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Thrift and Credit Cooperative Lending Channel under Prolonged Low Interest Rates: The Case of Thailand

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ABSTRACT

Objective – Considerable research indicates that during times of prolonged low interest rates, commercial bank lending channels are less effective in conveying the impact of expansionary monetary policies. What is the impact of easy money policy through lending channels of non-banking financial institutions (NBFIs) such as thrift and credit cooperatives (TCCs) and why should this result occur? The objective of this study is to examine the effectiveness of monetary policy through TCC lending channels compared to bank lending channels from 2008 to 2017.
Methodology/Technique – Annual data from 546 TCCs was used in this investigation. A fixed effects model for TCCs and random effect for banks were employed to examine the data. Two models of each institution, one with lagged interaction terms and the other with contemporaneous interaction terms, were tested and compared. The impact of institutional characteristics such as size, deposit, liquidity and equity, and macroeconomic variables such as GDP growth and yield spread, on lending channels were also examined.
Finding – As expected, the results show that TCC lending channels respond positively to prolonged low interest rate policies, whilst bank lending channels respond negatively in one model. Thus, if monetary authorities wish to increase the effectiveness of expansionary monetary policy, TCCs should be allowed to develop under careful supervision.
Novelty –This study concludes that incremental budgeting caused by regulation must be borne by TCCs.
Type of Paper: Empirical.
JEL Classification: E44 E51 E52 E58.

Keywords: Thrift and Credit Cooperatives (TCCs); Prolonged Low Interest Rates; Transmission Mechanism; Lending Channels; Fixed Effects.

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1. Introduction

Typically, lending channels are very effective transmission mechanisms of monetary policy. However, considerable research has found that bank lending channels are ineffective in transmitting impact of expansionary monetary policy when interest rates were kept at a very low level for a long period of time.

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Persistently low interest rates may induce uncertainty that reverses economic agents' expectations and confidence. Since the global financial crisis of 2007–08, the United States, Japan, and the European Union (EU) have heavily stimulated their economies with expansionary monetary policies. World finance has been affected by this development. Interest rates in most open economies were pushed to very low levels and have remained low ever since. Nevertheless, monetary stimulation has not improved the economic situation to a satisfactory level. Several studies such as those by Claudio Borio and Boris Hofmann (2017) and Nasha Ananchotikul and Dulani Seneviratne (2015) attempt to examine the inefficiency of expansionary monetary policy by looking at bank lending channels. However, commercial banks are not the only financial institutions through which monetary policy impacts the real economy. Koot and Walker (1980) studied the effectiveness of monetary policy through credit union lending channels. They found that, at first, credit unions responded well to expansionary monetary policy, but after prolonged easy money policy, the response died down. In some studies, such as De Santis and Serico (2013), expansionary monetary policy caused a continuous increase in cooperative bank and savings bank lending.

In Thailand, Thrift and Credit Cooperatives (TCCs) are non-banking financial institutions (NBFIs) that play an essential role as intermediators between members, including other TCCs. By the end of 2008, the total asset value for all TCCs in Thailand was 8.3 hundred billion Baht. At the end of 2017, total TCC assets grew to 2.4 trillion Baht, with an annual growth rate of 11%. Almost 80% of growth in assets was in the form of lending and borrowing. This lending and borrowing value grew from 6.8 hundred billion Baht in 2008 to 1.9 trillion Baht in 2017, which is the equivalent of 12% of credit in the commercial banking system. Obviously, TCCs were growing, despite suspicion about their ability to transmit the impact of expansionary monetary policy effectively.

This study attempts to examine the effectiveness of monetary policy and important determinants of TCC lending in Thailand from 2008 to 2017, during a period of prolonged low interest rates. In addition, the same regression model was used to compare and explain lending behaviour of commercial banks during this period. The research hypothesized that TCC lending would respond positively to low interest rate policies. This was mainly due to portfolio management by TCC members, who were a selectively circumscribed group of customers. On the other hand, banks lent money to diverse groups of customers, so the opposite result would be expected for banks. This study attempts to explain these results, with ultimate policy implications discussed and analysed. The rest of this paper is organized as follows. Section 2, the literature review, presents a brief overview of relevant empirical studies. Section 3 describes the data used in this study and explains the research methodology. Section 4 reports the study results. Section 5 proposes policy implications. Section 6 concludes the study.

1. Literature Review

Initially expounded by Bernanke and Blinder (1988), monetary policy passes on a direct impact on bank deposits. As bank deposits become the supply of loanable funds, they serve as the prime mover of bank lending. This explanation conceptualized the bank lending channel of monetary transmission. Koot and Walker (1980) studied the behaviour and size of the response of consumer instalment lending by credit unions in the United States during times of expansionary monetary policy. The study period was divided into 2 sub-periods: 1956Q1-1966Q4 and 1967Q1-1977Q4. A polynomial distributed lag regression model was used. The dependent variable was the percentage of change in consumer instalment credit granted. Independent variables were lagged values of dependent variables, as well as percentage of change in M1 (currency + demand deposit). The results show that credit unions responded quickly to monetary policy, although the size of the response was small and decreased from 1967Q1 to 1977Q4.

