Did Fiscal and Monetary Policies Affect Positively to Economic Activity of Thailand?

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Abstract
The purpose of this paper is to analyze fiscal and monetary policy impact to Thai economy in past twenty years. Although there are many papers to study about Thai economy, few paper analyzed not only monetary shock but also fiscal stimulus effect. In order to analyze the performance of monetary and fiscal policies, we constructed SVAR model using quarterly data from 2000 to 2017, and estimated the impact of monetary and fiscal policy. According to the results from SVAR model, it was found that shocks from monetary policies such as interest rate or money supply did not have significant effect in statistically for GDP growth rate. In the other hand, shocks of government expenditure had statistically significant positive effect to GDP growth, however this effect did not have long-term effect.
Keywords: Time-Series Data, SVAR, Monetary Policy, Fiscal Policy

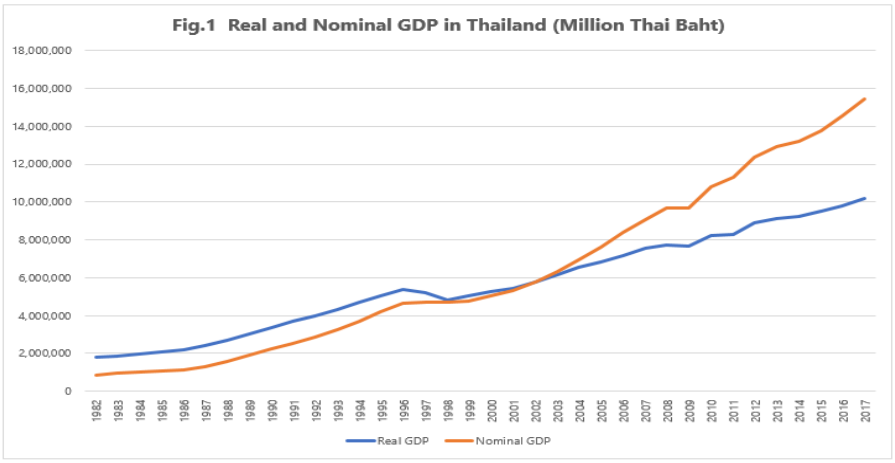
Introduction
Due to the 1997 Asian Financial Crisis, called Tom Yum Goong Crisis, economic growth of Thailand had stopped suddenly. Until then, ASCEAN countries had continued high economic growth and Thailand was the center of "East Asia Miracle." The Asian Financial Crisis was beginning from Thailand with financial collapse of Thai baht and this crisis developed to Indonesia, Korea or other Asian countries including Japan. This Asian Financial Crisis shown the vulnerability of Thai economy, and the economic growth rate has been lowered compare to the era of before the crisis. For example, economic growth rate in two consecutive years of 1997 and 1998 in Thailand became negative and Thailand could not recover the high growth rate in the 1980's and the early 1990's.
On the other hand, from the long run perspective, Thailand has succeeded in transformation of industrial structure from agriculture to manufacture. However, this industrial transformation made economic structure of Thailand sensitivity and vulnerability to currency fluctuations and had strongly affected by external economic fluctuations. Furthermore, in order for the Thai economy to build self-sustaining sustainable economic growth in log-term future, it is necessary to change economic structure that depends more on domestic demand. To accomplish domestic demand driven economy in Thailand, it would be more important to control and support to private economic activity by the Thai government, in other words, fiscal and monetary policies by Thai government will be key policy tools in the future.
After the 1997 Asian Financial Crisis, Thai economy has been recovered steadily, despite of the Great Recession in 2007-2008, however economic growth rate in recent years has been declined. To sustain the economic activity, as described above, fiscal and monetary policies are important for private activity. By the way, after 1997, did fiscal and monetary policies by Thai Government effective to macro-economy of Thailand? The purpose of this paper is to explore this question utilizing time-series analysis.

The organization of this paper is as follow: Section 2 gives broad perspective of Thai economy and the overview of related empirical literatures, in particular, studies using VAR model to analyze Thai economy. Section 3 provides the source of data which we will use in this paper and explanation about empirical method. In this section, we will summarize of theory of structural VAR model. The empirical results and analytical reports are shown in Section4. Impulse response function and variance decomposition are key tool of the empirical analysis. Concluding Remarks are given in Section 5.

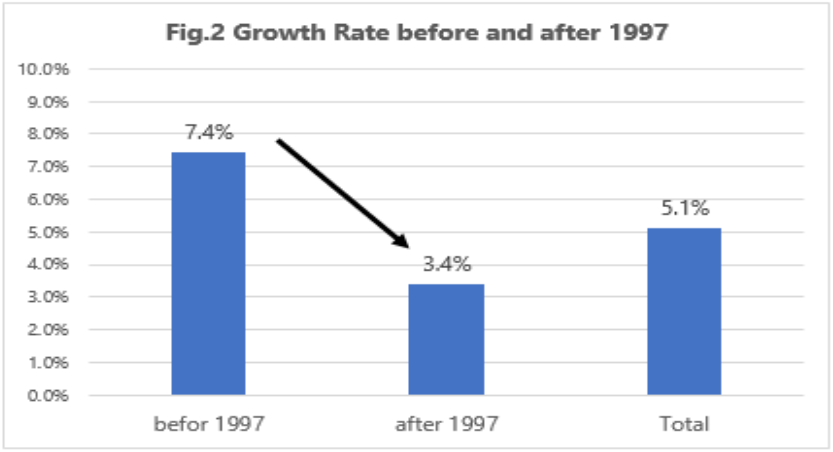
Perspective of Thailand Economy and the Overview of Related Literatures

