalized banks supply more loans to the economy. Specifically, a 1% increase in the bank capital ratio led to an increase in loan growth of approximately 1.77-2.02%. Regarding the BLC hypothesis, the study suggests that the impact of a monetary policy rate tightening is less significant for banks with larger capitalization. Then, large-capitalized banks still lend more even if under monetary policy tightening situation. This finding is consistent with previous studies such as Gambacorta and Mistrulli (2004); Gambacorta and Shin (2018) holds true for both developed and ASEAN countries. For other bank-characteristic, the study shows that ROA provides the positive significant result in developed country whereas the negative significant result is shown in ASEAN group. The less efficient banks are more likely to expand loans. One possible explanation is that banks in ASEAN countries exhibit a higher average NPL ratio, implying potential challenges in effectively managing bad loans and their adverse impact on profitability. Consequently, these banks may opt to

accelerate loan growth as a strategic measure to counterbalance potential profit erosion resulting from the elevated NPL ratio. The rationale behind this approach lies in the belief that expanding loan portfolios can yield additional interest income, potentially mitigating the negative effects of non-performing loans on overall profitability. By pursuing increased lending activities, banks aim to capitalize on the prospective gains from new loans, which may outweigh the losses incurred from existing non-performing loans. This strategic endeavor is intended to improve the financial position of the bank.

Table 7: The impact of bank capital on monetary policy mechanism

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1.Loangrowth	0.1360***	0.1590568***	0.1562***
	(0.0385)	(0.0425)	(0.0424)
Δ MP $rate_t$	1.0417*	1.410756*	1.3334
	(0.6218)	(0.8419)	(0.8263)
$Bankcapital_{t-1}$	2.0242***	1.77166***	1.7969***
	(0.4961)	(0.3687456)	(0.4165)
Δ MP $rate_t$*$Bankcapital_{t-1}$	1.0992**	0.7609446*	0.6540*
	(0.4908)	(0.437)	(0.3613)
$RGDP_t$	0.3735***	0.3065812***	0.3006**
	(0.1109)	(0.1136)	(0.1175)
CPI_t	-0.3320***	-0.2620578**	-0.3042**
	(0.1221)	(0.1177)	(0.1216)
ROA_{t-1}	0.2342	0.6648	0.6901
	(0.973)	(0.944)	(0.8858)
NPL_{t-1}	-0.1716	-0.4842	-0.4147
	(0.4805)	(0.4083)	(0.4063)
Year	0.4289	0.0841	-0.0231
	(0.3396)	(0.3756)	(0.3922)
Rescued	6.4068	4.7284	5.9471
	(4.6672)	(4.7284)	(4.5034)
Basel	-7.0593***	-6.8740***	-6.8886***
	(1.5973)	(1.5963)	(1.5312)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.6420	0.8040	0.8920
Hansen J	0.1520	0.1410	0.1820

Note: The dependent variable is loan growth. L1. loan growth, representing lag 1 of loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, NPL ratio, ROA, CPI, RGDP and Δ MP rate*Bankcapital. The rescued and Basel dummy is included in the estimation. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011) except NPL ratio which use lag 2 and 3 since Hansen test close to zero. *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of observations in Developed and ASEAN subset is 39 and 35 banks respectively. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

	Developed group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1.Loangrowth	0.0341	0.0418	0.0253
	(0.0568)	(0.0475)	(0.0484)
Δ MP $rate_t$	-0.8703	1.1093	0.2374
	(1.061)	(1.4226)	(1.3044)
$Bankcapital_{t-1}$	3.5086***	2.046***	1.6541***
	(1.2008)	(0.4119)	(0.3955)
Δ MP $rate_t$*$Bankcapital_{t-1}$	1.5207*	1.4471**	1.0681***
	(0.8978)	(0.6448)	(0.5067)
$RGDP_t$	0.2456	-0.0594	0.0194
	(0.1642)	(0.2028)	(0.202)
CPI_t	0.6042**	0.5440**	0.6380**
	(0.2828)	(0.265)	(0.2641)
ROA_{t-1}	2.7442*	2.5317	2.7768*
	(1.3935)	(1.5173)	(1.5819)
NPL_{t-1}	0.8260	0.0893	0.0315
	(0.6464)	(0.601)	(0.5955)
Year	-0.5747	-0.8058*	-1.1293**
	(0.386)	(0.4382)	(0.4253)
Rescued	2.2726	0.6416	0.8142
	(4.62)	(5.1274)	(4.7826)
Basel	-5.1484***	-5.5573***	-5.4878***
	(1.9062)	(1.8633)	(1.8662)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.1550	0.5860	0.4490
Hansen J	0.1440	0.1480	0.1520

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1.Loangrowth	0.1815***	0.2307***	0.2076***
	(0.0609)	(0.0624)	(0.0726)
Δ MP $rate_t$	2.1865***	2.1571***	3.0584***
	(0.6596)	(0.7763)	(0.8274)
$Bankcapital_{t-1}$	2.1012***	1.9444***	2.5043***
	(0.6027)	(0.4435)	(0.5805)
Δ MP $rate_t$*$Bankcapital_{t-1}$	1.1344**	0.5511	1.2415**
	(0.532)	(0.4081)	(0.4741)
$RGDP_t$	0.5091***	0.5718***	0.5290***
	(0.1195)	(0.1139)	(0.1189)
CPI_t	-0.3331**	-0.1950	-8.5698***
	(0.1417)	(0.1317)	(3.0004)
ROA_{t-1}	-4.3204**	-2.9580*	-3.1281*
	(1.7852)	(1.6693)	(1.746)
NPL_{t-1}	0.4803	0.3981	0.4205
	(0.4973)	(0.4299)	(0.4689)
Year	0.2061	-0.2841	-0.2201
	(0.4882)	(0.567)	(0.6213)
Rescued			
Basel	-8.1523**	-7.0952**	-8.5698***
	(3.0988)	(2.9107)	(3.0004)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.7720	0.8960	0.7650
Hansen J	0.1510	0.1850	0.2090

