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# Bank competition and the credit channel of monetary policy: Evidence from an emerging country

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ABSTRACT

Our study provides one of the first examinations in an emerging country on the credit channel of monetary policy transmission under the influence of competition. The study was conducted using a panel data of 30 joint-stock commercial banks in Vietnam in the period of 2008-2017. By applying the DGMM estimation method, we found that the existence of the influence of competition on monetary policy transmission through credit channels. The higher bank competitiveness will make monetary policy transmission via credit channels of commercial banks less effective. Large-scale commercial banks, because of a merger or equity increase, will increase their competitiveness because of increased market share, which will weaken the monetary policy transmission through credit channels. The estimation results from the two methods of competitiveness measurement-the Lerner index and the Boone index–are in a united direction but at different levels.



## 1. Introduction

As one of the monetary policy transmission channels, the credit channel complements the interest rate channel to amplify the impact of monetary policy transmission on the macroeconomic variables through the credit supply of commercial banks (Olivero et al., 2011b). When the central bank takes measures to tighten monetary policy, the capital of commercial banks is reduced, in which case if commercial banks are unable to or have difficulty in issuing capital mobilization tools in the market to compensate for that decline, they will then have to cut credit supply and vice versa. In Vietnam, along with many other macroeconomic policies, the tightened monetary policy in 2008, 2011, and the first half of 2012, with the aim of coping with the rise of inflation and macroeconomic instability, caused difficulties in business activities of the commercial banking system as well as enterprises. The credit tightening situation which went on for a long time has left the economy with enormous consequences: For enterprises-inventory goods, congested capital flows, low production, and business efficiency; for banks–liquidity stress, bad debt increase, and falling profitability are common signs of weakness that are clearly revealed and affecting credit supply of commercial banks.

In recent years, the banking industry in Vietnam has undergone significant changes in competition. Factors that contributed to the important changes in the market structure include Equitization, financial reforms, deregulation, mergers, and acquisition wave, along with the increase in the number of foreign banks. In addition, international economic integration has become an era trend and has strongly taken place in many fields. Along with participation in the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) as well as integration into the ASEAN Economic Community (AEC) and the implementation of international commitments roadmap in the finance field, the Vietnamese banking system will receive many opportunities but will also face many challenges and difficulties.

There have been many debates in recent studies about the disadvantages and benefits of the role of intrinsic factors in monetary policy transmission, including the important influence of bank competitiveness in monetary policy transmission through credit channels. Specifically, bank competitiveness can influence the effectiveness of

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monetary policy by encouraging or obstructing credit policy decisions (Burkhart and Lewis-Beck, 1994). Aftalion and White (1977) and VanHoose (1983) discussed the impact of monetary policy transmission through credit channels under the influence of commercial banks' competition. The studies focused on policymakers' goal of selecting appropriate monetary policy instruments to achieve their goals and examined how these choices are influenced by the banking market structure. VanHoose (1983) found that for banks with high competitiveness, a monetary policy instrument (such as the federal funds rate) became ineffective when regulating commercial banks' credit. According to Baglioni (2007), the regulatory efficiency of monetary policy instruments through different credit markets also depends on bank competitiveness. For example, the impacts of monetary policy transmission through credit channels are increased if the bank is less competitive.

## 2. Theoretical basis

### 2.1. Monetary policy transmission via credit channels

In previous studies, Bernanke (1990), Gertler and Gilchrist (1993), Kashyap and Stein (1997), and Kashyap et al. (1992) provided theoretical models explaining changes in credit supply in monetary regulatory mechanisms and accordingly impact on economic output. Studies showed that the important and common impact of monetary policy through commercial banks' credit channels is expressed in two aspects: Through bank credit operations and through adjustments to customers' balance sheets.

- **Firstly,** the impact on bank credit supply:

M ↓ (↑) → Bank reserve ↓ (↑) → credit ↓ (↑) → I ↓ (↑) → Y ↓ (↑)

In compliance with Bernanke and Gertler (1995), if the central bank tightens monetary policy, commercial banks have to reduce their credit supply by decreasing their deposits, and vice versa, affecting economic aggregate demand.