Kakes and Sturm (2001) studied the mechanism for different types of financial institutions, examining bank balance sheet data from Germany between 1975 and 1995. Financial institutions were divided into 6 groups:

1. big banks;
2. private banks (grouped under the commercial banking sector);
3. credit cooperatives;
4. regional institutions (grouped under the cooperative sector);
5. Landesbanken (a group of state-owned banks unique to Germany); and
6. saving banks (grouped under the savings bank sector).

They examined the response and behaviour of deposits, lending, and securities in different sectors during a variety of monetary policies. They employed a cross-sectional approach and vector error-correction model (VECM). Independent variables included short-term interest rates, long-term interest rates, real gross domestic product (GDP), GDP deflator, and dummy variables. Dummy variables were constructed for oil shocks and bank sizes. The results show that small banks (credit cooperatives and private banks) held higher ratios of liquid assets to total assets, causing them to lend out less money than large banks. Secondly, banks with substantial loan portfolios could still lend money. Bank lending channels could explain the commercial banking response, but not the response of private banks or credit cooperatives.

De Santis and Surico (2013) studied the transmission mechanism of monetary policy between nations and among financial institutions. They used balance sheet data from important EU financial institutions from 1999 to 2011, employing a linear ordinary least square (OLS) regression model and nonlinear quantile regression model. The dependent variable was loan growth and independent variables were:

1. changes in the three-month overnight index swap (representing change in monetary policy);
2. real GDP growth;
3. inflation (representing change in credit demand);
4. size;
5. capital;
6. liquidity;
7. number of banks;
8. profitability (representing special bank characteristics); and
9. interaction terms (representing indirect impact of monetary policy upon bank loans).

The findings show that the impact of monetary policy on bank lending was statistically significant in every nation. Expansionary monetary policy caused banks in every sample country to reduce liquid asset holdings and increase lending. In Germany, cooperatives and saving banks which were small in operational size were the financial institutions effectively responding to monetary policy through lending channels. In Italy, only saving bank lending was positively impacted by expansionary monetary policy. In some countries, other types of financial institutions contributed to the efficiency of the transmission of monetary policy.

Worms (2001) studied the response of financial institution lending to changes in monetary policy. Balance sheet data was used for all financial institutions in Germany from 1992 to 1998. Cooperatives and saving banks were grouped under small-sized financial institutions. The independent variables were:

1. interest rates;
2. bank characteristics (size, liquidity, capitalization);
3. average of sectoral real incomes;
4. bank-individual default risk; and

5. interaction terms between bank characteristics and interest rate.

The methodologies employed were the generalized method of moments (GMM) and vector autoregression (VAR) stochastic process model. The results show that lending response to monetary policy changes was statistically significant. When interest rates declined, lending rose. However, this response did not exist in saving banks and cooperatives. Different institutions had different magnitudes of response to monetary policy. The level of response may depend upon liquidity and capital ratio. When interest rates fell, financial institutions would increase lending, causing a decline in liquidity. The financial institutions with less liquidity could increase lending to a lesser degree. Finally, financial institutions with more capital could lend more money.

Havrylchyk and Jurzyk (2005) studied the impact of monetary policy upon lending channels. The data was obtained from balance sheets of 109 banks and 5 large credit unions in Poland during times of expansionary monetary policy from 1995 to 2002. The dependent variable was lending value. The independent variables included:

1. difference in market rate;
2. macroeconomic variables (real GDP growth rate and inflation);
3. bank characteristics (size, liquidity, capitalization); and
4. interaction terms between bank characteristics and interest rate.

The results show that changes in lending were not caused by monetary policy, but rather by liquidity and capital.

Borio and Gambacorta (2017) studied the impact of expansionary monetary policy on bank lending for 108 large-sized banks during a time of low interest rates. This study employed GMM. The dependent variable was annual loan growth. The independent variables were the three-month interbank rate (as a measure of monetary policy); control variables such as GDP growth; inflation; and the International Financial Reporting Standard's (IFRS's) dummy variable and low interest rate dummy variable. The results show that reducing interest rates did not cause banks to increase lending. In consequence, the economy did not grow as expected as a result of Central Bank action. This result of monetary policy was a form of pushing on a string, underlining the limits of monetary policy and the relative importance of Central Banks.