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, NPL ratio, ROA, CPI, RGDP and Δ MP rate*Bankcapital. The

rescued and Basel dummy is included in the estimation. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

The results from table 8 would like to test the combined impact of financial development and bank capital on the BLC and therefore weakened the monetary policy transmission mechanism. It confirms that the banks with large capitalization tend to provide more loans in all sample, developed and ASEAN groups. Considering the financial development, the result shows that higher level of CPS has a negative impact on loan growth in ASEAN. So, bank benefit from more non-core income, then inducing banks to become less reliant on bank loan supply as the main channel to create interest-based income. Moreover, the result reconfirms that during the increase in policy rate, well-capitalization banks get smaller effect and becomes apparent that the linkage between bank capital and the BLC weakens as financial development increases. It confirms that banks are more convenient to access external funding.

In contrast, the coefficient between the bank capital and change in monetary policy rate in the developed countries shows an unexpected negative the findings suggest that small-capitalized banks have a smaller effect when monetary policy contracts in developed countries. Then, small-capitalized banks still lend more even if under monetary policy tightening situation which aligns with the results of previous studies such as Hosono (2006). It is plausible that banks with limited capital would be motivated to adjust their loan portfolio to enhance profitability in response to a monetary policy shock. Moreover, the higher in private credit leads to the linkage between bank capital and the BLC has grown stronger. One of possible explanations

is that when private credit to GDP is higher, it is often associated with a more developed and complex debt market. However, the market may perceive it as a sign of excessive growth in private debt since before GFC, advanced economies experienced rapid increases in household debt which is a significant portion of CPS. This leads the market to tend to be more cautious and places greater emphasis on the strength of bank capital. The presence of adequate bank capital can help reduce information asymmetry. As a result, during the monetary policy contraction, large-capitalized banks with higher creditworthiness and substantial capital reserves have an advantage. They can attract deposits, access funding markets, and borrow at favorable rates, allowing them to provide more loans to borrowers.

For the SMC, the result shows an unexpected positive significant result. This suggests that banks perceive capital market itself as one of instrument to acquire the external funding and potential opportunities to supply more loans which is correlated with study of Lerskullawat (2017). The study still confirms that bank with large capital provide more loan during monetary policy contraction, however, the increase in size of the capital market has a weakening impact on the response of the BLC to bank capital representing by the negative coefficient in cubic interactive term. This suggests that the development of financial markets provides banks with increased access to external financing for both developed and ASEAN groups.

Table 8: The combined impact of financial development and bank capital on the BLC

Financial development: Private Credit (CPS)

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0999**	0.1552***	0.1406***
	(0.0475)	(0.0543)	(0.0493)
Δ MP $rate_t$	0.8228	1.4188*	1.658735**
	(0.6557)	(0.7241)	(0.7582)
$Bankcapital_{t-1}$	1.1570**	1.4754***	1.1940***
	(0.4872)	(0.3306)	(0.3697)
CPS_t	-0.4286***	-0.0956	-0.2432**
	(0.131)	(0.1172)	(0.111)
Δ MP $rate_t$*$Bankcapital_{t-1}$	0.8021*	0.5170	0.6797**
	(0.3373)	(0.3207)	(0.2843)
CPS_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.0037	0.0021	-0.0017
	(0.0049)	(0.0031)	(0.0025)
$RGDP_t$	0.2214*	0.3188***	0.1989*
	(0.119)	(0.1149)	(0.1092)
CPI_t	-0.3023**	-0.3441***	-0.3979**
	(0.1334)	(0.1119)	(0.1194)
ROA_{t-1}	0.1583	0.9754	0.3543
	(0.9264)	(0.9849)	(0.9265)
NPL_{t-1}	0.2176	0.2798	0.5213
	(0.3894)	(0.3462)	(0.3705)
Year	1.2167***	0.5390	0.9098**
	(0.4178)	(0.4516)	(0.419)
Rescued	9.5248**	4.5327	8.1587*
	(4.6259)	(4.3959)	(4.4425)
Basel	-5.2542***	-4.9915***	-6.2703***
	(1.5955)	(1.5688)	(1.4801)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.4780	0.7550	0.8230
Hansen	0.6600	0.6260	0.9950

	Developed group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0245	0.0872	0.0467
	(0.052)	(0.0701)	(0.0659)
Δ MP $rate_t$	-1.2401	2.4428	-2.5928
	(1.7188)	(2.2213)	(2.0415)
$Bankcapital_{t-1}$	2.8225**	2.0786***	0.9262***
	(1.2983)	(0.5066)	(0.3985)
CPS_t	-0.1075	0.1298	-0.0448
	(0.1012)	(0.111)	(0.1044)
Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.4235	-12.6847**	-6.6900*
	(12.6344)	(5.0779)	(3.7391)
CPS_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	0.0073	0.0814***	0.0343
	(0.0688)	(0.0301)	(0.0228)
$RGDP_t$	0.1741	-0.0096	0.1842
	(0.1703)	(0.2008)	(0.1977)
CPI_t	0.7027**	0.3225	0.7683***
	(0.288)	(0.3149)	(0.282)
ROA_{t-1}	2.3771**	1.8918	3.1537**
	(1.2929)	(1.6229)	(1.5244)
NPL_{t-1}	0.8627	0.4392	0.4829
	(0.7142)	(0.8079)	(0.702)
Year	-0.4789	-1.0781	-1.2094***
	(0.428)	(0.5223)	(0.4446)
Rescued	3.3963	-4.0597	4.7826
	(5.3443)	(8.2871)	(6.2704)
Basel	-5.7871***	-3.6928*	-4.4901**
	(1.9508)	(1.9834)	(2.058)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.1280	0.9320	0.7930
Hansen	0.1050	0.2390	0.0860

