# Competition and Bank Lending Channels:
# Evidence from Bank-Level Data in Thailand

## Jakkrich Jearviriyaboonya[1] and Yuthana Sethapramote[2]

**ABSTRACT**

This paper investigates the effect of competition on the bank lending channels of monetary policy in Thailand. In addition, we also examine the impact of foreign bank entry on bank lending channels. The panel data regressions were estimated using bank-level data. The competition variable was measured using the Lerner index, while the number of new player (foreign branch) entries and the limitations on foreign bank entries measured foreign bank penetration. The results showed three main findings. The higher market power or less competition in Thai banking may reduce the effectiveness of the monetary policy mechanism via the bank lending channel. Banks having higher capitalization may enhance loan growth. In addition, evidence was found that foreign bank penetration, measured by the number of new player entries in foreign branches, weakens the bank lending channel.

*Keywords: Competition, Thai Banks, Bank Lending Channel*

**Introduction**

Bank sector is an important financial intermediary in financial system. It is the main source of finance for firms and household in developing countries. Theoretically, bank loans can solve asymmetric information in financial markets. In addition, this role can affect the effectiveness of the monetary policy transmission mechanism through the bank lending channel (Bernanke and Blinder, 1988; Bernanke and Gertler, 1995). The bank lending channel is usually referred to the impact of monetary policy change on bank loans which subsequently affect

---

[1] Ph.D. Candidate, School of Development Economics, National Institute of Development Administration
E-mail: Jakkrichjear@hotmail.com

[2] Associate Professor, School of Development Economics, National Institute of Development Administration
E-mail: Yuthanas@gmail.com

economic activities, such as consumption and investment. For example, contractionary monetary policy will decrease bank reserves and bank deposits and then will decrease the loans available. This result leads to decrease in consumption and investment later. However, if bank deposits can perfectly substitute with other sources of funds, then this mechanism does not exit (Mishkin, 1996).

There are many studies regarding the influence of bank in the bank lending channel. Early, analysis used only aggregate data. For example, Bernanke and Blinder (1992) tested a relationship between bank balance sheet variables (loans, deposits, and securities) and the federal funds rate. A result showed that monetary policy significantly related to bank loans. However, an important problem from aggregate data is difficult to separate the supply and demand for loan. To correct this problem, disaggregated data on banks (balance sheet and income statement) has been used instead. Kashyap and Stein (1995) as seminal pioneer employed bank-level data to investigate a bank lending channel. Afterward, studies have also found that typical bank characteristic (size, liquidity, and capitalization) may differently influence in the bank lending channel (Kashyap and stein, 2000; Altunbas et al., 2002; Ehrmann et al., 2001; Altunbas et al., 2009).

Furthermore, recently, it can be argued that the bank competition can line in the transmission of monetary policy via this channel also. However, this issue has been explored in a number of researches but there is no consensus on how bank competition affects the bank lending channel. In particular, an intensive competition has a positive impact on monetary policy via bank lending channel (Fungacova et al., 2014; Leroy, 2014) The idea is that a higher level of bank competition may reduce the access to alternative sources of funds (certificates of deposit and interbank loan) and thus will probably response to cut their lending more than the other banks will. This strengthens the monetary policy transmission mechanism. Conversely, some evidences propose that increased competition weakens this channel (Gunji et al., 2009; Olivero et al., 2011b). A plausible reason is that higher bank competition relates to an increase in the market share of large bank that should have an easy access to other sources of funds more than smaller bank. So, this should weaken the bank lending channel of monetary policy transmission.

Unfortunately, despite a number of studies explored the lending channel for individual country but there has not been empirical research to examine the effect of bank competition on monetary policy transmission via the bank lending channel in Thailand during 2001-2015. In addition, after the financial crisis in 1997 in Thailand, the Bank of Thailand has implemented the

Financial master plan (FSMP). This is to support the competition among banks, such as consolidation, reducing the activity restriction, deregulation for foreign banks, etc., so the bank lending channel may have been undermined. Therefore, our study would like to analyze how competition influences the monetary policy transmission via the bank lending channel.