Ananchotikul and Seneviratne (2015) studied lending channels as transmitting mechanisms of monetary policy. They used bank data from Bankscope from Bureau van Dijk and macroeconomic data from the International Monetary Fund (IMF) and World Economic Outlook (WEO) database. The data covered 9Asian economies. They employed a fixed effects model to examine the impact of domestic interest rate upon bank lending. The dependent variable was loan growth. The independent variables were:

1. interest rate;
2. bank characteristics such as bank size, type of ownership, liquidity, capitalization and loan to deposit ratio;
3. macroeconomic variables such as real GDP growth rate and inflation;
4. interaction terms;
5. dummy variables such as state-owned or foreign banks; and
6. time effect.

The results show that bank lending responded to interest rates and external financial conditions. The response of lending to interest rate declined as low interest rate policies were extended.

Uslu and Karahan (2016) studied the monetary policy transmission mechanism through lending channels by using a vector autoregressive (VAR) model. Monthly data from 2002 to 2014 from the Central Bank of the Republic of Turkey (TCMB) was used. The independent variables included:

1. the consumer price index;
2. real exchange rates;
3. the industrial production index;
4. the total volume of credit to the private sector;
5. total deposit volume; security stocks; and
6. overnight money market interest rates.

The study explained that during times of restrictive monetary policy, the overnight money market rate rose, causing a reduction in bank loans. The reverse was true for times of expansionary monetary policy. In addition, lending channel could resolve asymmetric information in Turkey's financial system. The conclusion was that lending channels were effective transmission mechanism for monetary policy.

The reviewed studies relating to lending channels and monetary policy effectiveness mostly used panel models, on which the independent variables could be arranged into groups of quantitative, qualitative, and interaction terms. Variables such as assets; loan to asset ratio; deposit to asset ratio; cost-to-income ratio; income growth; and the Herfindahl-Hirschman Index (HHI) were grouped under bank characteristics. Real GDP growth and inflation were grouped under macroeconomic variables used as control variables. Dummy variables were created for types of institution; ownerships; governance indicator; and bank-specific quality (bank size for instance) for certain specific periods. Interaction terms were variables that combined quantitative variables with qualitative variables, such as bank size and low interest rates. The dependent variables were lending growth or some lending service indicators from financial institutions that could be changed by monetary policy.

Quite a few studies use panel data or cross-sectional data combined with a time series. Among this group of studies, popular methods of analysis were the fixed effects model and GMM model to meet the heteroscedasticity problem (Kakes & Sturm, 2001; Havrylchyk & Jurzyk, 2005; Ananchotikul & Seneviratne, 2015; Borio & Gambocorta, 2017). Some studies use quantile regressions with fixed effects (De Santis & Surico, 2013; Hesse & Cihak, 2007). At least one uses GMM with VAR (Worms, 2001). Less popular methods included polynomial distributed lag regression (Koot & Walker, 1979) and the VAR model (Uslu & Karahan, 2016).

While most papers found that bank lending was an effective transmission mechanism for monetary policy, some found that saving bank and cooperative lending channels were effective transmission mechanisms for monetary policy. (De Santis & Surico, 2013; Ananchotikul & Seneviratne, 2015; Koot & Walker, 1979). On the contrary, others deemed that cooperative and saving bank lending channels were ineffective monetary policy transmission mechanisms. (Kakes & Sturms, 2001; Worms, 2001; Havrylchyk & Jurzyk, 2005). Two pioneering studies cited ineffectiveness in saving bank and cooperative lending channels for transmitting monetary policy used data from Germany, while a third study employed data from Poland. These studies raised questions about the potential role of TCCs in Thailand. This paper aims to examine the effectiveness of monetary policy of TCCs and commercial banks in Thailand under a new environment of prolonged low interest rates.

3. Research Methodology

This study collected balance sheet data for 564 TCCs from the website of the Department of Cooperative Auditing, and 19 commercial banks from CEIC Data Global Database and the Thomson Reuters DataStream

platform from 2008 to 2017. Other macroeconomic variables were derived from the Bank of Thailand (BOT) website.

Table 1: Dependent and Independent Variables

Type of Variables	Variables	Symbols
Dependent: Loan growth	Total lending growth	L
Independent		
Monetary Policy Indicator	Treasury bill interest rate (1 month)	MP
Institutional characteristics	Total deposit	Depo
	Total borrowing ratio	Borrow
	Ownership ratio	Equity
	Liquidity ratio	Liquidity
Macroeconomic variables	GDP growth rate	GDP
	Policy interest rate	Interest rate
	Yield spread between 1-year and 10-year Government Bond	Yield
Qualitative variables	Low rate of interest	Low rate
	Medium size TCCs	Medium
	Large size TCCs	Large
	Largest size TCCs	Largest

Groups of TCCs were divided by size into 2 groups, using a median value. The top 50% were divided into 2 equal groups, termed largest and large-size TCCs. The bottom 50% were divided into 2 equal groups, termed medium and small-sized TCCs. The same approach applied to classifying bank sizes.