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0659	0.0332	0.1075
	(0.0656)	(0.0673)	(0.0737)
Δ MP $rate_t$	1.7816**	1.2072	3.1434**
	(0.8132)	(0.9718)	(1.1926)
$Bankcapital_{t-1}$	1.6755**	1.1648***	1.9137***
	(0.7606)	(0.4573)	(0.5853)
CPS_t	-1.1333***	-1.8084***	-1.0502***
	(0.3091)	(0.4199)	(0.2727)
Δ MP $rate_t$*$Bankcapital_{t-1}$	1.9079*	1.4182**	2.0409***
	(0.7624)	(0.6722)	(0.6067)
CPS_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.0319**	-0.0353	-0.0281**
	(0.013)	(0.013)	(0.0119)
$RGDP_t$	0.3294*	0.1542	0.2510
	(0.1837)	(0.1968)	(0.1713)
CPI_t	-0.6852***	-0.7454***	-0.6610***
	(0.1442)	(0.3149)	(0.13)
ROA_{t-1}	-1.4755	1.8918	-1.5567
	(1.8969)	(1.6229)	(1.7472)
NPL_{t-1}	-0.7353	-1.0748*	-0.2781
	(0.6445)	(0.6296)	(0.6042)
Year	2.9965***	4.3213***	2.8120***
	(0.6892)	(0.9152)	(0.6897)
Rescued			
Basel	-3.6497	-0.4074	-4.1736
	(3.2369)	(3.4124)	(3.2023)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.1470	0.5100	0.3280
Hansen	0.1110	0.1250	0.1300

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank

rate, common to equity ratio, CAR, Tier 1 ratio, Δ MP rate* Bankcapital, CPS, NPL ratio, ROA, CPI, RGDP and Δ MP rate* CPS* Bankcapital. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

Financial development: Stock market capitalization (SMC)

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.2065***	0.2143***	0.2294***
	(0.0497)	(0.054)	(0.0573)
Δ MP $rate_t$	3.0271***	3.6908***	3.8169**
	(0.5382)	(0.7894)	(0.7697)
$Bankcapital_{t-1}$	1.8825***	1.5928***	1.3742***
	(0.4663)	(0.3474)	(0.4215)
SMC_t	0.2511***	0.2279***	0.2460***
	(0.0552)	(0.062)	(0.0568)
Δ MP $rate_t$*$Bankcapital_{t-1}$	0.4936	0.8836*	1.2120**
	(0.6257)	(0.5307)	(0.5146)
SMC_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.0002	-0.0029	-0.0090
	(0.0093)	(0.0062)	(0.006)
$RGDP_t$	0.2115**	0.0983	0.0738
	(0.1152)	(0.1254)	(0.1174)
CPI_t	-0.1622	-0.2115*	-0.2460*
	(0.1284)	(0.1255)	(0.1296)
ROA_{t-1}	-0.2747	0.3538	0.0529
	(1.0375)	(0.9725)	(0.9686)
NPL_{t-1}	0.8374*	0.7747*	0.8929**
	(0.4257)	(0.3982)	(0.4246)
Year	-1.1964***	-0.9970*	-1.1048**
	(0.432)	(0.5379)	(0.4879)
Rescued	12.5029***	11.5330**	12.7063***
	(4.6009)	(4.5647)	(4.7872)
Basel	-2.0628	-2.7383*	-2.8287*
	(1.3787)	(1.4782)	(1.4023)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.8770	0.3090	0.4640
Hansen	0.5460	0.5690	0.5710

	Developed group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0354	0.0762	0.0762
	(0.0588)	(0.0478)	(0.0538)
Δ MP rate$_t$	0.9166	2.1797	2.1797
	(1.1923)	(1.5319)	(1.9073)
Bankcapital$_{t-1}$	3.0111**	2.1653***	2.1653***
	(1.1927)	(0.4596)	(0.5029)
SMC$_t$	0.0956**	0.1349***	0.1349***
	(0.0389)	(0.0466)	(0.0424)
Δ MP rate$_t$*Bankcapital$_{t-1}$	3.7157	8.0195*	8.0195*
	(4.1878)	(4.0924)	(3.8803)
SMC$_t$*Δ MP rate$_t$*Bankcapital$_{t-1}$	-0.0224	-0.0586*	-0.0586*
	(0.0372)	(0.0334)	(0.0309)
RGDP$_t$	0.1221	-0.3247	-0.3247
	(0.1851)	(0.2172)	(0.2272)
CPI$_t$	0.5442*	0.2500	0.2500
	(0.2751)	(0.2818)	(0.2621)
ROA$_{t-1}$	2.1520	1.8206	1.8206
	(1.4573)	(1.6994)	(1.687)
NPL$_{t-1}$	0.5716	0.2996	0.2996
	(0.7807)	(0.7235)	(0.6668)
Year	-1.1027***	-1.0438	-1.0438
	(0.4446)	(0.5542)	(0.4952)
Rescued	3.8454	-4.3012	-4.3012
	(4.3568)	(7.5664)	(7.4086)
Basel	-4.5276**	-4.6222**	-4.6222**
	(2.0803)	(2.134)	(2.108)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.2560	0.6570	0.7560
Hansen	0.1130	0.1790	0.1460