- **Secondly,** the process of adjusting customers' balance sheets:

Bernanke and Gertler (1995) analyzed the impact of monetary policy on bank credit through the status of balance sheet or customers' net worth in three directions:

(i) Through net worth:

M ↑ → Net worth ↑ → Adversary options ↓ and moral hazard ↓ → credit ↑ → I ↑ → Y ↑

When the central bank uses loose monetary policy (M ↑), the decrease in interest rates creates a rise in enterprise' stock price. Thus a rise in their asset value, limiting interest rate risk for the enterprise, and reducing risks for banks, the moral hazard and the bank's advisory options are reduced. The bank's lending activity is expanded while private sector investment increases, which leads to increased output and aggregate demand (Y ↑).

(ii) Impact on the market value of assets used as collateral for loans: Decreased interest rates as a result of expansionary monetary policy will increase collateral market value, reduce corporate interest rate risk, and boost financial status; allow businesses to have more easy access to bank capital while increasing credit will increase overall demand.

(iii) Through cash flow value:

M ↑ → ↑ Cash inflow → ↓ adversary options and ↓ moral hazard ↓ → credit ↑ → I ↑ → Y ↑

Enterprises' cash inflow (earnings) is the main source of debt repayment to the bank. When the central bank implements the expansionary monetary policy (M ↑), the decrease in interest rates increases the liquidity of the enterprise's balance sheet, the cash inflow increases. Corporate creditworthiness is increased thanks to increased solvency, reduced adverse options, and moral hazard. Banks can expand lending, thereby increasing investment and increasing the output of the economy (Y ↑).

### 2.2. Competitiveness

#### 2.2.1. Lerner unstructured index

The Lerner index proposed by Lerner (1934) points out the bank's market power by looking at the ratio between marginal cost and price. In a perfect competition environment, the selling price is equal to the marginal cost, while in an environment with monopoly power, the selling price is greater than the marginal cost. Therefore, to measure competitiveness, the Lerner index is the common method used to measure the competitiveness of commercial banks by considering the difference between the selling price and marginal cost:

$$\text{Lerner} = \frac{P_{i,t} - MC_{i,t}}{P_{i,t}} \quad (1)$$

where i is the bank representative, t is time; P is the output price, calculated by total revenue over total assets; MC (Margin Cost) is the bank's marginal cost, unable to be observed directly. Because it's unable to observe MC directly, the author used the model of Fu et al. (2013). In addition, the author also approached models by Leuvensteijn et al. (2013) and Fungáčová et al. (2010). MC is estimated based on the total cost function and is estimated following a two-step sequence:

**Step 1:** Get the natural logarithm of the total cost function:

$$\begin{aligned}LnTC_{it} =& \alpha_0 + \alpha_1 LnQ_{it} + \frac{1}{2}\alpha_2 (LnQ_{it})^2 + \alpha_3 Lnw_{1it} + \alpha_4 Lnw_{2it} + \alpha_5 Lnw_{3it} + \alpha_6 LnQ_{it}\, Lnw_{1it} + \alpha_7 LnQ_{it}\, Lnw_{2it} + \alpha_8 LnQ_{it}\, Lnw_{3it} + \alpha_9 Lnw_{1it}\, Lnw_{2it} + \alpha_{10} Lnw_{1it}\, Lnw_{3it} + \alpha_{11} Lnw_{3it}\, Lnw_{2it} + \frac{1}{2}\alpha_{12} (Lnw_{1it})^2 + \frac{1}{2}\alpha_{13} (Lnw_{2it})^2 + \frac{1}{2}\alpha_{14} (Lnw_{3it})^2 + \alpha_{15} T + \frac{1}{2}\alpha_{16} (T)^2 + \frac{1}{2}\alpha_{17}.T\, LnQ_{it} + .\alpha_{18} T\, Lnw_{1it} + .\alpha_{19} T\, Lnw_{2it} + .\alpha_{20} T\, Lnw_{3it} \quad (2)\end{aligned}$$

where TC is the total cost (including interest expenses and non-interest expenses); Q is total assets; the three input prices are: $w_1$ is the cost of deposits, $w_2$ is the cost of material goods, and $w_3$ is the labor cost; T is a variable that reflects technological change and reflects the fixed annual effect to capture technical changes in the cost function over time.