**Literature Review**

The measuring of banking competition: Lerner index

Lerner (1934) suggests the assessment of competition via market power, as the Lerner index (L): $L_i = \dfrac{p - mc_i}{p}$ where p is the price in the market and $mc_i$ is the marginal cost of firm i. This index derives from the profit maximization problem. The degree of competition is determined by range, $0 \leq$ Lerner index $\leq 1$. The index equals to zero if perfectly competitive, and equal to one if pure monopoly. The Lerner index is a popular tool in recent studies that investigate the bank competition (e.g., Fernandez de Guevara et al., 2005; Carbo et al, 2009; Beck et al., 2013). The important advantage of the index is to compare the market competition among banks and/or over the period. Recent works measure the banking competition by averaging the individual Lerner indices (Weill, 2013; Maudos and Solis ,2011). In empirical reviews, a number of studies attempt to account for the trend in competitive behavior over time, also. However, the Lerner index has a weakness (market power ≠ competition). In other words, an increase of the average Lerner index over time would be related with an increase in the intensity of competition. This result makes the index less reliable (Boone et al., 2013; Leon, 2015).

Bank competition and the bank lending channel of monetary policy

Early, studies of transmission mechanism of monetary policy have started at interest rate channel (the money view). However, this channel cannot explain completely the monetary transmission, when Bernanke and Gertler (1995) proposed credit view. The view of credit channel is amplified on interest channel through the external finance premium (cost of funding minus retained earnings). This additional effect will then influence the cost and availability of credit and thereby aggregate demand (firms and households) in economy. Especially, the credit channel has been separate into two groups: the balance sheet channel and the bank lending channel.

Theoretically, effectiveness of bank lending relies on the degree of substitution between deposit and alternative sources of funds (Mishkin, 1996). In addition, empirical researches

mention that the decline of the traditional banks, financial deregulation, and financial innovation may be less performance in the bank lending channel as well (Bernanke and Gertler, 1995).

During the 1990s, many monetary economists attempted to investigate the existence of the bank lending channel. Bernanke and Blinder (1992) contribute early to this task. They attempted to identify how monetary policy stance (the federal fund rate) affects the bank lending channel of monetary transmission. Their analysis is based on VAR model with US aggregate data. Their result supported to an evidence for the bank lending channel. Specifically, the expansionary monetary policy i.e. a decrease in monetary policy interest rate can increase the amount of bank lending to private sector.  However, the study confronts to a significant problem i.e., how to take out aggregate loans data from loans demand. Consequently, studies have used to disaggregate data on balance sheet and income statement (bank-level data) to correct this problem. This comparative data lead to constitute a new contribution to how banks with different characteristics (size, liquidity, capitalization, ownership) react differently to monetary a policy shock through credit channel. In other words, if a higher financial constraint which reflect also a greater external finance premium, then this weaken the bank lending channel of monetary policy.

There are many articles that attempt to identify how bank characteristics influence this channel. The literature has shown that a bank lending channel may be strong transmitted through small banks when compare to large banks (Kashyap and Stein, 1995; Kashyap and Stein, 2000). They suggested that the response of bank loans to monetary policy might be different across bank size. A reason is that the larger banks offer relatively more commercial and industrial (C&I) loan, while this loan reacts relatively less to monetary policy shock. Furthermore, studies have found that banks with illiquid (or undercapitalized) strengthen the monetary transmission mechanism (Kishan and Opiela, 2000; Gambacorta, 2005; Altunbas et al., 2009). They indicated that banks with higher liquid assets (cash and securities) can maintain their lending position against changes in monetary policy. In addition, If well-capitalized banks perform less credit risk (or higher ability to available increased uninsured deposits), less lending for these banks is lower after a tight monetary policy. However, some studies had not evidence of bank lending channel with bank-specific characteristics (Favero et al, 1999; Oliner and Rudebush, 1995).

Apart from these bank characteristics, Ananchotikul and Seneviratne (2015) added new variables such as degree of foreign bank penetration of the domestic banking industry and globalization. They mentioned that increased foreign bank penetration and relaxing global financial conditions would weaken the bank-lending channel. A global financial easing increases

capital flow and affect the domestic liquidity. Hence, the monetary policy will have smaller impacts on the restrictions of bank lending. Moreover, the high degree of foreign bank penetration in the domestic banking sector provides the higher access of external source of funds, and will lower the degree of responsiveness of all bank loans to monetary policy. In addition, few studies argue that competitive banking environment may be a considerable key for the transmission of monetary policy. This competition either weaken or strengthen the monetary policy transmission mechanism via the bank lending channel. In addition, assessment the degree of competition is a challenged topic too.

