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A Study on the Spillover Effects of China's Monetary Policy on Thailand under the Belt and Road Initiative

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Abstract

In the context of the implementation of the Belt and Road Initiative, the SVAR model is built in this paper to study the spillover effects of China's quantitative monetary policy and price-based monetary policy on Thailand through impulse response function and variance decomposition. It has been found that China's monetary policy has spillover effects on Thailand's economy and the spillover effect direction of each economic variable is different. Compared with the quantitative variations of China's monetary policy, the spillover effects by price variations of China's monetary policy on Thailand's economy is more obvious, which means that China's monetary policy has an apparently decisive impact on Thailand's output, but a relatively weak spillover effect on interest rate. Finally, suggestions are made from the monetary policy's international coordination, participation in the reform of international monetary system and promotion of RMB internationalization.

Keywords

China's Monetary Policy, the Spillover Effects, Thailand, The Belt and Road Initiative

1. The Brief Introduction to This Paper

Good relationships among countries need to be based on not only the close economic connections and institutionalized cooperation, but also on the formation of common values in a real sense among countries. After the Belt and Road Initiative was proposed in 2013, in order to promote economic transformation, Thailand plans to align its economic strategies such as the Eastern Economic Corridor Plan with the Belt and Road Initiative. Thailand is a key junction country in the Belt and Road Initiative where it can connect with both the Maritime Silk Road and the Land Silk Road. Thailand has played and will play an important role in the future Asian integration system. The scale of economic exchanges between China and Thailand is continuously expanding and the interest relationship is becoming increasingly close, which is very beneficial to realize the goals of the Belt and Road strategy. If intending to increase the convergence of interests, China and Thailand should carry out the further strategic cooperation and synergy to realize the common development and build the community with shared future for mankind. Over the past four decades, the scale of economic exchanges and common interests between the two countries has been continuously increased, laying a solid foundation for the joint construction of the Belt and Road.

2. The Literature Review of This Paper

According to Hmada and Sakuri (1978), the domestic price will fluctuate after monetary policy adjustment,

which will lead to the fluctuations in prices and output of other countries. First, the fluctuations in prices of imported investment products will affect the demands and output of other countries. Second, the imported goods become more expensive, which will force other countries to raise salaries and prices; thirdly, the imported goods become more expensive and the trade condition changes, which will lead to the fluctuations in trade balances and influence the balances and foreign exchange reserves of other countries.

Kim (2010) thought that the expansionary monetary policy of the United State will lead to the actual increase in the output of the other G7 members, which will result in a positive spillover effect. In the process of building a general dynamic equilibrium model between the two countries, Beningno (2016) thought that the spillover effect of monetary policy on the output of trade export channels is determined by the current and intertemporal elasticity of substitution. To find out how U.S. interest rate and money supply affect the Asian currency earnings, Miyakosh and Jalolov (2015) studied it. In order to explore the response of exchange rate and interest rate to China's monetary policy adjustment, and to bring the trade credit into the analysis framework of monetary policy transmission mechanism, Huang Xian et al. (2017) selected more than 50 countries and regions along "the Belt and Road" as research objects, and adopted a high-frequency event research method to study these countries and regions. In order to prove that China's monetary policy mainly affects trade balance through "trade credit" and "trade credit through exchange rate", Lu, Wang, and Jin (2008) conducted a large number of empirical verification.

3. Research Methods and Model Illustration in This Paper

In this paper, the SVAR model will be built and used to discuss how China's quantitative and price-based monetary policies affect Thailand's economy through the impulse response function and variance test.

3.1 The SVAR Model

In order to reflect the structural relationships among different variables and consider the simultaneous influence of different variables on the relationship, Sims and Bernanke (1986) created the 1SVAR model. In terms of the transmission effect of monetary policy, the 1SVAR model can identify the monetary shock under the minimum constraints, and impulse the response function and variance decomposition are used to explore the monetary policy in order to adjust how to cause changes in other variables.