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.2806***	0.34031***	0.3318***
	(0.076)	(0.0617)	(0.0752)
Δ MP rate$_t$	3.9226***	4.4871***	5.9722***
	(0.7087)	(0.7888009)	(1.0518)
Bankcapital$_{t-1}$	2.1612***	2.0425***	2.7043***
	(0.5867)	(0.44)	(0.7396)
SMC$_t$	0.38103***	0.4039***	0.3972***
	(0.0977)	(0.1077)	(0.1018)
Δ MP rate$_t$*Bankcapital$_{t-1}$	2.3453*	2.3334*	2.9316**
	(1.2583)	(1.1718)	(1.2535)
SMC$_t$*Δ MP rate$_t$*Bankcapital$_{t-1}$	-0.0318*	-0.0328*	-0.0276
	(0.0183)	(0.0185)	(0.017)
RGDP$_t$	0.2071	0.1723	0.0259
	(0.1552)	(0.1389)	(0.1414)
CPI$_t$	-0.2518	-0.0920	-0.2394
	(0.1825)	(0.1865)	(0.1967)
ROA$_{t-1}$	-5.3415***	-4.599641***	-5.5160***
	(1.8699)	(1.4364)	(1.7079)
NPL$_{t-1}$	1.4439**	1.432791**	1.7924**
	(0.6589)	(0.5528336)	(0.6261)
Year	-1.2420	-1.7048*	-1.3064
	(0.8536)	(0.9699)	(1.0185)
Rescued			
Basel	-3.0782	-2.7217	-4.4745
	(2.727)	(2.5477)	(2.7719)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.6950	0.3100	0.9190
Hansen	0.1340	0.1480	0.2310

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, Δ MP rate* Bankcapital, SMC, NPL ratio, ROA, CPI, RGDP and Δ MP rate*SMC* Bankcapital. The rescued and Basel dummy is included in the estimation. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested

by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

5. Conclusion

This study significantly contributes to the literature on the transmission of monetary policy by emphasizing the importance of bank capital in the BLC mechanism and consider the financial development. Bank level data from nine countries during 2007-2021 are utilized, including both developed and ASEAN countries. For the model, loan growth represents the dependent variable while the equity to asset ratio, CAR and Tier 1 ratio as well as the interaction term between the bank capital and change in 3-month interest rate are introduced to capture the consequence of bank capital on credit expansion in the monetary transmission mechanism. To consider the financial development, private credit to GDP and stock market capitalization to GDP is used in the model. Moreover, the three-way interaction term between bank capital, change in 3-month interest rate and financial development indicators are captured the linkage between bank capital and the BLC under the financial development has grown which made the monetary policy transmission mechanism less effective. All models employ a one-step difference GMM dynamic panel regression approach. These models account for macroeconomic and bank-specific variables.

The findings are largely consistent with previous research, demonstrating that banks with larger capital bases are better positioned to overcome financing constraints and expand their loan supply. Additionally, well-capitalized banks exhibit a smaller impact during periods of contractionary monetary policy, indicating their resilience to adverse shocks. However, this study uncovers divergent behavioral patterns between developed and ASEAN countries. In developed nations, the impact of policy rate changes on loan growth remains inconclusive. However, profitable, and efficient

banks in these countries are more inclined to expand credit due to their advanced financial systems. Additionally, higher inflation levels drive increased loan demand as businesses and households seek protection against inflationary pressures. Conversely, in the ASEAN subset, policy rate increases are positively associated with loan growth, signaling favorable economic conditions, and boosting confidence among borrowers. ASEAN banks also face challenges in managing non-performing loans, prompting them to strategically accelerate loan growth. Moreover, higher real GDP growth rates positively influence bank loan supply.

For the impact of financial development, higher levels of private credit to GDP restrict banks' ability to expand credit in ASEAN, while stock market development provides additional funding sources for increased loan supply in both developed and ASEAN group. However, it has contrasting effects on banks in developed and ASEAN countries. In ASEAN countries, the improvement of the financial system helps banks mitigate the impact of monetary policy shocks and weakens the link between bank capital and the BLC. In developed countries, the results indicate that investors in the money market continue to prioritize the resilience of banks and assess the creditworthiness of borrowers. This leads to a stronger linkage between bank capital and the BLC, ultimately impacting the effectiveness of the monetary policy transmission mechanism.

To conclude, bank capital is of utmost importance for policy makers in fulfilling monetary policy and financial supervisory mandates. It plays a vital function in facilitating credit expansion and ensuring the effective transmission of monetary policy to the real economy. Additionally, the BLC can be influenced indirectly by bank-specific indicators such as ROA and NPL. Policymakers should carefully

consider the combined impact of bank characteristics to design adaptive monetary policies that promote a healthy banking system and support the real economy. It is important to have a clear understanding of how monetary policy affects the economy through the BLC, especially in relation to the level of financial development. This understanding is crucial for policymakers to effectively implement monetary policy. It is essential for policymakers to be mindful of the advantages and disadvantages of financial development. While it can foster financial innovation and provide financing opportunities, it may also lessen the effectiveness of the BLC.