Perspectives of Thailand Economy

First of all, we confirm recent performance of Thailand economy, and compare with other Asian countries. We can conclude that recent economic growth of Thailand is weak compare to past performance and with other countries. Fig.1 shows the long-term economic growth in Thailand. Rapid economic growth realized high real GDP (at constant 1988 prices) from 1.77 trillion Baht in 1982 to 10.21 trillion Baht in 2017. Also, nominal GDP increased from 0.86 trillion Baht in 1982 to 15.45 trillion Baht in 2017. However, the speed of economic growth was braked by the 1997 Asian Financial Crisis. Average economic growth rate (real GDP) was 5.1 % from 1982 to 2017, however before the crisis the growth rate was 7.4%, after the crisis the growth rate was only 3.4% see Fig.2). From this observations, we concluded that recent performance of Thailand has been quite the opposite from its long-term past.



Source: ADB "Key Indicators of Developing Asian and Pacific Countries"



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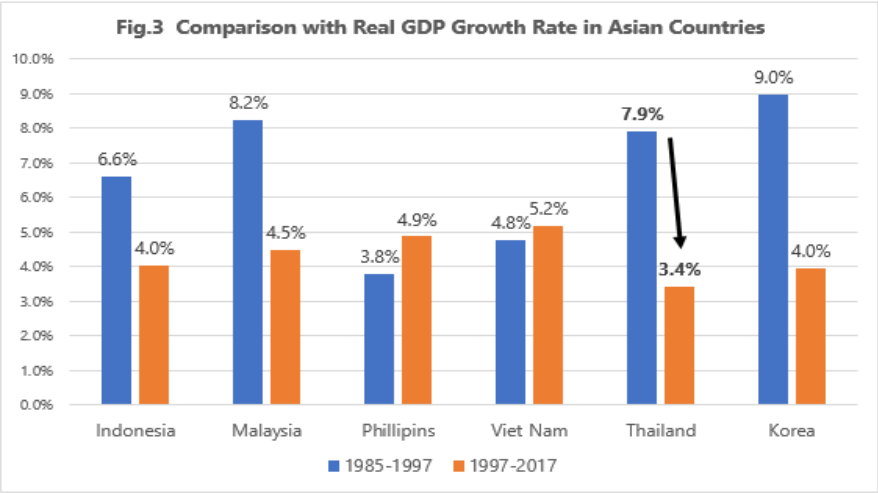


Source:World Bank"World Development Indicators"

Fig.3 shows comparison of the economic performance with other Asian countries, such as Indonesia, Malaysia, Philippines, Viet Nam, and South Korea, the economic growth rate of Thailand is the lowest in six countries after 1997. In contrast to Thailand, the economic growth rate is increased after 1997 in Philippines and Viet Nam.

Asian Development Bank (ADB) (2015) said “Thailand has transitioned to an upper-middle income country, but recent economic growth has lagged behind low- and middle-income Southeast Asian neighbors.” It is afraid that Thailand will be fallen into "middle-income trap" before Thailand will catch up to high-income country group. If these low economic growth would continue in the future, the "middle-income trap" would became real fact. In addition, Thailand will be faced demographic change. U.N. (2017) predicted that population in Thailand would be 69,685 thousand in 2025 and 69,626 thousand in 2030, so population decline will start from the latter half of 2020’s.

Many reports including ADB (2015) claimed that creative innovation, improvements of productivity, and preparation of infrastructure are necessary conditions to prevent from “middle-income trap” and to maintain sustainable economic growth.

Furthermore, autonomous economic growth should need domestic demand, not dependence on external economy or export, and the government is expected to control macroeconomic performance utilizing fiscal and monetary policy.

As mentioned above, the purpose of this paper is to examine the performance of fiscal and monetary policy in past twenty years. Although fiscal and monetary policy become more important to promote economic growth, however the effect are slightly vulnerable from the result of SVAR analysis in our paper.

Overview of Related Literatures

Vector Auto Regression (VAR) approach to macro economy of Thailand is used popularly, in particular, for analysis of monetary policy. Fung (2002) made VAR model of seven Asian countries including Thailand. He found that monetary shock of rising interest rate made output decline statistically significantly, however this shock had continued only for short-term in case of Thailand. Disyatat and Vongsinsirikul (2003) tried to inspect the transmission mechanism of monetary policy, which means the relation between monetary policy change and the impact on inflation and output. They made standard VAR including GDP components, CPI, and interest rate, and concluded that private investment was sensitive to change of monetary policy. Charoenseang and Manakit (2007) also analyzed the transmission mechanism of monetary policy, and they found that interest rate was weak.

As for structural VAR model, Patrawimolpon ei al. (2001) might be first paper for analyzing Thai economy using five variables SVAR model. They claimed that the response of variables was very different between pre and post 1997 Asian Financial Crisis. However, their data length of post the Crisis was much short to compare length of pre the Crisis, so it was difficult to accept their conclusions directly. Atchariyachanvanich (2004) used structural VAR model including six variables for five Asian countries to inspect the monetary shock to financial market after the 1997 Asian Financial Crisis, and their conclusion for Thailand was that monetary shock had short-lived impact to output compare to other Asian countries (Indonesia, Korea, Malaysia, and the Philippines). Hesse (2007) investigated the monetary transmission mechanism adopted structural VAR model, and did not obtain evidence of clear transmission mechanism of monetary shock in Thai economy. Kubo (2008) also shown similar conclusins. Arwatchanakarn (2017) was the mostrecent paper investigated Thai economy using structural VAR model. He made seven variables model and shown that interest rate and monetary aggregate had dominant channels of monetary transmission mechanism in Thailand.