This study followed the argument by Bernanke and Blinder (1992) that because of policy lag, lagged value of exogenous policy variables and consequently, lagged non-policy variables were determinants to presenting non-policy variables. Following this line of reasoning, Model 1 uses interaction terms with 1 lag value to capture policy impact delay. However, the data employed in this study is annual values, which might already include complete annual lagged adjustment. Taking this into account, a model with contemporaneous interaction terms was also tried. Model 2 uses interaction terms without lag to capture the immediate effect of monetary policies.

The following equation was estimated by using annual data of TCCs and commercial banks in Thailand as the first model. Model 2 had contemporaneous interaction terms substituted for lagged interaction terms. The equation was estimated for both TCCs and banks. The results are reported in Table 3.

$$\Delta lnL_{i,t} = \alpha + \beta MP_t + \delta Low\ rate_t + \tau_i(X_{i,t-1} * Low\ rate_{t-1}) + \omega X_{i,t} + \delta_i(size_{t_{i,t}} * Low\ rate_t) + \theta Y_t + u_{i,t}$$

where

$\Delta \ln L_{i,t}$ is lending growth of the TCC (bank) i at time t, the time of monetary policy (MP_t);

Low $rate_t$ is the qualitative variable or dummy variable, its value equal to 1 when policy rate at time t is lower than the average of the whole sample, otherwise it equals 0;

$X_{i,t}$ are idiosyncratic characteristics of the TCC (bank) i at time t. These variables are expected to directly cause change in lending growth within one year. These variables are liquidity; depo growth; borrow growth; and capital growth of TCC (bank) i at time t;

$X_{i,t-1} * \text{Low rate}_{t-1}$ represents interaction terms between TCC (bank) characteristics i at time t-1 and low rate (t-1). Since these variables could capture the impact of variables during policy action on lending growth, a lagged value is used to allow delays in policy results. These variables are:

$\text{Loan Growth}_{i,t-1} * \text{Low rate}_{t-1}$; $\text{Depo Growth}_{i,t-1} * \text{Low rate}_{t-1}$; $\text{Borrow Growth}_{i,t-1} * \text{Low rate}_{t-1}$; and $\text{Equity Growth}_{i,t-1} * \text{Low rate}_{t-1}$. These variables are substituted by contemporaneous interaction terms in Model 2 to measure the immediate impact of monetary policy upon balance sheet variables for TCCs and banks, such as $\text{Depo Growth}_{i,t} * \text{Low rate}_t$, $\text{Borrow Growth}_{i,t} * \text{Low rate}_t$, and $\text{Equity Growth}_{i,t} * \text{Low rate}_t$.

$\text{Size}_{i,t} * \text{Low rate}_t$ is the TCC (bank) size interacting with a low rate to capture impact of the size of operation during times of low interest rate. There are four sizes of operation. Three dummy variables are used to capture the impact of sizes during times of low interest rates;

Y_t is the control variable for changes in macroeconomic conditions. These variables are GDP growth, policy interest rate, and yield spread at time t;

$u_{i,t}$ represents the time-varying error term for firm i at time t;

α is the time specific effect.

4. Results

The results are reported in 2 parts in this section. One is for the Hausman test results. The second part is the results for the determinants of TCC and bank lending behaviour.

4.1 Fixed or Random Effect

For the Hausman Test on loan growth equation for TCCs, the null hypothesis of random effect was rejected, so that a fixed effect was used. The null hypothesis of random effect of loan growth equation of commercial banks was accepted, meaning that a random effect was used.

Table 2: Hausman Test for TCCs and Commercial Banks

Loan Growth	**Model 1**		**Model 2**	
	TCCs	**Commercial Banks**	**TCCs**	**Commercial Banks**
Chi-square (12)	333.190	9.160	95.440	1.440
P- value	0.000	0.907	0.000	1.000

Note: Hypothesis H_0: Difference in coefficients not systematic

From Table 2, the Hausman test was conducted for 4 equations. Two equations described TCC and commercial bank lending behaviour under Model 1, where there were lagged interaction terms. Two equations described TCC and commercial bank lending behaviour under Model 2, where there were contemporaneous interaction terms. The test results, P-value less than 0.01, suggest that the fixed effects model was appropriate for TCC lending behaviour in Model 1 and 2. The P-value is larger than 0.01 suggesting that random effects was appropriate for bank lending behaviour in Models 1 and 2. The estimation results are shown in Table 3.

4.2 Determinants of Loan Growth for TCC and Commercial Banks

This section reports the estimation of loan growth results for a set of independent, dummy, and interaction terms. The greatest distinction between TCCs and banks is reflected in openness of operation, that TCCs accept deposits and lend money to members and other TCCs, while banks have a variety of customers.