There are two main approaches in measuring the degree of baking competition: structural and non-structural approaches. Initially, structural approach, such as concentration indices and Herfindahl-Hirschman index (HHI), is used to measuring the competition. However, Claessens and Laeven (2004) suggested that these measurements may be not good predictors of competition. The high degree of concentration degree can occur in either the monopolistic competition market with high degree of competition or oligopoly market with lower degree of competition. Hence, the degree of concentration cannot be good indicators for the competitions. Alternatively, Non-structural approach is the direct measure of market power by observing bank pricing behavior in the market, such as the Panzar-Rose model and the Lerner index.

During the last two decades, a number of studies have examined whether bank competition influence the bank lending channel. Cecchetti (1999) investigated how the effect of ECB's monetary policy varied across countries with bank characteristics (such as size and concentration). A result suggested that if the number of banks increased, it did not lead to decrease the concentrated banking industry. In addition, the impact of the monetary policy shock was different among countries with size and concentration.

Adams and Amel (2005) applied the Herfindahl-Hirschman index (HHI) to measure the concentration. Their results showed that the less concentrated banks enhanced the bank lending channel of monetary policy. Furthermore, the effectiveness of bank lending channel among banks in rural areas is greater than banks in urban areas, because clients in urban markets can better access to their external financing and do not need to reply on bank credit as the main source of funding. On the other hand, Olivero et al. (2011a) the employed the five-firm concentration ratio and HHI to assess degree of concentration. Their study indicated that increased consolidation in banking system negatively affected to monetary policy effectiveness

via the bank lending channel. However, Olivero et al. (2011b) provide a different result when they applied the H-statistic as a potential and broader measurement of bank competition as well as result of Gunji et al. (2009) and Yang and Shao (2016).

Newly, Leroy (2014) used both the Lerner index and the market structure index to prove how these indices relate to the monetary policy transmission in Eurozone countries. Research revealed that effect of the bank competition on bank lending channel was significant i.e., increased competitive banking industry supported this channel. Additionally, Fungacova et al. (2014) and Khan et al. (2016) present a similar outcome.

## Methodology

### Data

This study employs a balanced panel dataset. The data comprises the quarterly bank-level data and macroeconomic data for the 2001 – 2015 obtained from Thomson Reuters Datastream, CEIC Data, and Bank of Thailand. Our data set covers the ten commercial banks registered in Thailand: Bangkok bank (BBL), Krung Thai bank (KTB), Siam commercial Bank (SCB), Bank of Ayudhya (BAY), TMB Bank (TMB), Thanachart Bank (TCAP), CIMB Thai bank (CIMB), Tisco Bank (TISCO), and Kiatnakin Bank (KKP). There are 600 observations in the panel dataset. The sample of all banks include subsample 240 observations for the four largest banks group, 240 observations for four medium, and 120 observations for two small banks group. The grouping criteria based on definition of the Bank of Thailand. Table 1 shows the summary statistics of the variables used in equation 2

### Econometric model

In the empirical study, we follow the literatures (Fernandez de Guevara et al., 2005) that use the Lerner index as the proxy of the bank competition. Moreover, the Lerner index can capture the dynamic in degree of market competition, which is important in estimating the panel data model. Therefore, this paper employs the Lerner index as competitive measure. The Lerner index measures the mark up price over marginal cost as follows.

**Table 1** Summary Statistics.

| Variables | Mean | Max. | Min. | Std. Dev. | Obs. |
|---|---|---|---|---|---|
| Loans growth | 0.026 | 0.662 | -0.44 | 0.063 | 590 |
| Policy rate (%) | 2.446 | 5 | 1.25 | 1.028 | 600 |
| LERNER | 0.335 | 0.709 | -0.353 | 0.122 | 600 |
| SIZE | -3.33E-12 | 1.478 | -2.161 | 1.037 | 600 |
| LIQ | -0.004458 | 0.320 | -0.182 | 0.086 | 600 |
| CAP | -4.80E-06 | 0.214 | -0.091 | 0.047 | 600 |
| GDP (%) | 4.06 | 15.33 | -4.31 | 3.307 | 600 |

Source: Thomson Reuters DataStream, Bank of Thailand, and author's calculation

$$L_{i,t} = \frac{p_{i,t} - mc_{i,t}}{p_{i,t}} \tag{1}$$

The important problem of this measure is that the information on prices and costs cannot be directly observed. According to the conventional approach, we estimate the price by the ratio of total income to total assets, and estimate the marginal cost from a translog cost function with one output (total assets) and three input prices, i.e. fund price, labor price, and physical price (Fungacova et al, 2014).