From the survey of past papers those studied about Thai economy, few paper pointed out about not only monetary shock but also fiscal stimulus effect. So, this paper seeks to investigate both policies by Thai government to macro economy.

Model, Data and Method

Model and Data

Because the purpose of this paper is to examine the effect of monetary and fiscal policy to macro economy, then money stock, interest rate, and government expenditure, and GDP growth rate are necessary variables. In addition, we assume that Thailand is small open economy which is affected largely by fluctuation of exchange rate. From these perspective for economy, the following basic text model is assumed in behind our SVAR analysis.

$\mathrm{Y} = \alpha + \beta\mathrm{GOV} - \sigma(\mathrm{R} - \Delta\mathrm{P}) - \kappa(\mathrm{EX}) + u_Y$ (IS equation)

$\mathrm{M} - \mathrm{P} = \delta\mathrm{Y} - \lambda\mathrm{R} + u_R$ (LM equation)

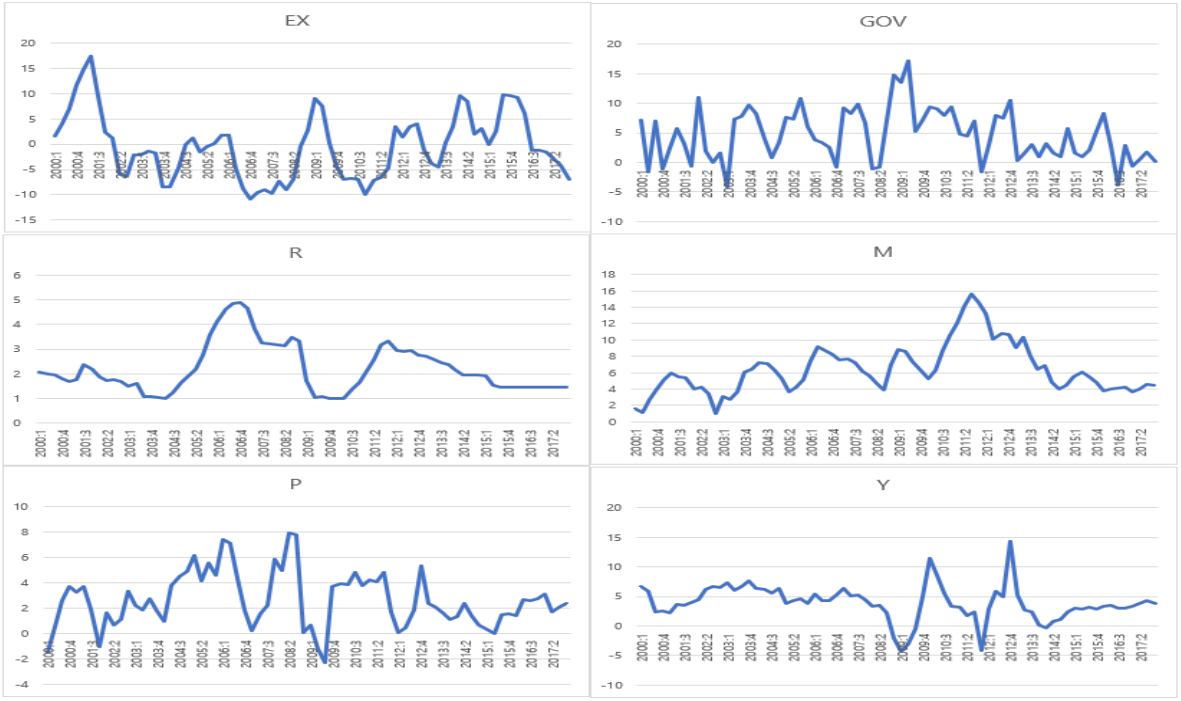
$\Delta\mathrm{M} = u_M$ (money stock process)

$\Delta\mathrm{GOV} = u_{GOV}$ (government expenditure process)

where,

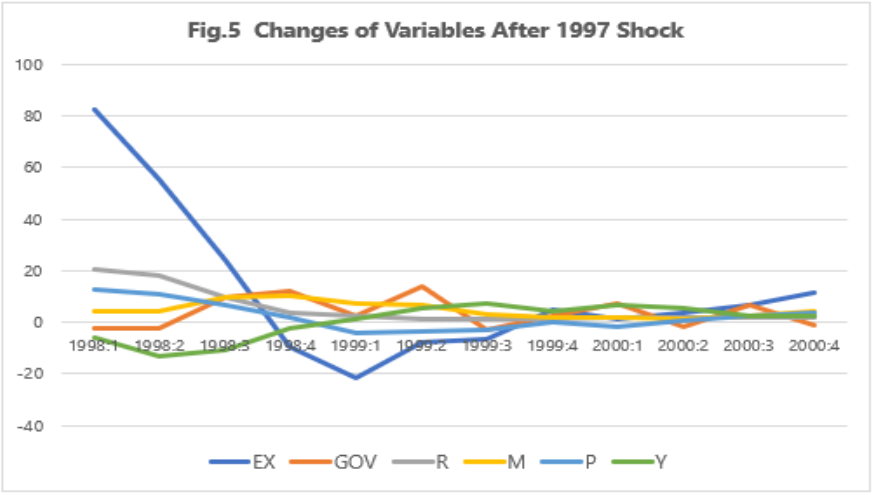
Y : growth rate of real GDP (%)
GOV: growth of government expenditure (%)
R: interbank overnight lending rates (%, average of quarterly)
P: growth rate of GDP deflator(%)
EX: changing rate of value of US dollar (Exchange rate, %)
M: growth rate of broad money(M1+M2, %)
Above variables are obtained from statistical tables of Bank of Thailand, and ADB.