**Step 2:** After estimating the total cost function, the marginal cost is determined by taking the first derivative of the total cost function and is estimated as follows:

$$MC_{it} = \frac{\partial TC_{it}}{\partial Q_{it}} = \frac{(\alpha_1 + \alpha_2\, LnQ_{it} + \alpha_6\, Lnw_{1it} + \alpha_7\, Lnw_{2it} + \alpha_8\, Lnw_{3it} + \alpha_{17} T)\, TC_{it}}{Q_{it}} \quad (3)$$

Ariss (2010) pointed out that the greater Lerner index value implies the weaker level of competition among banks and the stronger competitiveness of each bank. The Lerner index ranges from 0 to 1. The smaller the Lerner index (near zero), the lower the competitiveness. In contrast, the larger Lerner (almost equal to 1) signifies the greater competitiveness.

When perfect competition exists, the selling price is equal to the marginal cost, so this index will have a value of 0. When the price is greater than the marginal cost, the Lerner index will be greater than zero and in the range between 0 and 1. The closer the index is to 1, the higher the monopoly power of the enterprise, meaning the higher competitiveness of commercial banks.

### 2.2.2. Boone index

Besides the Lerner competitiveness index (Lerner, 1934), an alternative measure of competitiveness was proposed by Boone (2008) to measure the impact of efficiency through profitability. The idea of this index through profit elasticity is called Boone Index (β), based on the assumption that banks with superior efficiency are those with lower cost and more profits gained thanks to reallocated market share from less efficient to more efficient banks. This effect becomes stronger when commercial banks are highly competitive. This means that if commercial banks have low competitiveness, they will sacrifice more profits because of the cost disadvantage. In other words, banks are more heavily punished in terms of profits for the ineffective costs. Therefore, the stronger this effect is, the greater the absolute value will be, which is also an indication that the competitiveness in the specific market is low. In the empirical application, the simplest equation to determine the Boone index for bank i at time t is determined as follows:

$$\ln(\pi_{it}) = \alpha + \beta\, LnMC_{it} + \varepsilon_i \quad (4)$$

where $\pi_{it}$ is the profit of bank i in year t; $MC_{it}$ is the marginal cost of bank i in year t, estimated by Eq. 3; β is Boone index.

A feature of the Boone index is that it carries a negative value. That means the higher the bank's marginal cost is, the smaller the profit. In addition, the Boone index also has another meaning in that the greater the absolute value of this index is, the weaker the competitiveness of banks.

### 2.3. Monetary policy transmission via credit channels under the influence of competitiveness at commercial banks

Studies on the impact of monetary policy transmission through credit channels under the influence of competitiveness at commercial banks are still limited. However, bank competitiveness plays an important role in the operation of a commercial bank and can influence the effectiveness of monetary policy by strengthening or obstructing the bank's credit channel. Several studies have shown that increased competitiveness in the banking sector can lead to lower prices of financial products and better access to financial products (Pruteanu-Podpiera et al., 2007). However, bank competitiveness can have an unfavorable impact on the efficiency of bank management due to reduced credit relationship time, and it can cause banks to implement higher risk-taking strategies (Hellmann and Murdock, 1997; Repullo and Suarez, 2000). Kashyap and Stein (1997) emphasized that the monopoly of the banking system is very important in analyzing the effectiveness of the monetary policy. According to Lensink and Sterken (2002), determining the role of bank competitiveness in the mechanism of monetary policy transmission is an important thing in the future.

In addition, studies by Aftalion and White (1977), Olivero et al. (2011a; 2011b), and VanHoose (1983) showed that:

(i) Firstly, when commercial banks become larger in scale because of merger and equity increase resulting in changes in scale, structure, human resources, or technology, the competitiveness of commercial banks will increase, which will then weaken the capability of monetary policy transmission through credit channels. The reason is that large banks often enjoy advantages in capital supplement from savings deposits or interbank loans, thereby increasing their ability to resist the decline in reserves due to tightened monetary policy.