The SVAR model with the common n elements and the lag order of P can be described as (Huang & Xia, 2016):

$$BY_t = A_0 + A_1 Y_{t-1} + A_2 Y_{t-2} + \ldots + A_p Y_{t-p} + u_t \quad (1)$$

Where B represents the n-order coefficient matrix with the main diagonal line of 1, A represents multivariate coefficient matrix with n-order lag operator, and u_t represents stochastic disturbance terms.

3.2 The Model Illustrations

Taking 2013 when The Belt and Road Initiative was proposed as the intermediate time node, the relevant data from 2009 to the first quarter of 2017 have been collected for analysis on a quarterly basis. The raw data for the relative exchange rate between RMB and Thai Baht comes from the statistics published by IMF. Other data sources in this paper include macroeconomic database of WIND, CEIC, Central Bank of Thailand and TRENDING ECNOMICS. The meaning of each variable is shown in Table 1 below:

Table 1. Meaning and Definitions of Variables

Variable	Meaning
	Money supply and economic indexes of China
M2	Year-on-year growth rate of Chinese currency M2
RAT_CH	China's benchmark one-year deposit rate
GDP_CH	Year-on-year growth rate of China's GDP
	Economic indexes of Thailand
GDP_TL	Year-on-year growth rate of GDP
CPI_TL	Comparative growth rate of CPI
EXC_TL	Comparative growth rate of Thai Baht against RMB
RAT_TL	Thai money market rate
UN_TL	Unemployment rate

3.3 Data Stationary Test

Considering that the spillover effect of monetary policy is not a presentation of economic equilibrium in an open environment, it is not advisable to build a model based on non-stationary data. Moreover, the SVAR model requires the stationary sequence data. The KPSS method is used to complete the unit root test. It can be known from the analysis of data in Table 2 that only the UN_TL variable is non-stationary. So this variable has been removed when creating the model.

Table 2. Unit Root Test Results

Variable	LM	Results
M2	0.1537***	Stationary
RAT_CH	0.0832***	Stationary
GDP_CH	0.3541***	Stationary
GDP_TL	0.0833***	Stationary
CPI_TL	0.1342**	Stationary
EXC_TL	0.0531**	Stationary
RAT_TL	0.0988**	Stationary
UN_TL	0.3325*	Non-stationary

Note: "*", "**", "***" indicate that the original hypothesis cannot be rejected at the significant levels of 1%, 5% and 10%, respectively, and the data are stationary.

3.4 The Determination of Model's Lag Order

The premise of effective SVAR model is the stable VAR model. In order to introduce the variables of M2 and RCA into the model, we conduct an empirical study on the year-on-year data of quantitative monetary policy M2 and the one-year benchmark deposit rate of price monetary policy, namely,

$$y_t = \{GDP\_CH, M2 / RAT\_CH, GDP\_TL, CPI\_TL, EXC\_TL, TAT\_TL\}^T \quad (2)$$

According to formula (2), the lag number of the VAR model is determined and the model stability test is performed. Finally, it is obtained that the lag phase of M2 is 2, and that of RAT_CH is (?)

4. How to Empirically Analyze the Spillover Effect of China's Monetary Policy on Thailand

4.1 How to Identify the SVAR Model

We perform economic theory analysis on matrix B by adding N (n-1)/2 constraints to identify SVAR models. In the first part of this paper, the year-on-year growth rate of China's GDP is applied. In the second part, the year-on-year growth rate of M2 or benchmark one-year deposit rate is applied. In the third part, the macro variable of Thailand is applied. Based on the order of GDP, exchange rate, CPI, interest rate and unemployment rate, the SVAR system with recursive features is created. We use B to represent the lower triangular matrix and get n(n-1)/2 constraints. At this point, it can be determined that the constrain matrix of SVAR model is:

$$B = \begin{Bmatrix} 1 & 0 & 0 & \cdots & 0 \\ b_{21} & 1 & 0 & \cdots & 0 \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ b_{71} & b_{72} & \cdots & b_{76} & 1 \end{Bmatrix}, \quad \Omega_\varepsilon = \begin{Bmatrix} a_{11} & & & \cdots & \\ & a_{22} & & \cdots & \\ \cdots & \cdots & \cdots & & \cdots \\ & & \cdots & & a_{77} \end{Bmatrix} \quad (3)$$

4.2 How to Analyze Impulse Response Function and Variance Decomposition Results

In order to discuss how China's monetary policy affects Thailand's economy, we adopt the impulse response function and variance decomposition method provided by Eview6.0.