Fig.4 Transition in Vatables of SVAR model



Note: Data periods is from 2000:1 to 2017:4. Data source is described in the text.

Fig.5 Changes of Variables After 1997 Shock



Note: Data periods is from 1998:1 to 2000:4. Data source is described in the text.

Fig.4 shows the transition of six variables from the first quarterly in 2000 to the fourth quarterly in 2017. All variables seem to have stationarity, however we should confirm it by unit root test. SVAR model will be built in period after Asian Financial Crisis. Fig.5 shows short-term transition from in six variables from the first quarterly in 1998 to the fourth quarterly in 2000, and temporary shock by the crisis was disappeared rapidly and variables moved heading toward stationarity. Hence, it is considered that including periods after the crisis is not problem to analyze dynamic behavior of macro variables.

Unit Root Test

Confirming stationarity of variable is important procedure to make VAR model. Of course, if variables to be analyzed would have unit root, then we should confirm the existence of cointegration and build VECM model. However, we use demand driving IS-LM type model as shown the above, so short-term dynamic effect is main concern in our analysis, hence stationary data should be used.

Table 1 shows results of Unit Root test, that is ADF test. It seems that all variables are confirmed stationarity. As for ADF test, null hypothesis is that the variable has a unit root, however t-statistics of ADF is so large and the null hypothesis is rejected. In ADF test, lag length is determined by Schwarz information criterion. Since stationarity is necessary condition to analyze by VAR model, we can continue to estimate VAR model directly.

Table1 The Results of Unit Root Test (ADF test with intercept)

	EX	R	M	GOV	P	Y
Statistics	-3.6602***	-13.442***	-2.9977**	-6.6850***	-3.4058**	-3.8885***
Probability	(0.0067)	(0.0001)	(0.0395)	(0.00)	(0.0138)	(0.0033)
Lag Length	5	1	1	0	4	0

Note: Null Hypothesis: Each variable has a unit root

Test Period: 1998Q1-2017Q4

*** denotes significance at the 1% level, and ** denotes significance at the 5% level.

Method

After Sims (1980)'s breakthrough paper, VAR model is considered one of the most flexible and useful tool to analyze macroeconomic or financial system, and became most popular instrument to deal with multivariate time series. As one of the character of VAR model, VAR model explains dependent variables of current state by their own lagged variables, not shows contemporaneous relationship each other. Structural VAR model, in contrast, allows the current relationship explicitly. From this characteristics, SVAR became popular tool to set small macroeconomic model.

Structural VAR model is divided by two types, one is contemporaneous restriction model, and another is long-run restriction model. When model is built utilizing quarterly data, contemporaneous model is more prefer from short-term relations among variables (see Ouliaris et.al. (2016)). As for contemporaneous model, there are many studies such as Bernanke (1986), Blanchard and Watson (1989), Keating (1992), Gali (1992), or Lütkepohl (2005).

When X_t is $(n \times 1)$ vector, structural form of vector autoregressive model (SVAR) can be written as,

$AX_t = \phi(L)X_{t-1} + \varepsilon_t$ (1)

$\Phi(L)$ is a matrix polunomial of the p[th] lag order, A is parameter of $(n \times n)$ matrix, and ε_t is structural shock or disturbance with variance Σ_ε. Multiplied A^{-1} to both side of eq.(1), reduced form VAR is specified.

$X_t = C(L)X_{t-1} + e_t$ (2)

where

$C(L) = A^{-1}\phi(L), e_t = A^{-1}\varepsilon_t$, (3)

e_t is reduced disturbance with Σ_e.

To compact SVAR model related with reduced form, we can summarize

$Ae_t = \varepsilon_t$. (4)

When we adopt the above system, then problem is that how to identify A matrix. Because the purpose of SVAR analysis is to estimate impacts of structural shock to variables in SVAR model dynamically, identification of A matrix becomes necessary condition.

Reduced form, eq.(2), consists of n variables, therefore Σ_e has $n(n+1)/2$ independent elements, on the other hand, A matrix has n^2 elements and Σ_ε has $n(n+1)/2$ elements. To satisfy just identification, n^2 restrictions are required. So, we should impose restrictions to eq. (4).

To solve identification problem, we restrict

$Ae_t = \varepsilon_t = Bu_t$ and $E(u_t u_t') = I$, (5)

From eq. (5), variance of ε_t is symmetric matrix, then we impose $\frac{1}{2}(n^2+n)$ restrictions. Hence, it is necessary to determine $n^2 - \left[\frac{1}{2}(n^2+n)\right] = \frac{1}{2}(n^2-n)$ restrictions more. When we adopt contemporaneous restriction model, it is convenient to assume A matrix is lower triangular and B matrix is diagonal as further restrictions. Because A matrix.is triangular, this gives $\frac{1}{2}(n^2-n)$ restriction, so identification problem is just solved.

Remained problem is how to determine the triangular form of A matrix. Triangular matrix is well fit to impose recursive structure to macroeconomy. Recursive structure becomes key role of contemporaneous SVAR model.

Estimation and Analysis

Granger Causality Test

Before constructing SVAR model, it would be informative to explore Granger Causality among six variables. Granger Causality means a way to investigate existence of causality between selected two variable of VAR model. Note, firstly, this causality is defined that whether one variable is useful to predict another future variable or not. So, this "causality" is different with ordinary mean in our life. Secondly, since Granger Causality test adopts pairwise variables, the conclusion is not same as VAR estimation results using all variables, however, test results are informative to construct VAR model.