In addition, we employed the following three equations to investigate how degree of competition in Thai commercial banks affect to bank lending channel. The equation (4) regresses loan growth ($\Delta loans_{i,t}$) on the stance of the monetary policy indicator ($mp_t$), bank characteristics ($BC_{i,t}$), competition index ($Compet_{i,t}$), GDP growth ($\Delta GDP_t$) and interaction term between change of the monetary policy indicator with competition index (or bank characteristic).

$$\Delta \ln loans_{i,t} = \theta_i + \alpha mp_t + \omega BC_{i,t-1} + \eta BC_{i,t-1}mp_t + \gamma Compet_{i,t}$$
$$+ \beta Compet_{i,t} * mp_t + \psi \Delta GDP_t + \varepsilon_{it} \tag{2}$$

with i = 1,...,N and t = 1,...,T represent bank i and the time period (quarterly), respectively. According to Ehrmann et al (2001), a significant coefficient $\beta$ implies that the bank competition can affect the bank lending channel. GDP growth is included to control demand effect (changing in the demand for loan). In addition, the Lerner index is used to assess degree of competition (Fungacova et al., 2014) and bank characteristics comprise bank size, liquidity and capitalization. We reduce the potential endogeneity between loan growth and bank characteristic by using one-quarter lag values of the bank characteristic. These bank characteristics can be defined as

follow. Size is calculated by the log of total asset (A). Liquidity is assessed as the ratio of liquid assets to total assets $(\dfrac{L}{A})$. Capitalization is given by the ratio of capital to total assets $(\dfrac{C}{A})$. These bank characteristics are normalized with respect to the sample mean. These variable cab be defined as (Gambacorta, 2005):

$$\text{Size}_{i,t} = \log A_{i,t} - \frac{1}{N_t}\sum_i \log A_{i,t} \tag{3}$$

$$\text{Liquidity}_{i,t} = \frac{L_{i,t}}{A_{i,t}} - \frac{1}{T}\sum_t\left(\frac{1}{N_t}\sum_i \frac{L_{i,t}}{A_{i,t}}\right) \tag{4}$$
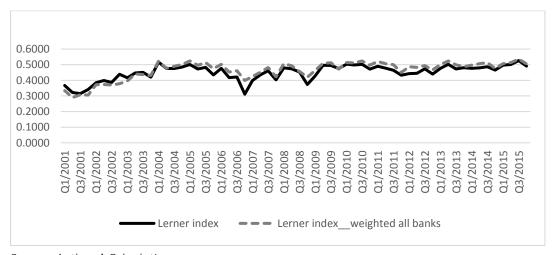
$$\text{Capitalization}_{i,t} = \frac{C_{i,t}}{A_{i,t}} - \frac{1}{T}\sum_t\left(\frac{1}{N_t}\sum_i \frac{C_{i,t}}{A_{i,t}}\right) \tag{5}$$

## Empirical Results and Discussion

### Measuring the degree of competition: Lerner index

Figure 1 presents the Lerner indices changing over time. They are calculated both equally weighted form and weighted form by the asset market share. Overall, these Lerner indices imply the monopolistic competition in the Thai banking industry. Furthermore, they imply that the evolution of competition continues to decrease. In particular, the degree of competition in Thai banking industry clearly decreased from 2001 to 2003, however the competition was higher after the implementation of Financial Sector Master Plan 1 during period 2004 -2006. Later, it was more competitive and became much more stable over the last 6 years.