4.2.1 The Impact of M2 Shock on Spillover Effects in Thailand

Table 3 shows the value of impulse response function between a standard deviation's impact of M2 and Thail-

and's GDP growth rate. Through analyzing this table, the spillover effect direction and extent of a standard deviation's shock of M2 (the increase in M2 represents an expansive currency shock) on Thailand's output can be known.

Table 3. Values of Impulse Response Function between M2 Shock and Spillover Effect of Thailand

Period	3-month	6-month	9-month	1-year	1.5-year	2-year	3-year	5-year
Output	-0.0983	0.0042	0.0315	0.0412	0.0433	0.0241	0.0042	0.0031
Exchange Rate	-0.0078	-0.0071	-0.0312	-0.0420	-0.0171	-0.0038	0.0026	0.0004
Inflation	-0.0085	0.0022	0.0053	0.0051	0.0042	0.0031	0.0012	0.0002
Interest Rate	-0.0082	-0.0113	-0.0116	-0.0098	-0.0084	-0.0071	-0.0007	0.0017

4.2.2 Impact of RAT_CH Shock on Spillover Effects in Thailand

Table 4 shows the value of impulse response function between a standard deviation's shock of RAT_CH and GDP growth rate of Thailand. Through this table, the spillover effect direction and extent of a standard deviation's shock of RAT_CH (increase in RAT_CH indicates a tight currency shock) on Thailand's output can be known.

Table 4. Values of Impulse Response Function between RAT_CH Shock and Spillover Effect of Thailand

Period	3-month	6-month	9-month	1-year	1.5-year	2-year	3-year	5-year
Output	-0.0113	-0.2242	-0.2115	-0.1432	-0.7413	-0.5211	0.0913	0.0532
Exchange Rate	-0.0088	-0.2371	0.3342	0.7410	0.1141	0.1538	0.0326	-0.0424
Inflation	-0.0083	-0.0232	0.1653	0.1751	-0.1644	-0.0131	0.0772	0.0237
Interest Rate	-0.0072	0.0573	0.0596	0.0598	0.0784	-0.0271	-0.1457	-0.0467

4.3 The Analysis of Empirical Results

The following Table 5 demonstrates two aspects. One is the empirical test result of the spillover effect of China's quantitative monetary policy on Thailand's main economic variables, the other is the empirical test result of China's price monetary policy on Thailand's main economic variables. In Table 5, "-" represents that the shock of China's monetary policy variable has a negative spillover effect on a certain variable of Thailand and "+" represents a positive spillover effect. And "a, b, c, d, e" represent the levels of spillover effect, "a" refers to a contribution rate of less than 1%, meaning that the spillover effect is very small; "b" refers to a contribution rate between 1% and 10%, meaning that the spillover effect is small; "c" refers to a rate between 10% and 30%, meaning that the spillover effect is large; "d" refers to a rate between 30% and 50%, meaning that the spillover effect is larger; "e" refers to a contribution rate more than 50%, meaning that the spillover effect is great.