Fig.6 Granger Causality Test

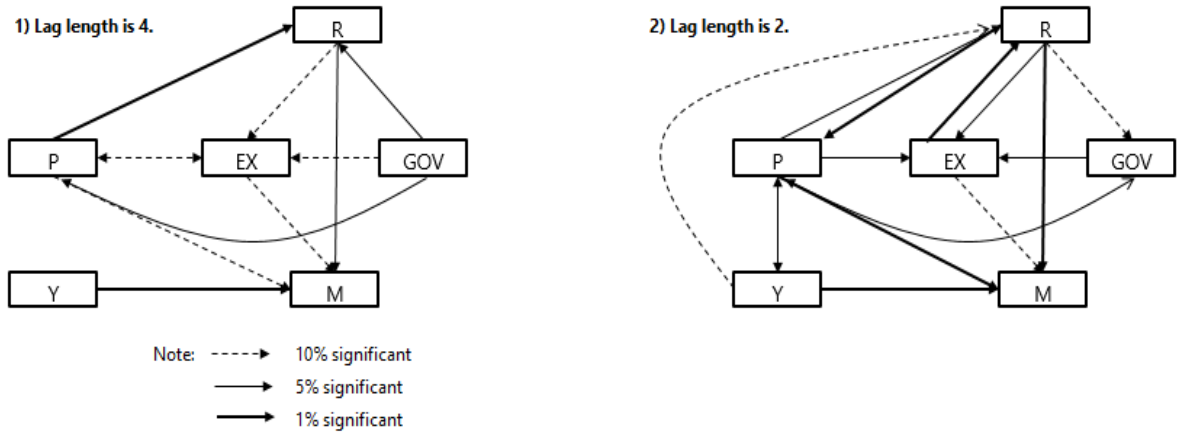


Fig.6 shows the results of Granger Causality test. When we assumed that the lag length is four in VAR model, P (growth rate of GDP deflator) is cause to R (interest rate), and Y (GDP growth rate) is also cause to M (growth rate of money) in 1% statistical significant level. On the other hand, when lag length is two, then R, P, and Y are cause to M, and P and R is cause each other in 1% statistical significant level.

Model Selection

In order to construct SVAR model, it is necessary to construct the reduced form, in other words, estimating VAR model is the first step. For the estimating VAR model, to determine the lag length of variables is the important problem. Adopting quarterly data, lag length could be four, eight, or multiple of four is almost rule of thumb, however long large lag length has possibility to be brought of losing degree of freedom. On the other hand, some research adopted shorter lag length than four. Therefore, the lag length was determined from various statistical criteria set with the upper limit of lag length 4, considering importance of degree of freedom. Determining the lag length means most important part of constructing VAR model, so this process may be called as model selection test.

Table 2 shows the result of model selection. From the Log likelihood and AIC criteria, lag length of four is selected, however from SBIC criteria, lag length of two is preferred, and from HQ criteria, lag length of one is selected. Though the coincident results are nor obtained, considering the rule of thumb, we adopted the four lag length, and this lag length is most plausible in time series data analysis.

Table2 Statistics of Model Selection

	lag=1	lag=2	lag=3	lag=4
Log likelihood	-959.3804	-857.31	-799.80	**-741.09**
AIC	25.351	23.982	23.735	**23.450**
SBIC	26.611	**26.339**	27.205	28.050
HQ	**24.133**	24.306	24.876	25.288

Note: Gothic value indicates lag order selected by the criterion.

Estimation Results of Contemporaneous Restriction

Using estimated VAR model, which is consists of six variables such as Y, GOV, R, P, EX, and M with four lag length, in order to construct SVAR model, estimating contemporaneous relationship is necessary. Before estimating A, B matrices those are already defined at sec.3.3, assumption of variables order is required. This order should be reflected macroeconomic structure in real world, and be coincident of research purpose. In addition, the variables should be ordered from exogenous one to endogenous one, however, it is slightly difficult to judge the exogenous, so we assumed the order as EX, GOV, R, M, P, and Y, hence we set this assumption of contemporaneous relationship as follows;

@e1 = C(1)*@u1
@e2 = C(2)*@e1 + C(3)*@u2
@e3 = C(4)*@e1 + C(5)*@e2+C(6)*@u3 (6)
@e4 = C(7)*@e1 + C(8)*@e2+C(9)*@e3+C(10)*@u4
@e5 = C(11)*@e1 + C(12)*@e2+C(13)*@e3+C(14)*@e4+C(15)*@u5
@e6 = C(16)*@e1 + C(17)*@e2+C(18)*@e3+C(19)*@e4+C(20)*@e5+C(21)*@u6

where @e1 represents EX residuals, @e2 represents GOV residuals, @e3 represents R residuals, @e4 represents M residuals, @e5 represents P residuals, and @e6 represents Y residuals.

Firstly, Table3 shows the estimation results of the above contemporaneous relationship, and the coefficients those are underlined in (6) are not statistical significant. It is much interesting that monetary policy such as interest rate or monetary supply does not have influence to economic growth rate in the contemporaneous period. From Table3, estimated coefficient C(16) was -0.290 and this meant that there was negative effect from exchange rate shock to GDP shock in simultaneously. In the other hand, estimated coefficient C(17) was 0.176 and public expenditure had positive impact to GDP. However, coefficient C(18) and C(19) were not statistically significant, then interest rate and fiscal monetary expansion did not have any effect to GDP.