6. Appendix

The results from table below which would like to test the relationship between financial development, loan growth, and the BLC (hypothesis 3) indicates that the higher level of CPS has a negative impact on loan growth. Similarly, the SMC shows a significant result, but it indicates an unexpected positive relationship with loan growth. Additionally, there is confirmation that the development of financial system in ASEAN which lessen the financial frictions can assist banks in insulating the impact of monetary policy shocks, supporting the findings of previous research such as Lerskullawat (2017); Nguyen et al. (2022) However, it is important to note that the development of the CPS has nonsignificant weakening effect on the BLC. One of possible explanation from Zhan et al. (2021) is that the advancement of financial system has a dual impact on banks. It enhances the external financing market by improving access to funds but also imposes stronger financing constraints by influencing liability-side funds. Tightening monetary policy increases yields of alternative financial assets, leading households to reduce deposits. This restricts banks' access to loanable funds and decreases credit supply. Overall, the offsetting effects result in a nonsignificant impact of money market development.

Table 9: The relationship between financial development, loan, and the BLC.

Financial development: Private Credit (CPS)

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.1129**	0.1358***	0.1488***
	(0.0453)	(0.051)	(0.051)
Δ MP rate$_t$	0.5991	-0.0468	0.1871
	(1.0966)	(1.1502)	(1.0891)
Bankcapital$_{t-1}$	0.8999**	1.0988***	0.8685**
	(0.4328)	(0.2964)	(0.3337)
CPS$_t$	-0.4166***	-0.0811	-0.1162
	(0.1379)	(0.144)	(0.1516)
CPS$_t$*Δ MP rate$_t$	-0.0009	0.0144	0.0127
	(0.0121)	(0.0131)	(0.0132)
RGDP$_t$	0.2864**	0.2363***	0.2459**
	(0.1257)	(0.1106)	(0.112)
CPI$_t$	-0.2963**	-0.3546***	-0.4247***
	(0.1262)	(0.1132)	(0.1152)
ROA$_{t-1}$	0.4846	1.0935	0.7117
	(0.9197)	(0.9593)	(0.9276)
NPL$_{t-1}$	0.1789	0.3169	0.3517
	(0.3916)	(0.3285)	(0.3474)
Year	1.1371***	0.4178	0.5830
	(0.4206)	(0.4527)	(0.4852)
Rescued	8.7523*	9.6383**	9.6454*
	(4.5061)	(4.4352)	(4.5414)
Basel	-4.7773***	-4.5059***	-4.7054***
	(1.5454)	(1.5244)	(1.5538)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.5230	0.9320	0.9740
Hansen	0.5870	0.7050	0.7070

	Developed group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0289	0.0372	0.0263
	(0.0484)	(0.0457)	(0.046)
Δ MP rate$_t$	-12.7452	-10.9420	-14.1773
	(8.6267)	(7.7877)	(8.557)
Bankcapital$_{t-1}$	2.6511***	1.53069***	1.3228***
	(0.9648)	(0.3762)	(0.3589)
CPS$_t$	-0.1199*	0.0125	0.0220
	(0.0673)	(0.084)	(0.0863)
CPS$_t$*Δ MP rate$_t$	0.0612	0.0605	0.0765
	(0.0475)	(0.0443)	(0.0482)
RGDP$_t$	0.1732	-0.0240	0.0244
	(0.1696)	(0.1819)	(0.1837)
CPI$_t$	0.8287***	0.6370**	0.6753**
	(0.2165)	(0.2665)	(0.2643)
ROA$_{t-1}$	2.1679*	2.9736*	3.0899*
	(1.1096)	(1.5494)	(1.6142)
NPL$_{t-1}$	0.6972	0.1208	0.0432
	(0.675)	(0.6705)	(0.6815)
Year	-0.6022*	-0.9755**	-1.1773**
	(0.3313)	(0.4391)	(0.4578)
Rescued	5.1628	5.2975	5.2975
	(4.2887)	(4.6513)	(4.6513)
Basel	-6.1169***	-5.2818**	-5.2818***
	(1.9541)	(2.0232)	(2.0232)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.1640	0.4300	0.3430
Hansen	0.1010	0.0990	0.1030

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	-0.0191	-0.0065	0.0146
	(0.0752)	(0.0879)	(0.08)
Δ MP $rate_t$	-3.763723**	-2.4813	-2.4704
	(1.6551)	(2.0666)	(1.8839)
$Bankcapital_{t-1}$	1.2111*	1.1461**	1.2002**
	(0.6957)	(0.4874)	(0.4599)
CPS_t	-0.9192***	-1.4278***	-1.1437***
	(0.3146)	(0.4214)	(0.3494)
CPS_t*Δ MP $rate_t$	0.1059***	0.0889**	0.0856**
	(0.0326)	(0.0365)	(0.0329)
$RGDP_t$	-0.023	-0.1692	-0.0383
	(0.2253)	(0.2409)	(0.2061)
CPI_t	-0.8040***	-0.8227***	-0.7893***
	(0.1601)	(0.1618)	(0.1379)
ROA_{t-1}	0.1429	0.8222	0.9585
	(1.8244)	(2.0511)	(1.8544)
NPL_{t-1}	-0.2919	-0.5037	-0.3166
	(0.5395)	(0.5666)	(0.542)
Year	2.6371***	3.7825***	3.0477***
	(0.691)	(0.9806)	(0.8343)
Rescued			
Basel	-1.3201	-0.5998	-1.0217
	(3.3652)	(3.3368)	(3.1031)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.1320	0.2350	0.2890
Hansen	0.1150	0.1010	0.1080

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, CPS, NPL ratio, ROA, CPI, RGDP and Δ MP rate* CPS. The rescued and Basel dummy is included in the estimation. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