**Figure 1**  The Lerner Index



Source: Authors' Calculations

**The impact of bank competition on the bank lending channel**

This subsection shows main results for the effect of bank competition on the bank lending channel of monetary policy in Thailand. To examine this objective, we generate three difference models based on equation 2. First, the model 1 is built on the standard of bank lending channel with bank characteristics (size, liquidity, capital) and its interaction with monetary policy interest rate without bank competition indicators. Next, the model 2 substitute the interaction between bank characteristic and monetary policy rate with the bank competition variables. Finally, the model 3 we combine models 1 and 2 with competition variables and interaction terms. Results are as follows (Table 2).

First, a baseline result (model 1) shows that the effect of monetary policy rates on loan growth is negative sign as expected, but it is not significant (only significant at the 85 % level). In other words, it seems that there is no evidence on the bank lending channel in Thailand during from 2001 to 2015. However, when the stance of monetary policy is associated with the degree of competition and bank characteristics in model 2 and model 3, the impact of monetary policy rate on loan growth is significantly negative sign. This may imply that an increase (decrease) in interest rate leads to a decrease (increase) in loan growth rate.

Then, the interaction terms of the monetary policy rate and bank-specific characteristics (size, liquidity, and capitalization) are not significant. This implies that the difference in bank characteristics does not affect bank lending channel. In addition, if banks are high capitalized, then loan growth may be higher. Finally, there is an evidence that the significant effect of competition on bank lending channel, when we include interaction terms of monetary policy and the traditional bank characteristics (size, liquidity, and capitalization) in model 3. In particular, the coefficient on the interaction term of monetary policy rate and the Lerner index (MP × Lerner index) is positive and statistically significant. This suggests that increased market power weakens the bank lending channel. In other words, a decrease in the level of bank competition weaken this transmission, because banks should have relatively easy access to alternative sources of funding cost. This finding affirms many previous studies such as Fungacova et al. (2014) or Leroy (2014) that indicated that banking sector with higher market power (or less competition) reduced the transmission of monetary policy via the bank lending channel. In addition, this result confirms the recent work of Khan et al. (2016) on five ASEAN countries (Malaysia, Indonesia, Singapore, Philippines and Thailand). They apply four indicators as measure

the competition (CR5, HHI, Lerner index, and Boone indicator). In particular, the result from the Lerner index showed that increased market power weakens the bank lending channel.

In term of policy implication, this result confirms to the debate on separation of banking supervision from the conduct of monetary policy, which has raised the question of conflicting between price stability and financial stability (Fungacova et al. , 2014). In this case, the Bank of Thailand provide the supporting reason for the financial master plan that aim to increase the competition of banking industry in Thailand. In addition, the changing in economy, measured by GDP growth, is positively related to loan growth.

In addition, over the past ten years, the impact of increased foreign bank entry on the monetary policy transmission mechanism though the bank lending channel has been an important point. In Thailand, the entry of foreign banks in Thai bank industry was deregulated through acquisition and merger, subsidiary, foreign branch according to the Financial Sector Master Plan (FSMP) during the period from 2004 -2015.

**Table 2** Effects of Bank Competition on the Bank Lending Channel

| Independent variables | Bank lending channel (Model 1) | Lerner index included (Model 2) | Bank lending channel with Lerner index and all interactions (Model 3) |
|---|---|---|---|
| MP (Policy rate) | - 0.003 | - 0.014* | - 0.017** |
|  | (0.002) | (0.008) | (0.008) |
| Size (-1) | - 0.035* | - 0.029 | - 0.025 |
|  | (0.019) | (0.019) | (0.016) |
| Liquidity (-1) | 0.117 | 0.102 | 0.109 |
|  | (0.138) | (0.078) | (0.127) |
| Capitalization (-1) | 0.220 | 0.258* | 0.412** |
|  | (0.191) | (0.155) | (0.165) |
| MP x Size (-1) | 0.001 |  | - 0.002 |
|  | (0.002) |  | (0.002) |
| MP x Liquidity (-1) | - 0.012 |  | - 0.006 |
|  | (0.029) |  | (0.025) |
| MP x Capitalization (-1) | 0.002 |  | - 0.067 |
|  | (0.076) |  | (0.060) |
| Lerner index |  | - 0.078 | - 0.105 |
|  |  | (0.087) | (0.083) |