(ii) Secondly, banks can have a credit market segment by having borrowers' personal information through customer relationship building. When the central bank implements a tightened monetary policy, small banks will reduce the credit supply. Customers must then switch from small banks to other banks and lose the information cost as well as time cost in the conversion process. The reaction of total supply in the bank credit market towards changes in monetary conditions depends on the level of these conversion costs. Increased competitiveness of commercial banks will reduce this cost due to reduced information asymmetry between banks and the level of consumer confidence, leading to a reduced monetary policy shock to changes in supply.
(iii) Thirdly, to increase competitiveness in the 4.0 technology development and international economic integration trend, commercial banks are gradually promoting international cooperation in the field of financial technology (between banks and Fintech) with the aim of providing convenient finance-banking services which meet the demand at reasonable prices, targeting those who have not yet accessed traditional banking services (unbanked), contributing to increased banking service coverage among customers and enterprises. In addition, banks also focus on the application of digital technology in data management, monitoring, collection, and analysis, along with improving and automating the business process, promoting cooperation in the field of risk management and monitoring, as well as confidentiality and security enhancement. Increased competitiveness creates an airy operating corridor as well as a clear database with quick updates and minimized risk of information asymmetry from the central bank to commercial banks as well as customers. The impact of the central bank's policy tools will be easily quantified, adjusted, and effectively controlled in line with the set macroeconomic goals. Thus the monetary policy transmission becomes more efficient, with reduced delay and enhanced clarity. In the first two cases, increased competition undermines the impact of monetary policy transmission on bank credit supply. In the last case, it enhances the efficiency of monetary policy transmission. Which of these influences creates a stronger impact is still a debate following empirical study results.

## 3. Methodology

### 3.1. Model

This study used the empirical study models from previous studies (Amidu and Wolfe, 2013; Gunji et al., 2009; Khan et al., 2016; Olivero et al., 2011b) to examine the influence of competitiveness on the impact of monetary policy transmission through credit channels. The proposed model is as follows:

$$loang_{i,t} = \beta_0 + \beta_1 . loang_{i,t-1} + \beta_2 \Delta MP_{i,t} + \beta_3 \Delta MP_{i,t} * CP_{i,t} + \beta_4 Dep_{i,t} \beta_5 Cap_{i,t} + \beta_6 Liqui_{i,t} + \beta_7 Size_{i,t} + \beta_8 GDP_t + \beta_9 INF_t + \varepsilon_{i,t}. \quad (5)$$

Table 1 shows a summary description of the study variables.

**Table 1:** Summary description of the study variables

| Variable | Variable description | Expected correlation | Relevant studies |
|---|---|---|---|
| | Dependent variable | | |
| $loang_{i,t}$ | Credit growth of commercial banks $\frac{\ln(loan_{i,t}) - \ln(loan_{i,t-1})}{\ln(loan_{i,t-1})}$ | | |
| | Independent variable | | |
| $Li_{i,t}$ | Liquidity ratio | + | Yang and Shao (2016); Fungáčová et al. (2013) |
| | | - | Amidu and Wolfe (2013); Khan et al. (2016); Olivero et al. (2011a) |
| $Size_{i,t}$ | Total assets | - | Fungáčová et al. (2013); Khan et al. (2016); Olivero et al. (2011a); Yang and Shao (2016) |
| | | + | Amidu and Wolfe (2013); Lindner et al. (2019) |
| $Cap_{i,t}$ | Equity ratio | + | Fungáčová et al. (2010); Olivero et al. (2011a); Yang and Shao (2016) |
| | | - | Khan et al. (2016); Lindner et al. (2019) |
| $Dep_{i,t}$ | Mobilized deposit ratio | + | Khan et al. (2016); Lindner et al. (2019) |
| | | - | Fungáčová et al. (2010) |
| $CP_{i,t}$ | Bank competitiveness (Lerner) | + | Khan et al. (2016); Yang and Shao (2016) |
| | Bank competitiveness (Boone) | + | Khan et al. (2016); |
| $GDP_t$ | GDP growth rate | + | Khan et al. (2016); Yang and Shao (2016); Amidu and Wolfe (2013); |
| $INF_t$ | Inflation rate | + | Khan et al. (2016); |
| | | - | Yang and Shao (2016) |
| $\Delta MP_t$ | Re-discount interest rate ($\Delta IM$); M2 money supply growth rate ($\Delta M2$) | - | Khan et al. (2016); Yang and Shao (2016); Amidu and Wolfe (2013); |
| $\Delta MP_t * CP_{i,t}$ | Impact of monetary policy transmission under the influence of competitiveness (Lerner) | + | Fungáčová et al. (2013); Khan et al. (2016); Olivero et al. (2011b); Yang and Shao (2016) |
| | | - | Amidu and Wolfe (2013) |
| | Impact of monetary policy transmission under the influence of competitiveness (Boone) | - | Khan et al. (2016) |

(+) shows the positive impact of the independent variable on the dependent variable; (-) shows the negative impact of the independent variable on the dependent variable

### 3.2. Database

The study is conducted using a panel data of 30 joint-stock commercial banks in Vietnam from 2008 to 2017. The data used to measure the characteristics of each bank is taken from the database of the official website of the General Statistics Office of Vietnam, State Bank of Vietnam, The Asian Development Bank, Ho Chi Minh City Stock Exchange.