Financial development: Stock market capitalization (SMC)

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.1782***	0.1950***	0.2091***
	(0.0449)	(0.0506)	(0.0522)
Δ MP $rate_t$	-1.3492	-1.2871	-1.3348
	(1.6371)	(1.7025)	(1.6984)
$Bankcapital_{t-1}$	1.6151***	1.2069***	0.9468***
	(0.4208)	(0.2965)	(0.3593)
SMC_t	0.2921***	0.2776***	0.2794***
	(0.0622)	(0.068)	(0.0639)
SMC_t*Δ MP $rate_t$	0.0513**	0.05196**	0.0542***
	(0.0209)	(0.0201)	(0.0201)
$RGDP_t$	0.0426	-0.0525	-0.0498
	(0.1347)	(0.1363)	(0.1256)
CPI_t	-0.2372*	-0.2427**	-0.3191***
	(0.129)	(0.1175)	(0.121)
ROA_{t-1}	-0.0473	0.7749	0.5104
	(1.002)	(0.9953)	(0.9946)
NPL_{t-1}	0.7663*	0.8371**	0.8762*
	(0.4291)	(0.3901)	(0.4255)
Year	-1.1436***	-1.0867**	-0.9582**
	(0.4247)	(0.5071)	(0.4738)
Rescued	13.5294***	13.5571***	13.7519***
	(4.4359)	(4.6137)	(4.7025)
Basel	-2.5377*	-2.9512**	-3.0274**
	(1.4147)	(1.4767)	(1.4263)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.6260	0.2890	0.2570
Hansen	0.6110	0.6640	0.7050

	Developed group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0498	0.0360	0.0284
	(0.0543)	(0.0486)	(0.0495)
Δ MP $rate_t$	-8.0267**	-0.9506	-1.904
	(3.7658)	(3.3597)	(3.5584)
$Bankcapital_{t-1}$	3.2833***	1.4986***	1.2155***
	(1.1203)	(0.3668)	(0.3325)
SMC_t	0.1055**	0.0836*	0.0813**
	(0.043)	(0.042)	(0.0402)
SMC_t*Δ MP $rate_t$	0.0531**	0.0087	0.0134
	(0.0237)	(0.0235)	(0.0241)
$RGDP_t$	0.1974	-0.0153	0.0299
	(0.1613)	(0.1883)	(0.186)
CPI_t	0.4269*	0.4306*	0.4524**
	(0.2173)	(0.2205)	(0.2273)
ROA_{t-1}	3.9793**	3.7341*	3.8911*
	(1.7401)	(1.8943)	(1.9691)
NPL_{t-1}	0.8060	-0.0881	-0.0607
	(0.6657)	(0.6792)	(0.6816)
Year	-0.7640**	-1.1792***	-1.2783***
	(0.362)	(0.3937)	(0.4015)
Rescued	4.8665	6.4216	4.9926
	(3.9887)	(4.2314)	(4.2916)
Basel	-5.5057**	-4.2979**	-4.3509**
	(2.1421)	(1.9488)	(1.9669)
AR(1)	0.0000	0.0000	0.0000
AR(2)	(0.514)	0.7880	0.6810
Hansen	0.9460	0.9470	0.9480

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.1679**	0.2156***	0.2135***
	(0.0768)	(0.0786)	(0.0753)
Δ MP $rate_t$	-7.6519**	-8.3218***	-8.1273***
	(2.9721)	(3.0177)	(2.9499)
$Bankcapital_{t-1}$	1.9332**	1.7609***	1.6926***
	(0.5794)	(0.3908)	(0.468)
SMC_t	0.4373***	0.4204***	0.4262***
	(0.0908)	(0.0941)	(0.0897)
SMC_t*Δ MP $rate_t$	0.1739***	0.1891***	0.1887***
	(0.0456)	(0.0455)	(0.0449)
$RGDP_t$	-0.1664	-0.2246	-0.2212
	(0.1759)	(0.1668)	(0.1599)
CPI_t	-0.2402	-0.1049	-0.1689
	(0.1626)	(0.1522)	(0.1503)
ROA_{t-1}	-4.1007**	-3.0744*	-2.9233*
	(1.6934)	(1.565)	(1.6068)
NPL_{t-1}	1.5964**	1.6852***	1.7876***
	(0.6313)	(0.5023)	(0.5918)
Year	-1.3489*	-1.6489*	-1.6125*
	(0.7734)	(0.8489)	(0.8579)
Rescued			
Basel	-5.4957**	-5.0713**	-4.9554**
	(2.2318)	(1.9043)	(2.0336)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.6860	0.3840	0.5880
Hansen	0.1400	0.1270	0.1160

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, SMC, NPL ratio, ROA, CPI, RGDP and Δ MP rate* SMC. The rescued and Basel dummy is included in the estimation. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

Table 10: All equation

Financial development: Private Credit to GDP (CPS)