**Table 2**  (Continued)

| Independent variables | Bank lending channel (Model 1) | Lerner index included (Model 2) | Bank lending channel with Lerner index and all interactions (Model 3) |
|---|---|---|---|
| MP x Lerner index | | 0.035 | 0.046* |
| | | (0.023) | (0.024) |
| GDP | 0.002*** | 0.002*** | 0.002*** |
| | (0.001) | (0.001) | (0.001) |
| Constant | 0.023*** | - 0.048 | 0.056* |
| | (0.004) | (0.033) | (0.032) |
| Observations | 590 | 590 | 590 |
| R-squared | 0.144 | 0.150 | |

Note: This estimation was based on panel data regression with fixed effect. Cluster-robust Standard errors in parentheses are calculated by White period method. * Significant level at 10 %; ** Significant level at 5 %; ***Significant level at 1 %.


This paper employs two approaches to measure the foreign bank entry. The first variable is the number of new entities in foreign branches, i.e. the higher index indicates the higher foreign bank penetration. The second index is the limitation on foreign banks entry through merger, subsidiaries, branches, and joint venture. A value is added to index if foreign banks can enter through merger, subsidiaries, branches, and joint venture, then it scores 1, 2, 3, and 4, respectively. The indicator ranges from zero to four. To detect the variable of new foreign bank branches, we substitute new player index (foreign bank branches) for competition index.  For estimation, it applies the regression model from equation 2. As reported in Table 3, our main finding are as follows. First, the coefficients on the stance of monetary policy (MP) indicates are negative and statistically significant. This shows that the bank lending channel exits, i.e., negatively correlate between loan growth and monetary policy rate. Second, the significantly negative sign of the coefficients on the new entry for foreign branches suggest that if new players in foreign bank branches sector increase, loan growths decrease. Finally, the coefficient on the interaction term between monetary policy rate and the new entry for foreign branches (MP x New entry foreign branches) is statistically significant in both models. This implies that an increase in foreign bank branches weakened the effectiveness of the bank lending channel in Thailand during the period from 2001 -2015.

**Table 3** Effects of New Foreign Bank Branches Entry on the Bank Lending Channel

| Independent variables | Bank lending channel with new player index ( foreign branches) | Bank lending channel with new foreign bank index and all interactions |
|---|---|---|
| MP (Policy rate) | - 0.018*** | - 0.019*** |
| | (0.006) | (0.008) |
| Size (-1) | - 0.032 | - 0.035* |
| | (0.020) | (0.019) |
| Liquidity (-1) | 0.094 | 0.146 |
| | (0.085) | (0.136) |
| Capitalization (-1) | 0.232 | 0.207** |
| | (0.129) | (0.170) |
| MP x Size (-1) | | 0.001 |
| | | (0.002) |
| MP x Liquidity (-1) | | - 0.017 |
| | | (0.024) |
| MP x Capitalization (-1) | | 0.011 |
| | | (0.067) |
| New entry_foreign branches | - 0.014** | - 0.014** |
| | (0.007) | (0.007) |
| MP x New entry_foreign branches | 0.007** | 0.007*** |
| | (0.003) | (0.003) |
| GDP | - 0.002** | 0.002** |
| | (0.001) | (0.001) |
| Constant | 0.053*** | 0.055*** |
| | (0.016) | (0.017) |
| Observations | 590 | 590 |
| R-squared | 0.151 | 0.152 |

Note: This estimation was based on panel data regression with fixed effect. Cluster-robust standard errors in parentheses are calculated by White period method. ***, ** and * indicate that each coefficient is significant at 1 %, 5 %, and 10%, respectively.

**Table 4** Effects of Limit Foreign Entry on the Bank Lending Channel

| Independent variables | Limit entry index included | Bank lending channel with Limit entry index and all interactions |
|---|---|---|
| MP (Policy rate) | - 0.009** | - 0.009** |
|  | (0.004) | (0.003) |
| Size (-1) | - 0.033 | - 0.035* |
|  | (0.021) | (0.020) |
| Liquidity (-1) | 0.089 | 0.127 |
|  | (0.083) | (0.133) |
| Capitalization (-1) | 0.230* | 0.220 |
|  | (0.133) | (0.178) |
| MP x Size (-1) |  | 0.001 |
|  |  | (0.002) |
| MP x Liquidity (-1) |  | - 0.014 |
|  |  | (0.025) |
| MP x Capitalization (-1) |  | - 0.004 |
|  |  | (0.071) |
| Limit entry_foreign banks | - 0.006 | - 0.006 |
|  | (0.006) | (0.006) |
| MP x Limit entry_foreign banks | 0.003 | 0.003 |
|  | (0.002) | (0.002) |
| GDP | -0.002** | 0.002** |
|  | (0.001) | (0.001) |
| Constant | 0.037** | 0.038** |
|  | (0.015) | (0.015) |
| Observations | 590 | 590 |
| R-squared | 0.146 | 0.146 |