Table 3: Determinants of Loan Growth for TCCs and Commercial Banks

Dependent Variable: Loan Growth	**Model 1**		**Model 2**	
	TCCs	**Commercial Banks**	**TCCs**	**Commercial Banks**
MP	0.085*** (7.300) [0.000]	-0.685 (-0.440)[0.663]	0.072*** (7.390) [0.000]	-0.509 (-0.910) [0.364]
Low rate	0.694*** (4.550) [0.000]	-3.495 (-0.760) [0.445]	0.671*** (4.590)[0.000]	-2.735* (-1.780) [0.075]
MP*Low rate	-0.205*** (-4.390) [0.000]	0.698 (0.390) [0.697]	-0.231*** (-8.490) [0.000]	0.188 (0.330) [0.741]
Loan Growth (t-1) X Low rate (t-1)	-0.05** (-2.08) [0.038]	-0.300*** (-4.360) [0.000]		
Depo Growth (t-1) X Low rate (t-1)	0.006 (0.750) [0.455]	-0.663*** (-9.820) [0.000]		
Borrow Growth (t-1) X Low rate (t-1)	0.004 (1.560) [0.119]	0.132 (1.410) [0.159]		
Equity Growth(t-1) X Low rate(t-1)	0.015 (0.270) [0.783]	0.076 (1.270) [0.203]		
Depo Growth X Low rate			0.016 (1.540) [0.125]	-0.701 (-1.340) [0.179]
Borrow Growth X Low rate			-0.004 (-1.330) [0.184]	0.084 (1.150) [0.249]

Equity Growth X Low rate			-0.069 (-1.210) [0.227]	-0.03 (-0.410) [0.683]
Liquidity	-0.327*** (-6.490) [0.000]	-4.565 (-1.320) [0.188]	-0.359*** (-8.000) [0.000]	4.784 (1.010) [0.313]
Depo Growth	0.043*** (7.340) [0.000]	0.057 (1.020) [0.308]	0.036*** (4.720) [0.000]	0.721 (1.390) [0.163]
Borrow Growth	0.028*** (14.480) [0.000]	0.031 (1.230) [0.219]	0.028*** (10.970) [0.000]	0.008 (0.140) [0.888]
Equity Growth	0.798*** (20.770) [0.000]	0.035 (1.210) [0.225]	0.924*** (19.890) [0.000]	0.058 (1.050) [0.295]
Medium X Low rate	-0.199 (-1.390) [0.165]	1.405*** (3.960) [0.000]	-0.171 (-1.180) [0.237]	1.826*** (4.640) [0.000]
Large X Low rate	-0.369*** (-2.740) [0.006]	1.602*** (6.380) [0.000]	-0.312** (-2.230) [0.026]	1.959*** (7.480) [0.000]
Largest X Low rate	-0.388*** (-2.890) [0.004]	1.599*** (6.690) [0.000]	-0.327** (-2.340) [0.019]	1.861*** (7.790)[0.000]
GDP growth	0.005*** (4.140) [0.000]	0.020 (0.390) [0.694]	0.005*** (5.220) [0.000]	-0.019 (-0.920) [0.358]
Yield spread	0.048*** (8.480)[0.000]	-0.235 (-0.520) [0.600]	0.048*** (11.180) [0.000]	-0.197* (-1.900) [0.057]
Constant	-0.157** (-5.140) [0.000]	2.199 (0.480) [0.631]	-0.134*** (-5.330) [0.000]	1.572 (1.000) [0.317]
Observations	3,322	135	3,958	152
R-squared	0.401	0.745	0.413	0.372
Adjusted R-squared	0.365	0.728	0.363	0.303
Number of banks	564	17	591	17

Remarks: Numbers in () are t-statistics for Model 1 and z-statistics for Model 2, in [ ] are p-values.

*, **, *** are significance level of 0.1, 0.05 and 0.01.

4.2.1 TCC Results (Fixed Effects)

Due to the fixed effects model specifications in Table 3, the Model 1 adjusted R-squared statistics of 0.365 was not low. The coefficient of MP was positive and statistically significant at .01 (.085, p-value of 0.000), meaning that overall policy rate may have positive impact upon TCC lending. The interaction term MP x Low rate was negative and statistically significant at .01 (-0.205, p-value of 0.000). The increase in policy rates during low rate times caused TCCs to reduce lending. This reflected that lending during low rate times increased as interest rate decreased. As expected, the low rate variable coefficient was positive and statistically significant at .05 (.694, p-value of 0.000), meaning that over the study period, low interest rates may cause an increase in TCC lending. This result was inconsistent with evidence from Worms (2001), Kakes and Sturm (2002) and Havrylchyk and Jurzyk (2005) who found that saving banks and cooperative lending channels did not respond to low interest rate policies. During low rate times, TCCs could lend more for 2 reasons. First, under low interest rates, TCC members adjusted their portfolio by moving money from deposit to equity to obtain higher-than-interest-rate dividends. With more equity, TCCs could lend more as more equity reduced their cost of lending. Secondly, future loan value decreased during low interest rate times, so TCC members could have their credit lines re-evaluated and request higher credit lines, as their ability to finance debt increased. As a result, TCCs could increase lending.