Table3 Estimation Results of Recursive System

	Coefficient	Std. Error	z-Statistic
C(1)	3.73727***	0.3031	12.3288
C(2)	0.29275**	0.1186	2.4680
C(3)	3.86469***	0.3135	12.3288
C(4)	-0.01484*	0.0088	-1.6913
C(5)	-0.01550*	0.0082	-1.8977
C(6)	0.27514***	0.0223	12.3288
C(7)	-0.013556	0.0318	-0.4260
C(8)	0.06199**	0.0297	2.0841
C(9)	-0.161291	0.4082	-0.3951
C(10)	0.97922***	0.0794	12.3288
C(11)	0.038602	0.0550	0.7020
C(12)	0.03522	0.0528	0.6672
C(13)	0.559253	0.7054	0.7928
C(14)	-0.073286	0.1980	-0.3701
C(15)	1.69024***	0.1371	12.3288
C(16)	-0.28998***	0.0566	-5.1225
C(17)	0.17637***	0.0543	3.2463
C(18)	0.633248	0.7268	0.8712
C(19)	-0.168504	0.2034	-0.8286
C(20)	0.53906***	0.1177	4.5797
C(21)	1.73444***	0.1407	12.3288

Note: *** means 1% significant, ** means 5% significant, and * means 10% siginificant

Secondly, using these result, estimated A and B matrices are as follows;

$$A = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ -0.29275 & 1 & 0 & 0 & 0 & 0 \\ 0.014844 & 0.015497 & 1 & 0 & 0 & 0 \\ 0.013556 & -0.06199 & 0.161291 & 1 & 0 & 0 \\ -0.0386 & -0.03522 & -0.55925 & 0.073286 & 1 & 0 \\ 0.28998 & -0.17637 & -0.63325 & 0.168504 & -0.53906 & 1 \end{bmatrix} \quad (7\text{-}1)$$

$$B = \begin{bmatrix} 3.737273 & 0 & 0 & 0 & 0 & 0 \\ 0 & 3.864678 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0.275139 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0.97922 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1.690241 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1.734442 \end{bmatrix} \quad (7\text{-}2)$$

Using these SVAR model estimation, inducing impulse response function and variance decomposition is the next step to analyze macro economy of Thailand.
For reference, if we would chose another variable order such as EX, R, M, GOV, P, and Y, then the A and B matrices are;

$$A = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 \\ 0.01938 & 1 & 0 & 0 & 0 & 0 \\ -0.00108 & 0.34226 & 1 & 0 & 0 & 0 \\ -0.23523 & 2.62081 & -0.87207 & 1 & 0 & 0 \\ -0.0386 & -0.55925 & 0.073286 & -0.03522 & 1 & 0 \\ 0.28998 & -0.63325 & 0.168504 & -0.17637 & -0.53906 & 1 \end{bmatrix} \quad (8\text{-}1)$$

$$B = \begin{bmatrix} 3.737273 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0.281582 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1.006812 & 0 & 0 & 0 \\ 0 & 0 & 0 & 3.672754 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1.690241 & 0 \\ 0 & 0 & 0 & 0 & 0 & 1.734442 \end{bmatrix} \quad (8\text{-}2)$$

This result is somewhat different, however the calculation results of impulse response function and variance decomposition is not much different with in the above case of variable order.

Impulse Response and Variance Decomposition

1) Impulse Response Function: Impulse response functions those are calculated from estimated SVAR model are shown in Fig.7. As for response of exchange rate, EX, increase of government expenditure brings depreciation of Thai Baht, on the other hand, interest rate or increase of money supply does not have significant effect for exchange rate. Government expenditure is not almost influenced from shocks of other variables, so it is confirmed that government expenditure is exogenous. Interest rate is respond positively from price shock, so it may be suggested that central bank manages interest rate like textbook theory. Furthermore, government expenditure raises interest rate in a few quarter later. In addition it is shown that money supply is affected from government expenditure and price shock gives positive influence for money supply. Price is not affected from shocks of other variables excluding from shock of government expenditure.