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.1130***	0.1586***	0.0868
	(0.0492)	(0.0566)	(0.0579)
Δ MP $rate_t$	1.0914	-0.7161	-0.9451
	(1.1217)	(1.5855)	(2.1265)
$Bankcapital_{t-1}$	1.0239**	1.5465***	0.9847**
	(0.5304)	(0.3709)	(0.4118)
CPS_t	-0.4707**	0.3354	-0.5641***
	(0.1806)	(0.2098)	(0.1773)
Δ MP $rate_t$*$Bankcapital_{t-1}$	0.7913**	0.425	0.3279
	(0.3357)	(0.4036)	(0.5628)
CPS_t*Δ MP $rate_t$	-0.009	0.0367*	0.0073
	(0.0137)	(0.0206)	(0.0245)
CPS_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.0045	0.0046	-0.0065
	(0.0057)	(0.0046)	(0.008)
$RGDP_t$	0.2799*	0.2849**	0.0664
	(0.1456)	(0.125)	(0.2039)
CPI_t	-0.2824*	-0.4026***	-0.2469*
	(0.1466)	(0.1317)	(0.1467)
ROA_{t-1}	-0.0861	0.477	0.4428
	(0.9692)	(1.145)	(0.8633)
NPL_{t-1}	-0.6808	-0.8607*	-0.6332
	(0.4753)	(0.4902)	(0.5228)
Year	1.2352**	-0.4819	1.1009*
	(0.4893)	(0.6072)	(0.5544)
Rescued	8.8800*	4.0303	16.2722**
	(4.9059)	(5.039)	(7.8722)
Basel	-5.2178***	-5.3260***	-7.9049***
	(1.7242)	(1.7451)	(1.7432)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.5530	0.8020	0.4570
AR(3)			
Hansen	0.1770	0.2480	0.0960

	Developed group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	-0.0142	-0.0253	-0.0341
	(0.0527)	(0.0424)	(0.0423)
Δ MP $rate_t$	-7.9371	-8.628	-10.8072
	(8.1064)	(6.324)	(7.0623)
$Bankcapital_{t-1}$	3.3765**	1.5521***	1.3599***
	(1.3142)	(0.4097)	(0.4012)
CPS_t	-0.071	0.0316	0.0412
	(0.0826)	(0.0992)	(0.1037)
Δ MP $rate_t$*$Bankcapital_{t-1}$	0.7246	3.1754	5.8941
	(10.5507)	(7.4258)	(7.9144)
CPS_t*Δ MP $rate_t$	0.0389	0.0518	0.0621
	(0.0459)	(0.0352)	(0.0384)
CPS_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	0.0016	-0.0204	-0.0357
	(0.0583)	(0.042)	(0.0443)
$RGDP_t$	0.1905	-0.0847	-0.0341
	(0.18)	(0.2036)	(0.2047)
CPI_t	0.6523**	0.6351**	0.7089***
	(0.2606)	(0.2401)	(0.2468)
ROA_{t-1}	2.2187*	2.25199*	2.2375*
	(1.1142)	(1.2303)	(1.2161)
NPL_{t-1}	-0.4775	-1.4431	-1.484
	(0.7584)	(0.9904)	(1.0501)
Year	-0.4682	-1.0888**	-1.3512***
	(0.3841)	(0.4359)	(0.4708)
Rescued	2.9826	7.6666	7.0673
	(5.871)	(5.6982)	(5.7847)
Basel	-6.4729***	-5.5321***	-5.7253***
	(1.8743)	(1.9342)	(1.9817)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.0650	0.0910	0.0790
AR(3)		0.2100	0.2200
Hansen	0.908	0.9510	0.9550

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	-0.0005	0.0115	0.0570
	(0.0792)	(0.0965)	(0.097)
Δ MP $rate_t$	-1.741	0.0531	1.259
	(2.3221)	(2.9649)	(3.0831)
$Bankcapital_{t-1}$	1.5609**	1.1057**	1.7774***
	(0.7694)	(0.4621)	(0.535)
CPS_t	-1.0253***	-1.7796**	-1.1898***
	(0.2836)	(0.427)	(0.2987)
Δ MP $rate_t$*$Bankcapital_{t-1}$	1.183	1.1533	1.6341*
	(0.8718)	(0.8917)	(0.8152)
CPS_t*Δ MP $rate_t$	0.068	0.0221	0.0216
	(0.0406)	(0.0528)	(0.0556)
CPS_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.0152	-0.0298	-0.0189
	(0.0146)	(0.0194)	(0.0174)
$RGDP_t$	0.0748	0.0762	0.1718
	(0.2555)	(0.2815)	(0.2978)
CPI_t	-0.7549***	-0.7736***	-0.6964***
	(0.1553)	(0.1479)	(0.1466)
ROA_{t-1}	-0.6373	0.927	-0.5154
	(1.934)	(2.1473)	(1.8569)
NPL_{t-1}	-0.4859	-1.0187	-0.4538
	(0.5364)	(0.6198)	(0.5471)
Year	2.8010***	4.2979***	3.1044***
	(0.624)	(0.9384)	(0.7175)
Rescued			
Basel	-2.3747	-0.4074	-3.4553
	(3.3719)	(3.4124)	(3.2999)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.1900	0.4030	0.3180
AR(3)			
Hansen	0.1030	0.1230	0.1170

Financial development: Stock market capitalization (SMC)

	All Sample		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.1931***	0.2176***	0.1697***
	(0.0464)	(0.0533)	(0.0557)
Δ MP $rate_t$	-0.7048	-0.6586	-0.3893
	(1.7053)	(2.1)	(2.5588)
$Bankcapital_{t-1}$	1.6448***	1.4039***	1.6626***
	(0.4909)	(0.3415)	(0.4588)
SMC_t	0.2914***	0.2819***	0.24401***
	(0.0641)	(0.0761)	(0.0649)
Δ MP $rate_t$*$Bankcapital_{t-1}$	0.1640	0.2466	2.0525***
	(0.6346)	(0.6227)	(0.7792)
SMC_t*Δ MP $rate_t$	0.0457*	0.0340	0.0491
	(0.0241)	(0.0254)	(0.031)
SMC_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	0.0033	0.0029	-0.0186*
	(0.0102)	(0.0077)	(0.0103)
$RGDP_t$	0.0433	0.1436	-0.1881
	(0.1448)	(0.1532)	(0.1695)
CPI_t	-0.2165	-0.1505	-0.2988**
	(0.1359)	(0.1236)	(0.1358)
ROA_{t-1}	-0.2354	1.0789	-0.0466
	(1.0337)	(1.0553)	(0.9556)
NPL_{t-1}	0.4949	0.3379	0.3555
	(0.4576)	(0.4844)	(0.4857)
Year	-1.1973**	-1.3905	-0.924893*
	(0.4529)	(0.5759)	(0.5312)
Rescued	12.7287***	9.1893**	13.2867**
	(4.7015)	(4.5962)	(5.5267)
Basel	-2.8162*	-3.5619**	-5.2222***
	(1.582)	(1.6743)	(1.5956)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.5730	0.1760	0.5770
Hansen	0.1780	0.1310	0.1080