Among interaction terms that captured impacts of variables at times of low rate with one-year lag, the Loan Growth (t-1) x Low rate (t-1) coefficient was negative and statistically significant (-0.05, p-

value=0.038). It is possible that lending targets were overshot during times of low interest rates, so that the following year, lending decreased to balance appropriate amounts. For the remaining interaction terms, Depo Growth (t-1) x Low rate (t-1); Borrow Growth (t-1) x Low rate (t-1); and Equity (t-1) x Low rate (t-1) variables, their coefficients were positive but not statistically significant.

Among the contemporaneous variables, equity growth had the strongest positive push on lending (0.798, p-value=.000). Depo-Growth and Borrow-Growth had smaller positive impact on lending growth (0.043, p-value=0.000) and (0.028, p-value=0.000). For liquidity, the coefficient was negative and statistically significant (-0.327, p-value=0.000). This reflected that as TCC liquidity grew by one unit, lending growth decreased by an average of 0.327 units. This result may merely reflect that under expansionary monetary policy, TCCs sometimes substitute other liquid assets for lending. The same result was reported by Kakes and Sturm (2001).

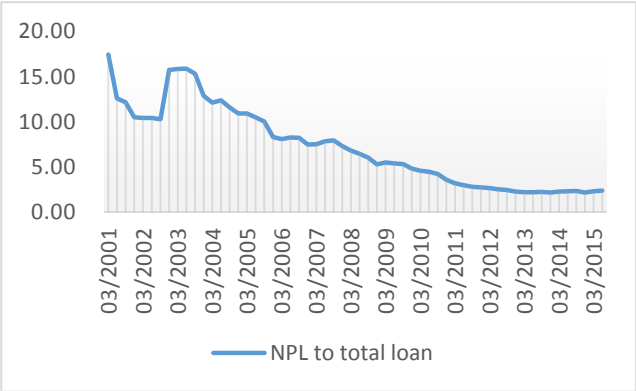
During low interest rate times, only the largest and large-sized TCCs with more assets had negative and statistically significant coefficients (-0.388, p-value=0.004 and -0.369, p-value=.006). The largest and large-sized TCCs reduced lending compared to small-sized TCCs during low interest rate times. This evidence reflected that largest and large-sized TCCs with more assets and capital may be more careful in their lending.

For the macroeconomic variables (GDP growth and yield spread), the coefficients were positive and statistically significant (0.005, p-value=0.000 and 0.048, p-value=0.000). These results reflected that economic growth and yield spread positively contributed to TCC lending growth.

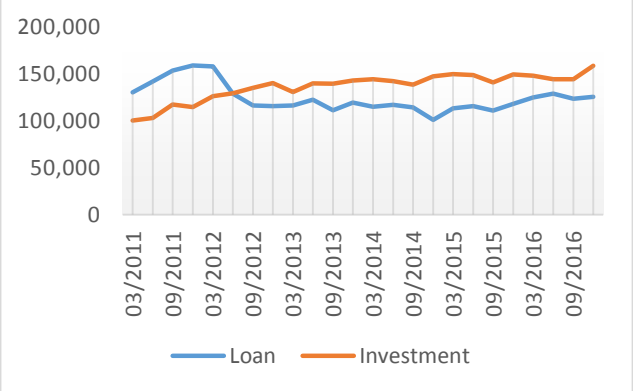
For Model 2 with contemporaneous interaction terms, MP and Low rate retained positive and statistically significant results. Similar to Model 1, MP x Low rate was likewise negative and statistically significant. All contemporaneous interaction terms had statistically insignificant coefficients. Thus, there was no instant impact of interaction terms upon lending within a single year. Liquidity had a negative impact on lending. Borrow Growth and Equity Growth still showed a significant positive impact upon lending. The remaining variables still had same directions and similar sized coefficients.

4.2.2 Commercial Banks Results (Random Effects)

For commercial banks, the adjusted R-squared from Model 1 with lagged interaction terms was 0.728. During this period, MP coefficients for commercial banks were negative but statistically insignificant (-0.685, p-value=0.663), suggesting that MP had no influence on bank lending. The coefficient on low rate variable was negative but statistically insignificant (-3.495, p-value=0.445). This result reflected that bank lending for Model 1 was uninfluenced by low rates. Although there was no immediate direct impact upon bank lending, the low rate indirect impact occurred after one year through the interaction term of Loan Growth (t-1) x Low rate (t-1) and Depo Growth (1-1) x Low rate (t-1). Both indirect impacts of low rate variable were negative (-0.300, p-value=0.000) and (-0.663, p-value=0.000). In Model 1, banks faced with an economic slowdown signal from low interest rates may screen borrowers more thoroughly during the same period, resulting in lending declines for the following period. Bank deposit growth during low interest rate times lagged for one period decrease as banks tried to avoid nonperforming loans (NPLs). Concurrently, Figure 1 shows that during low interest times, banks kept NPLs at a low level. This reflected that banks reduced lending during prolonged times of low interest rates. Furthermore, Figure 2 shows that banks attempted to maintain revenue by reducing lending and increasing investment. This evidence yielded shows that banks moved money from lending to investment to maintain or search for yields, causing small change in the liquidity ratio.