Table 5. Direction and Level of Spillover Effect of China's Money Supply Expansion and Interest Rate Rising on Thailand

	Output	Exchange Rate	Inflation	Interest Rate
expansion of money supply	-→+ ; b	-→+ ; b	-→+ ; a	-→+ ; a
increase of interest rate	-→+ ; e	-→+→- ; e	-→+→-→+ ; e	-→+→- ; c

4.3.1 The Spillover Effects of China's Quantitative Monetary Policy on Thailand

It can be confirmed by the analysis of Table 5 that if Thailand does not adjust its monetary policy, in the long run, there will be a positive impact on Thailand's output, mainly because the impact on income absorption effect of Thai monetary policy is stronger than export increase, and thus there is a constant and positive spillover effect. The negative impact of China's money supply expansion on Thailand's relative exchange rate will lead to a decline in exchange rate and Thailand's currency revaluation. From a long-term perspective, Thailand's exchange rate will be increased because both governments will regulate the exchange rate, increase the money supply and rise the domestic inflation rate, which is consistent with the conclusion of empirical study of inflation. As China increases its money supply, in the short term, Thailand's export, income and price will be reduced wholly, resulting in an inflation reduction. After a period of time, Thailand will strengthen the control of exchange rate, increase the money

supply and stimulate the capital inflow to rise the inflation rate. The impact of China's money supply increase on Thailand's interest rate is mainly negative and only after three years can it become positive. The reason is that China's money supply has increased and China's interest rate has reduced. While the interest rates in Thailand and China are inconsistent, the capital will be flown in at a large amount, resulting in lower interest rate.

4.3.2 The Spillover Effects of China's Price-based Monetary Policy on Thailand

It can be confirmed that, by the analysis of Table 5 that from the viewpoint of output, there will be a negative impact on Thailand's output within three years if China's one-year benchmark deposit rate is increased and the GDP growth rate and output of the latter one is reduced. After three years, Thailand's GDP growth rate and output will begin to increase, showing a positive spillover effect. In this case, the expenditure transfer effect is stronger than the income conversion effect. From the perspective of exchange rates, in the short run, Thailand's currency revaluation will continue for a long time because China's interest rate increase has led to change in exchange rate. The exchange rate will be reduced in the later period because the relevant departments in Thailand will take measures to avoid large fluctuations in exchange rate and reduce money supply. From the perspective of inflation, China's interest rates will be increased in the short term and the capitals of various countries will be withdrawn, leading to an inflation increase. From a medium and long term perspective, China's implementation of tightening monetary policy will have an impact on output, thus Thailand's price level and inflation rate will be reduced. From the perspective of interest rate, China's interest rate will be increased in the short term and the capitals of both countries will be flown out. After a period of time, the relevant Thailand departments will intervene aggressively, so the capitals will be flown to the two countries and the interest rate will be reduced.

5. Conclusions and Suggestions

The Chinese government has determined the Belt and Road Initiative to promote the development of regional economy. Therefore, studying the spillover effects of China's monetary policy on Thailand under the Belt and Road Initiative is of the great practical value. The main conclusions of this paper are as follows. First, China's monetary policy has spillover effects on Thailand's economy and the spillover effect direction of each economic variable is not completely consistent. Second, the price variations of China's monetary policy have a stronger spillover effect on Thailand's economy than the quantitative variations. Third, China's monetary policy has a greater impact on Thailand's output, and the spillover effect on Thailand's output is relatively stronger, but the effect on interest rate is relatively weaker.

Considering that China's monetary policy has spillover effects of various levels on Thailand, the author has made several suggestions based on the conclusions of this research. First, China's relevant Chinese departments must take monetary policy implemented by relevant countries into account and maintain the coordination of policy to the greatest extent when formulating the monetary policy. The empirical test results of this paper indicate that China will have either the positive or the negative spillover effect on relevant countries' economy. Thus, when formulating monetary policy, we should manage to strengthen the positive impact and weaken the negative impact. Second, China should play a more important role in the reform of global monetary system and develop regional financial and economic cooperation mechanisms. China should proactively promote the establishment of "the Belt and Road" regional cooperation framework. When formulating the cooperation framework and mechanism, China cannot ignore the influence and role of monetary policy. Otherwise, it will limit the exerting of mechanism's function. Third, China should strive to push RMB onto the path of internationalization while implementing the Belt and Road strategy. In the process of the implementing the Belt and Road strategy, the trade, finance and investment cooperation between China and other countries will be improved. Thus, a good opportunity for the internationalized development of RMB will be proved.

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