### 3.3. Estimation method

The study utilized the difference generalized method-of-moments estimation (DGMM), developed by Arellano and Bond (1991). In DGMM, the system of equations is estimated at the root and first-order differential. This method can solve two important econometric problems: (i) because the past value of the dependent variable can determine its current value, DGMM allows us to use the lags of the dependent variable in the equation to explore the dynamics of the data; (ii) explanatory variables may not be strictly exogenous, by using DGMM, the study can overcome endogenous problems when using variables with lags or variance as instrumental variables. Testing the determinants of constraints, the Hansen test is used to test the rationality of instrumental variables. To test the second-order autocorrelation, we use the Arellano-Bond test. The reliability tests of the model performed by the author include:

Testing the autocorrelation of residuals: According to Arellano and Bond (1991), GMM estimation requires a first-order correlation and no second-order correlation of residuals. Therefore, when testing the hypothesis $H_0$: There is no first-order correlation (AR (1) test) and no second-order correlation of the residuals (AR (2) test). If the test results reject $H_0$ in the AR (1) test and accept $H_0$ in the AR (2) test, the model meets the requirements.

## 4. Empirical results and discussion

Table 2 shows descriptive statistics on variables used in the regression model of monetary policy transmission through credit channels under the competitive influence of commercial banks in Vietnam.

**Table 2:** Descriptive statistics of the sample

| VARIABLE | OBS | MEAN | STD. DEV. | MIN | MAX |
|---|---|---|---|---|---|
| $loang_{i,t}$ | 300 | 0.3327511 | 0.6586659 | -0.3129435 | 10.58861 |
| $Cap_{i,t}$ | 300 | 0.0874981 | 0.0619781 | 0.0006825 | 0.2867239 |
| $Size_{i,t}$ | 300 | 18.127 | 1.736606 | 1.455935 | 25.91995 |
| $Li_{i,t}$ | 300 | 0.2113769 | 0.0965267 | 0.0522971 | 0.6109695 |
| $INF_t$ | 300 | 0.08424 | 0.0690287 | 0.0063 | 0.2297 |
| $GDP_t$ | 300 | 0.0600761 | 0.0052783 | 0.0524737 | 0.0681 |
| $Dep_{i,t}$ | 300 | 0.6703058 | 0.0776768 | 0.5458078 | 0.8944071 |
| $\Delta IM_{i,t}$ | 300 | 0.0854233 | 0.024424 | 0.06375 | 0.1333333 |
| $\Delta M2_{i,t}$ | 300 | 0.20431 | 0.0542346 | 0.12 | 0.298 |

Impact of monetary policy transmission using re-discount interest rates tool. Table 3 shows the estimated results of model 5 using the DGMM method.

**Table 3:** Estimated results of model 5 using DGMM method

| VARIABLE | LERNER | BOONE |
|---|---|---|
| $\Delta IM_{i,t}$ | -10.01002*** | -40.21993* |
| $\Delta IM_{i,t} * CP_{i,t}$ | 11.22252*** | -3.783749* |
| $Size_{i,t}$ | 0.0207567** | 0.0001487 |
| $Cap_{i,t}$ | -2.056042** | -0.1356706 |
| $Li_{i,t}$ | -4.591277*** | -0.5777824 |
| $Dep_{i,t}$ | 0.2016771 | 0.513167 |
| $loang_{i,t-1}$ | -0.4924816*** | -0.6627992*** |
| $GDP_t$ | -11.42243 | -22.96956 |
| $INF_t$ | 4.836389*** | 0.913219 |
| p-value (F test) | 0.000 | 0.000 |
| p-value (AR(1)) | 0.045 | 0.073 |
| p-value (AR(2)) | 0.151 | 0.192 |
| p-value (Hansen test) | 0.211 | 0.306 |
| Number of groups | 30 | 30 |
| Number of instrumental variables | 23 | 14 |