Note: This estimation was based on panel data regression with fixed effect. Cluster-robust standard errors in parentheses are calculated by White period method. * Significant level at 10 %; ** Significant level at 5 %.

To measure the limitation on foreign bank entry through merger, subsidiaries, branches, and joint venture, this based on the index constructed by World Bank. We estimate two regression models by applying in equation 2. Table 4 reports the following empirical results. First, loan growth is significantly associated with monetary policy rate in both models. In

particular, higher policy rate can reduce the growth rate of loans, and vice versa. Then, the two coefficients on *MP x Limit entry foreign banks* is only positive sign, but they are not significant. This cannot conclude that the limitation on foreign bank may reduce the ability of the bank lending channel.

**Conclusions and Recommendations**

This paper investigates the degree of Thai bank competition by using panel data on 10 domestic commercial banks during the period from 2001 to 2015, and to detect how the evolution of bank competition affects the bank system the monetary policy mechanism through bank lending channel. The main results of study are as follow. First, we find evidence that the degree of competition in Thai banking sector, measured by the Lerner index (market power or the markup price over marginal cost), considerably declined before 2004 and became more stable over the last 6 years. Second, there are 3 important evidences in the competition and the bank lending channel in Thai credit market. The higher market power or less competition in Thai banking seem to reduce the effectiveness of monetary policy mechanism via the bank lending channel. Banks with higher capitalization may enhance loan growth. In addition, we find an evidence that the foreign bank penetration, measured by the number of new player entry in foreign branches, weaken the bank lending channel.

Our findings suggest two issues. First, the decreased bank competition weakens the monetary policy transmission through the bank lending channel, which provide the supporting reason for the financial master plan that aim to increase the competition of banking industry in Thailand. Second, we find that foreign bank branches may show different response from domestic banks in loan growth. This finding suggests that BOT should monitor to increased foreign bank branches in Thai banking industry, especially when BOT conduct the monetary policy via bank lending channel. For example, if a global bank in home country occur liquidity problem, it reallocates financial resource from foreign bank branch in host country to the parent bank in home country. This may be challenge to monetary policy transmission via bank lending channel in host country.

## References

Adams, R. M., & Amel, D. F. (2005). *The effects of local banking market structure on the bank-lending channel of monetary policy.*

Altunbaş, Y., Fazylov, O., & Molyneux, P. (2002). Evidence on the bank lending channel in Europe. *Journal of Banking & Finance, 26*(11), 2093-2110.

Altunbas, Y., Gambacorta, L., & Marques-Ibanez, D. (2009). Securitisation and the bank lending channel. *European Economic Review, 53*(8), 996-1009.

Ananchotikul, N., & Seneviratne, D. (2015). *Monetary Policy Transmission in Emerging Asia: The Role of Banks and the Effects of Financial Globalization.*

Beck, T., De Jonghe, O., & Schepens, G. (2013). Bank competition and stability: cross-country heterogeneity. *Journal of financial Intermediation, 22*(2), 218-244.

Bernanke, B. S., & Blinder, A. S. (1988). Credit, money, and aggregate demand. *American Economic Review* 78, 435-439.

Bernanke, B. S., & Blinder, A. S. (1992). The federal funds rate and the channels of monetary transmission. *The American Economic Review*, 901-921.

Bernanke, B. S., & Gertler, M. (1995). *Inside the black box: the credit channel of monetary policy transmission* (No. w5146). National bureau of economic research.

Boone, J., van Ours, J. C., & van der Wiel, H. (2013). When is the price cost margin a safe way to measure changes in competition?. *De Economist, 161*(1), 45-67.