Developed group			
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.0494	0.0339	0.0956
	(0.0529)	(0.0533)	(0.0689)
Δ MP $rate_t$	-9.7993***	3.8555	1.0478
	(3.3158)	(4.3596)	(6.8483)
$Bankcapital_{t-1}$	3.1210**	1.6418***	1.8970***
	(1.2012)	(0.4853)	(0.6171)
SMC_t	0.1117**	0.1242**	0.1422**
	(0.0457)	(0.0561)	(0.0589)
Δ MP $rate_t$*$Bankcapital_{t-1}$	1.1472	4.8472**	14.1572***
	(2.7367)	(2.113)	(3.7219)
SMC_t*Δ MP $rate_t$	0.0690**	-0.0244	0.0076
	(0.0227)	(0.0373)	(0.0491)
SMC_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.013	-0.0393**	-0.1196***
	(0.0207)	(0.019)	(0.0318)
$RGDP_t$	0.1472	-0.162	-0.2847
	(0.1546)	(0.2242)	(0.2247)
CPI_t	0.3618	0.4973**	0.1077
	(0.233)	(0.2297)	(0.2954)
ROA_{t-1}	3.9565***	3.3007*	3.4951
	(1.7609)	(1.9347)	(2.6529)
NPL_{t-1}	0.8588	0.197	1.4509*
	(0.7033)	(0.7135)	(0.8452)
Year	-0.5409	-1.6188***	-0.8398
	(0.3734)	(0.4101)	(0.6552)
Rescued	4.018	2.5754	-13.118
	(3.8849)	(5.0314)	(9.367)
Basel	-4.9741**	-0.7533	-4.13088*
	(2.0262)	(1.9039)	(2.111)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.4950	0.9580	0.7470
Hansen	0.9350	0.9910	0.9930

	ASEAN group		
Independent variable	**Equity to asset**	**CAR**	**Tier1 ratio**
L1 loangrowth	0.1642**	0.1826**	0.2135**
	(0.079)	(0.0826)	(0.0833)
Δ MP $rate_t$	-8.3525**	-11.70623***	-6.5882
	(3.9543)	(4.173)	(4.3371)
$Bankcapital_{t-1}$	1.9265***	1.7189***	2.2445***
	(0.5946)	(0.3725)	(0.5894)
SMC_t	0.4457***	0.4011***	0.4192***
	(0.0984)	(0.0884)	(0.093)
Δ MP $rate_t$*$Bankcapital_{t-1}$	-0.6109	-2.3082	-0.0542
	(1.4879)	(1.6239)	(1.2916)
SMC_t*Δ MP $rate_t$	0.1837***	0.2283***	0.1809***
	(0.0572)	(0.0642)	(0.0609)
SMC_t*Δ MP $rate_t$*$Bankcapital_{t-1}$	0.0101	0.0412	0.0168
	(0.0251)	(0.0292)	(0.0188)
$RGDP_t$	-0.1792	-0.2049	-0.2892
	(0.1849)	(0.2118)	(0.194)
CPI_t	-0.2437	-0.1327	-0.2260
	(0.1619)	(0.1574)	(0.1667)
ROA_{t-1}	-4.0528**	-2.4786	-4.0000**
	(1.7351)	(1.5102)	(1.6582)
NPL_{t-1}	1.6289**	1.6197***	1.9734***
	(0.6469)	(0.5237)	(0.6158)
Year	-1.3262	-1.4330	-1.1874
	(0.8002)	(0.9312)	(0.9355)
Rescued			
Basel	-5.7723	-6.0093**	-6.9461***
	(2.4115)	(2.3175)	(2.382)
AR(1)	0.0000	0.0000	0.0000
AR(2)	0.6740	0.4790	0.9590
Hansen	0.1120	0.0900	0.1750

Note: The dependent variable is loan growth. The independent variables include change in three-month interbank rate, common to equity ratio, CAR, Tier 1 ratio, Δ MP rate*Bankcapital, SMC, Δ MP rate* SMC, NPL ratio, ROA, CPI , RGDP and Δ MP rate* SMC * Bankcapital. The rescued and Basel dummy is included in the estimation. L1. loan growth, representing lag 1 of loan growth. The instruments for loan growth are the second and further lags. For bank characteristic variables are lag 1 and 2. CPI RGDP and monetary policy rate are considered exogenous, suggested by Gambacorta and Mistrulli (2004); Zulkefly Abdul Karim (2011). *, **, *** indicate the significant levels of 10%, 5%, and 1%, respectively. () represents the robust standard error. The reported findings include the p-value from the Arellano-Bond (AR) test for autocorrelation. The number of banks in All, Developed and ASEAN sample is 74, 39 and 35 banks respectively.

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