In the two models above, the variable $CP_{i,t}$ will be replaced by LERNER and BOONE, respectively. *** statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%

The results show regression coefficients of IM*CP variables respectively at 11.22 and -3.78; statistically significant at 1% and 10%, respectively. This shows that under the influence of increased competitiveness, the impact of monetary policy transmission on commercial banks' credit channels is reduced (due to the negative value of Boone itself). When commercial banks get larger in scale because of merger and equity increase resulting in the change of structure, human resources, or technology, their competitiveness will increase because of increased market share, which will weaken the monetary policy transmission through credit channels. The reason is that large banks often enjoy advantages in the capital supplement. On the other hand, increased competitiveness will reduce conversion costs due to the reduction in information asymmetry between banks and customers at Vietnamese commercial banks. Thus the impact of the transmission of monetary policy shock towards changes in credit channels will decrease. This result is consistent with the theory and empirical studies by Fungáčová et al. (2013), Khan et al. (2016), Olivero et al. (2011b), and Yang and Shao (2016).

Table 4 shows the impact of monetary policy transmission using the M2 money supply growth rate. Estimated results of model 5 with

competitiveness measured respectively through Lerner and Boone index have regression coefficients of M2*CP variables respectively at -5.3 and 0.073; statistically significant at 1% and 10% respectively. This shows that under the influence of increased competitiveness, the impact of monetary policy transmission on commercial banks' credit channels is reduced. This result is similar to the study result when considering the influence of competitiveness on the impact of monetary policy transmission through commercial banks' lending channels using the re-discount interest rates tool.

**Table 4:** Estimated results of model 5 by DGMM method

| VARIABLE | LERNER | BOONE |
|---|---|---|
| $\Delta M2_{i,t}$ | 2.617785*** | 0.4158488* |
| $\Delta M2_{i,t} * CP_{i,t}$ | -5.349357*** | 0.0729532* |
| $Size_{i,t}$ | 0.0194082*** | 0.0386408*** |
| $Cap_{i,t}$ | 1.566642* | 0.7501615* |
| $Li_{i,t}$ | -1.003275*** | -1.280921*** |
| $Dep_{i,t}$ | 0.906518*** | 0.5706257*** |
| $loang_{i,t-1}$ | -0.389686*** | -0.3554578*** |
| $GDP_t$: | 7.973663*** | 6.937286*** |
| $INF_t$ | 0.1768006 | 0.4752359** |
| p-value (F test) | 0.000 | 0.000 |
| p-value (AR(1)) | 0.083 | 0.075 |
| p-value (AR(2)) | 0.152 | 0.153 |
| p-value (Hansen test) | 0.349 | 0.693 |
| Number of groups | 30 | 30 |
| Number of instrumental variables | 29 | 23 |

In the two models above, the variable $CP_{i,t}$ will be replaced by LERNER and BOONE, respectively. *** statistically significant at 1%; ** statistically significant at 5%; * statistically significant at 10%

## 5. Conclusion

Studies conducted so far often overlook the role of competitiveness in monetary policy transmission through credit channels of commercial banks. However, just like scale, capitalization rate, or liquidity, competitiveness can have an influence on the monetary policy transmission, especially the credit channels of commercial banks. The hypothesis of the study is that a more competitive bank would be more likely to hedge against a monetary shock due to greater and better access in the financial market. Because a more competitive bank will have many options to replace debt with other funding sources, the impact of monetary policy changes on credit supply will be less important, and monetary policy will be considered less effective. When commercial banks get larger in scale because of merger and equity increase resulting in the change of structure, human resources, or technology; their competitiveness will increase because of increased market share, which will weaken the monetary policy transmission through credit channels. The reason is that large banks often enjoy advantages in the capital supplement. On the other hand, increased competitiveness will reduce conversion costs due to the reduction in information asymmetry between banks and customers, the impact of the transmission of monetary policy shock towards changes in credit channels will decrease. Based on the results of this study, the following studies can use the model developed in this study with larger sample size. Besides, the addition of new variables to the model will also bring new findings.

## Compliance with ethical standards

## Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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