Source: Bank of Thailand
Fig. 1 NPL to Total Loan



Source: Bank of Thailand
Fig. 2 Average Loan and Investment

The bank liquidity coefficient in Model 1 was negative but statistically insignificant, meaning that bank liquidity had no direct influence upon bank lending. Commercial bank equity growth coefficient was positive but statistically insignificant, suggesting that bank capital may not contribute to lending. During times of low rates, bank size may positively contribute to lending. Large-sized banks tend to lend more than small-sized banks. This may be because larger banks have more assets and larger networks. Macroeconomic variables may not relate to bank lending.

For Model 2, Depo Growth x Low rate, Borrow Growth x Low rate, and Equity x Low rate were used to examine the immediate indirect impact of low rates on bank lending. Their coefficients were insignificant. However, the low rate variable coefficient turned out to be negative and statistically significant at 0.1 (-2.375, p-value= 0.075). This reflected that low rates may have immediate negative impact upon bank lending. One year after the low rate, the impact of low rates influenced bank lending through Depo Growth and Borrow Growth, as may be inferred from Model 1. As in Model 1, Model 2 reflected that larger banks could lend more than small-sized banks. Among macroeconomic variables, only yield spread had a negative and statistically significant coefficient (-0.197, p-value=0.057). Under Model 2, a rising yield spread caused banks to substitute other investment types for lending, as consistently reflected in Figure 2.

Contemporaneously, Borrow Growth had a positive but statistically insignificant coefficient (0.008, p-value=0.888). This suggests that during expansionary monetary policy, growth in bank borrowing may not be related with growth in bank lending.

Contemporaneous Deposit Growth and Deposit Growth during times of low rates did not impact lending growth (0.721, p-value=0.163 and -0.701, p-value=0.179). These results confirm that banks may not be pressured by low interest rates to increase lending immediately, even if they have increased deposits. Instead, they diversified between investment and lending.

Bank sizes in Model 2 yielded results similar to those in Model 1. Largest, large and medium-sized banks contributed to higher lending growth, compared to small banks. These results show that large banks with more branches and more assets could lend more than smaller banks.

To answer this study's question about the effectiveness of TCC lending channel during prolonged low interest rate times, low interest rates may cause TCCs to increase lending, while possibly causing commercial banks to reduce lending. Thus, TCC lending channels are effective, but bank lending channels are ineffective during times of prolonged low interest rate policy. Secondly, an increase in equity during low interest rate times may induce TCCs to increase lending, while bank equity may not affect lending. The reason for this may be that equity provided cost-free funds for TCCs, whose low-NPL risk members were ready and able to get more loans. In contrast, banks paid less attention to lending as a source of income. Banks that wanted to

maintain revenue during low interest rate times could easily get more funding from other sources, not just depositors, while simultaneously cutting back on lending and putting money into investments, including the possibility of increased risk projects. Thirdly, at times of low rates, largest and large-sized TCCs may reduce lending growth relative to smaller TCCs as their equity grew more than with small-sized TCCs. As a result, the lending ratio of largest and large-sized TCCs could not grow as fast as smaller TCCs could. During the same time period, largest, large and medium-sized banks may increase lending growth compared to smaller banks. This may be a consequence of the wider network of larger banks.

5. Discussion

From Table 3, the low rate coefficient of TCCs in Models 1 and 2 were positive and statistically significant, while that of commercial banks in Model 2 is negative but statistically insignificant. This suggests that the TCC lending channel was more effective than banks. Though the amount of TCC lending was not as large as in commercial banks, expansionary monetary policy effectiveness could still be improved by TCCs.

To improve monetary policy effectiveness through lending channels, TCCs ought to be supported and allowed to expand operations more effectively, under careful supervision. The system of internal and external audits by qualified registered examiners or statutory auditors must be improved. TCCs must not be free to choose their own individual internal and external auditors. A system of rotating auditors and fast detection of embezzlement must be designed for TCCs. These improvements require more manpower and resources, and therefore lead to more expense. The incremental budget for extra-systematic regulations must come from fees charged to all TCCs according to individual overall risks, since all members are the ones who would benefit from such improvements.