Carbó, S., Humphrey, D., Maudos, J., & Molyneux, P. (2009). Cross-country comparisons of competition and pricing power in European banking. *Journal of International Money and Finance, 28*(1), 115-134.

Cecchetti, S. G. (1999). *Legal structure, financial structure, and the monetary policy transmission mechanism* (No. w7151). National bureau of economic research.

Claessens, S., & Laeven, L. (2004). What drives bank competition? Some international evidence. *Journal of Money, Credit, and Banking, 36*(3), 563-583.

Ehrmann, M., Gambacorta, L., Martínez-Pagés, J., Sevestre, P., & Worms, A. (2001). *Financial systems and the role of banks in monetary policy transmission in the euro area.*

Favero, C. A., Giavazzi, F., & Flabbi, L. (1999). *The transmission mechanism of monetary policy in Europe: evidence from banks' balance sheets* (No. w7231). National bureau of economic research.

Fernandez de Guevara, J., Maudos, J., & Perez, F. (2005). Market power in European banking sectors. *Journal of Financial Services Research, 27*(2), 109-137.

Fungáčová, Z., Solanko, L., & Weill, L. (2014). Does competition influence the bank lending
        channel in the euro area?. *Journal of Banking & Finance*, *49*, 356-366.

Gambacorta, L. (2005). Inside the bank lending channel. *European Economic Review*, *49*(7),
        1737-1759. Gunji, H., Miura, K., & Yuan, Y. (2009). Bank competition and monetary
        policy. *Japan and the World Economy, 21*(1), 105-115.

Gunji, H., Miura, K., & Yuan, Y. (2009). Bank competition and monetary policy. *Japan and
        the World Economy*, *21*(1), 105-115.

Kashyap, A. K., & Stein, J. C. (2000). What do a million observations on banks say about the
        transmission of monetary policy?. *American Economic Review*, 407-428.

Kashyap, A. K., & Stein, J. C. (1995, June). The impact of monetary policy on bank balance
        sheets. In *Carnegie-Rochester Conference Series on Public Policy* (Vol. 42, pp. 151-
        195), North-Holland.

Khan, H. H., Ahmad, R. B., & Gee, C. S. (2016). Bank competition and monetary policy
        transmission through the bank lending channel: Evidence from ASEAN.
        *International Review of Economics & Finance*, *44*, 19-39.

Kishan, R. P., & Opiela, T. P. (2000). Bank size, bank capital, and the bank lending
        channel. *Journal of Money, Credit and Banking*, 121-141.

Leon, F. (2015). *Measuring competition in banking: A critical review of methods*.
        available at https://halshs.archives-ouvertes.fr/halshs-01015794/document.

Lerner, A., (1934). The concept of monopoly and the measurement of monopoly power.
        *Review of Economic Studies* 1, 157–175.

Leroy, A. (2014). Competition and the bank lending channel in Eurozone.
        *Journal of International Financial Markets, Institutions and Money*, *31*, 296-314.

Maudos, J., & Solís, L. (2011). Deregulation, liberalization and consolidation of the Mexican
        banking system: Effects on competition. *Journal of International Money and
        Finance*, *30*(2), 337-353.

Mishkin, F. S. (1996). *The channels of monetary transmission: lessons for monetary
        policy* (No. w5464). National Bureau of Economic Research.

Olivero, M. P., Li, Y., & Jeon, B. N. (2011a). Consolidation in banking and the lending
        channel of monetary transmission: Evidence from Asia and Latin America. *Journal of
        International Money and Finance*, *30*(6), 1034-1054. Olivero, M. P., Li, Y., & Jeon,

Olivero, M. P., Li, Y., & Jeon B. N. (2011b). Competition in banking and the lending channel: Evidence from bank-level data in Asia and Latin America. *Journal of Banking & Finance*, *35*(3), 560-571.

Oliner, S. D., & Rudebusch, G. D. (1995). Is there a bank lending channel for monetary policy?. *Economic Review-Federal Reserve Bank of San Francisco*, (2), 3.

Weill, L. (2013). Bank competition in the EU: How has it evolved?. *Journal of International Financial Markets, Institutions and Money, 26,* 100-112.

Yang, J., & Shao, H. (2016). Impact of bank competition on the bank lending channel of monetary transmission: Evidence from China. *International Review of Economics & Finance, 43,* 468-481.