6. Conclusion

Quite a few studies have indicated that during times of prolonged low interest rates, monetary policy effectiveness through lending channels of commercial banks tends to decline. Nevertheless, other NBFIs could still function as transmission mechanisms for monetary policy. This study examined the lending channel of TCCs during times of prolonged low interest rates in comparison to commercial banks. Two models, one with lagged interaction terms and the other with contemporaneous interaction terms, were used for both financial institutions. The fixed effects method was used on TCC equations and the random effects method was used on commercial bank equations to estimate loan growth determinant equations. The dependent variable was loan growth. The independent variables of the first model were policy interest rates, low rates (dummy variable), interaction of lagged independent variables between loan growth, deposit, borrowing, equity and low rate, liquidity ratio, deposit growth, borrowing growth, equity growth, interaction terms between different sizes of banks and low rates, GDP growth, and yield spread. For the second model, contemporaneous interaction terms were substituted for lagged interaction terms while the rest remained the same.

From Table 2, the results of Model 1 show that during times of prolonged low interest rates, TCC lending channels may increase the effectiveness of expansionary monetary policy mainly through policy interest rates at low rates, Low rates, Equity Growth, Borrow Growth and Deposit Growth variables. The commercial bank results reflected a less effective lending channel as interactive terms with low rate (t-1) of Loan Growth, and Deposit Growth showed negative and statistically significant coefficients. Largest and large-sized TCCs had a negative impact upon lending when compared to small-sized TCCs. On the contrary, largest, large, and medium-sized banks had a positive impact upon lending compared to small-sized banks.

The results for the case of TCCs in Model 2 were similar to those of Model 1. The coefficients of the contemporaneous interaction terms were statistically insignificant. The rest of the coefficients remained approximately the same in magnitude and direction. The only crucial distinction from Model 1 was that Model 2 of banks had a coefficient of low rate turned from a negative but statistically insignificant value to a negative and statistically significant value. This indicates that with contemporaneous interaction terms, the low rate caused banks to lend less. Thus, the bank lending channels may be ineffective under a prolonged low interest rate policy.

For both models, the coefficients of TCC equity were positive and statistically significant, which meant that when equity rose, TCCs lent more. To be more explicit, during low interest rate times, equity of TCCs rose as members of TCCs adjusted their portfolio to maximize earning by switching their deposit holding to equity to obtain dividend that was higher than saving and time deposit interest rates. With more equity, TCCs could expand their lending. Contrary to this, bank equity did not have the same positive impact on bank lending as banks wanted to control NPL.

In conclusion, TCC lending behaviour was more responsive to the recent prolonged low interest rate policy, as compared to commercial banks. Consequently, TCCs should be allowed to grow under careful and systematic supervision to enhance the effectiveness of expansionary monetary policies through their lending channels. The extra cost of regulation should be financed by TCCs themselves.

References

Ananchotikul, N., & Seneviratne, M. D. (2015). Monetary policy transmission in emerging Asia: The role of banks and the effects of financial globalization (No. 15-207). International Monetary Fund. https://www.imf.org/external/pubs/ft/wp/2015/wp15207.pdf

Bernanke, B. S., & Blinder, A. S. (1988). Credit, money, and aggregate demand (No. w2534). National Bureau of Economic Research. DOI: 10.3386/w2534

Bernanke, B. S., & Alan, S. i Blinder AS (1992) The Federal Funds Rate and the Channels of Monetary Transmission. American Economic Review, 82(4). https://ideas.repec.org/a/aea/aecrev/v82y1992i4p901-21.html

Borio, C., & Gambacorta, L. (2017). Monetary policy and bank lending in a low interest rate environment: diminishing effectiveness?. Journal of Macroeconomics, 54, 217-231. https://doi.org/10.1016/j.jmacro.2017.02.005

Borio, C. E., & Hofmann, B. (2017). Is monetary policy less effective when interest rates are persistently low? https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2957961

De Santis, R. A., & Surico, P. (2013). Bank lending and monetary transmission in the euro area. Economic Policy, 28(75), 423-457. https://doi.org/10.1111/1468-0327.12013

Gerstenberger, J., & Schnabl, G. (2017). The impact of Japanese monetary policy crisis management on the Japanese banking sector. ssrn.com/abstract=2976280

Havrylchyk, O., & Jurzyk, E. (2005). Does the bank lending channel work in a transition economy? A case of Poland. European University Viadrina, mimeo. http://www.ceistorvergata.it/conferenze&convegni/banking&finance/XII_conference/9DICEMBRE/HavrylchykJurzyk.pdf

Koot, R. S., & Walker, D. A. (1980). A statistical analysis of the impact of monetary policy on credit union lending. Journal of Banking & Finance, 4(3), 301-311. https://doi.org/10.1016/0378-4266(80)90026-6

Kakes, J., & Sturm, J. E. (2002). Monetary policy and bank lending:: Evidence from German banking groups. Journal of Banking & Finance, 26(11), 2077-2092. https://doi.org/10.1016/S0378-4266(02)00200-5

Uslu, N., & Karahan, P. (2016). An analysis on the efficiency of bank lending channel in Turkey. Journal of Business, Economic and Finance, 5(2), 206-217. https://doi.org/10.17261/Pressacademia.2016219262

Worms, A. (2001). The reaction of bank lending to monetary policy measures in Germany.