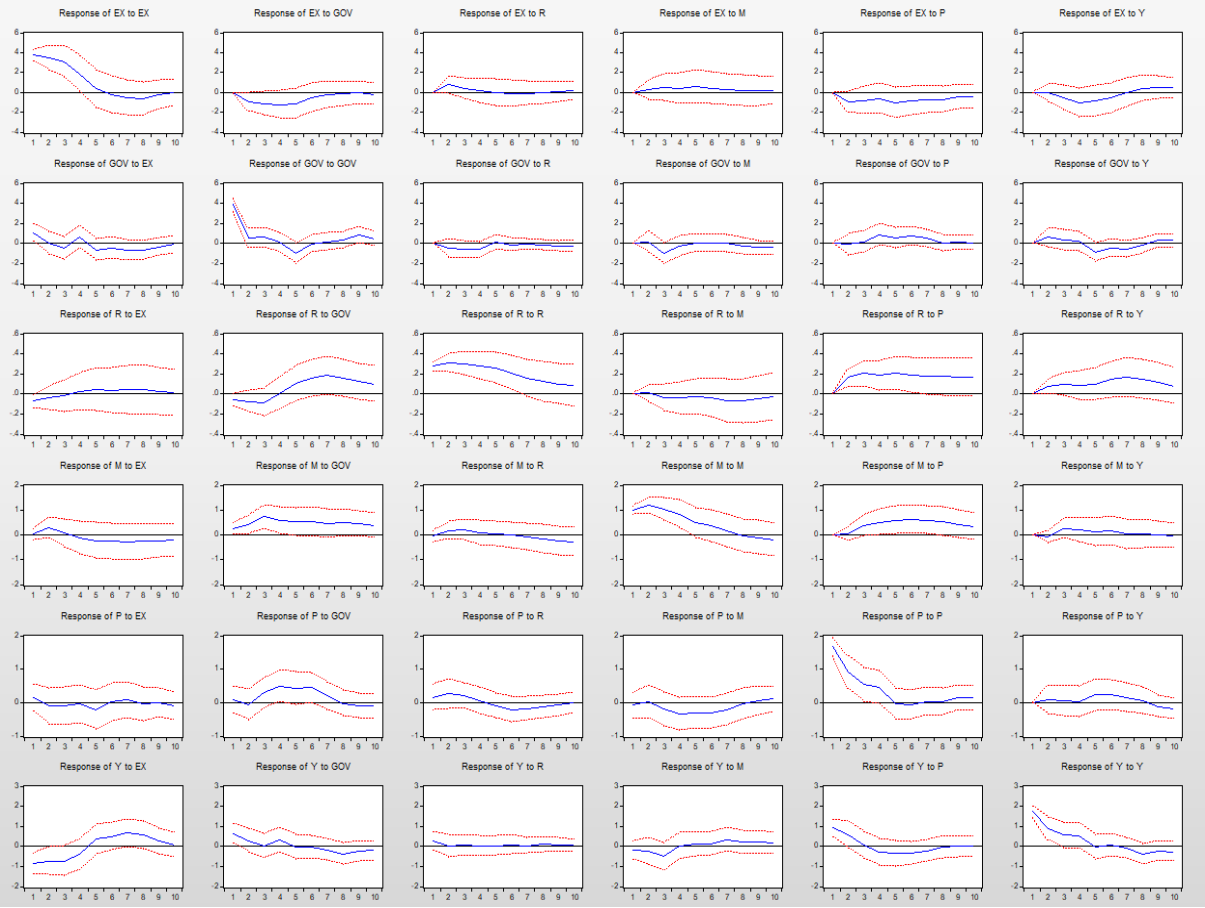
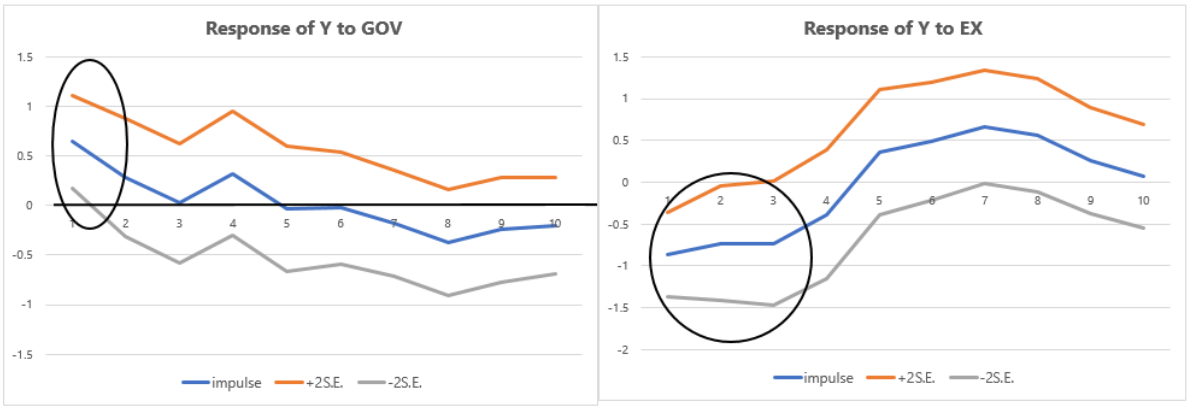


Fig.7 Impulse Response Function and 2S.E. Band

Fig.8 Impulse Response of Y to GOV and EX



Our most interest results is the response of GDP growth rate from shocks of other variables. Shocks of exchange rate brings GDP growth rate negatively in statistical significance. On the other hand, shocks related monetary policies such as interest rate or money supply do not give significant effect for GDP growth rate. As for influence by government expenditure, GDP growth rate responds positively in the first quarter, however the effect does not continue after the second quarter. Fig.8 is expanded to show the impulse response of GDP growth rate to government expenditure and exchange rate.

2) Variance Decomposition: Variance decomposition of forecast error shows that which of the independent variables is dominant in explaining the variability in the dependent variables

over time. In other words, variance decomposition shows how much of forecast error of each dependent variable is contributed by shock to other variables.
Table 4 shows the variance decomposition of P (price) and Y (economic growth rate). As for price, P, own variance is the most dominant factor in the long run, however, government expenditure, G, has about 14% and money supply, M, has about 7% contribution to variance in the prediction periods. The results of Y, economic growth rate, is interesting. In the long run, own variance contributes to future variance about 42%, and exchange rate, EX, also contributes about 29%, therefore it could be suggested that external economic environment represented by exchange rate has been large influence to Thai economy. In addition, government expenditure has about 14% contribution to future variance of Y, however interest rate, R, and M have little influence for future variance of Y.

Table4 Variance Decomposition of Forecast Error

Variance Decomposition of P:

Perio	EX	GOV	R	M	P	Y
1	0.674426	0.244233	0.847364	0.17676	98.05722	0
2	0.831058	0.339891	2.527613	0.144872	95.90897	0.247591
3	1.020233	2.255317	3.247374	1.011535	92.15977	0.305772
4	0.952008	6.979812	2.926833	3.289782	85.57	0.281564
5	1.782391	9.933871	2.886757	4.786328	79.39074	1.219912
6	1.66074	12.7903	3.449196	6.121594	73.92017	2.057997
7	1.70777	13.18646	3.903568	6.740106	72.04906	2.413034
8	1.729712	13.1437	4.168907	6.730885	71.75878	2.468021
9	1.719174	13.15912	4.23435	6.722876	71.49014	2.674342
10	1.902227	13.14478	4.171217	6.804783	70.76611	3.210886
11	2.333662	12.99021	4.121229	6.89795	70.08489	3.572055
12	2.547273	13.07603	4.093903	6.856886	69.74714	3.678763
13	2.718054	13.35432	4.077986	6.83833	69.35183	3.659478
14	2.762221	13.64328	4.086012	6.89486	68.88382	3.729806
15	2.754642	13.76748	4.108905	6.998452	68.56368	3.806838
16	2.759258	13.77047	4.136388	7.049629	68.44653	3.837723
17	2.765719	13.75788	4.159729	7.060052	68.42274	3.833881
18	2.778211	13.74573	4.171332	7.055216	68.39503	3.854487
19	2.801314	13.73406	4.178532	7.049346	68.34976	3.886985
20	2.817025	13.73087	4.185815	7.044933	68.31184	3.909511

Variance Decomposition of Y:

Perio	EX	GOV	R	M	P	Y
1	14.64661	8.180401	1.386313	0.810389	16.2158	58.76048
2	18.60311	7.217805	1.030065	1.440008	16.80117	54.90784
3	22.66778	6.212508	0.965154	4.509048	14.53431	51.1112
4	22.69467	6.95946	0.896126	4.18199	14.43737	50.83038
5	23.44173	6.753172	0.885059	4.236952	15.45893	49.22416
6	25.04921	6.479047	0.938381	4.243576	16.0469	47.24289
7	27.82603	6.391159	0.890724	5.061048	15.49421	44.33684
8	29.07871	7.293778	0.942287	5.139552	14.56677	42.9789
9	29.08222	7.688343	0.983927	5.451481	14.26522	42.52882
10	28.74742	7.961134	0.989363	5.569537	14.08124	42.65131
11	28.74012	7.964948	0.99077	5.561962	14.04225	42.69994
12	28.90319	7.994622	0.994496	5.566164	14.0012	42.54033
13	28.90177	8.010218	1.012306	5.673302	13.98817	42.41423
14	28.79026	8.016544	1.023575	5.774501	13.96499	42.43013
15	28.71805	7.995648	1.031627	5.773064	13.99929	42.48233
16	28.70435	8.035885	1.030467	5.766573	14.01933	42.44339
17	28.68631	8.093373	1.034059	5.794413	14.01862	42.37322
18	28.64844	8.161786	1.044144	5.856198	13.9943	42.29513
19	28.62987	8.185947	1.059975	5.892236	13.97354	42.25843
20	28.62428	8.18624	1.0706	5.917166	13.96739	42.23432

Concluding Remarks

In order to that we want to confirm the macroeconomic effect of monetary and fiscal policy to GDP in Thai economy, we constructed SVAR model using quarterly data from 2000 to 2017. Observing recent economic growth of Thailand, the speed of growth has been reducing compare to the period before Asian Financial Crisis, and many economist in Thailand are afraid that this country falls into middle income trap. Preventing from that and to continue sustainable economic growth, government support to macroeconomic will be more important and necessary, including reshaping industrial structure or responding new technology. Adding such a structural improvement of Thai economy, it is also important to control macro economy in short term by fiscal and monetary policy.
As we showed in this paper, SVAR model is very popular method to analyze short term economic impact among major macroeconomic variables. So, by constructing SVAR model in Thailand, and we estimated the impact of monetary and fiscal policy. According to the results from SVAR model, it was found that shocks from monetary policies such as interest rate or money supply did not have significant effect in statistically for GDP growth rate. In the other hand, shocks of government expenditure had statistically significant positive effect

to GDP growth, however this effect did not have long-term effect. In addition, exchange rate shock which means appreciating Thai Baht make Thai economy downward.
Summarizing these result, from past experiences of Thai macro economy, fiscal policy has effective influence to GDP growth but this is in limited. In other hand, monetary policy was not effective tools to control macro economy in Thailand. Considering the new era of international economy which become tight connected with monetary policy, it may not be good situation to control domestic economy. To solve these problems, we should need more researches.

References

Asian Development Bank. 2015. **Thailand: Industrialization and economic catch-up.** Manila: Asian Development Bank.

Atchariyachanvanich, W. 2004. "VAR Analysis of Monetary Policy Transmission Mechanisms: Empirical Study on Five Asian Countries after the Asian Crisis." **Forum of International Development Studies** 25: 39-59.

Arwatchanakarna, P. 2017. "Structural Vector Autoregressive Analysis of Monetary Policy in Thailand." **Sociology Study** 7 (3): 133-145.

Bernanke, B. 1986. "Alternative Explanation of the Money-lncome Correlation." **Carnegie Rochester Conference Series on Public Policy** 25: 49-100.

Blanchard, O. & Watson, M. 1989. "Are Business Cycle All Alike?." in R. Gordon (ed.). **The American Business Cycle.** Illinois: University of Chicago Press.

Blanchard, O. 1989. "A Traditional Interpretation of Macroeconomic Fluctuation." **American Economic Review** 79 (5): 1146-1164.

Charoenseang, J. & Manakit, P. 2007. "Thai Monetary Policy Transmission in an Inflation Targeting Era." **Journal of Asian Economics** 18 (1): 144-157.

Disyatat, P. & Vongsinsirikul, P. 2003. "Monetary Policy and the Transmission Mechanism in Thailand." **Journal of Asian Economics** 14 (3): 389-418.

Dungey, M. & Vehbi, T. 2011. **Modelling East Asian economies in a small open economy VECM: The influence of international and domestic shocks.** Retrieved from www.aeaweb.org/conference/2012/retrieve.php?pdfid=327.

Fung, B. 2002. **A VAR Analysis of the Effects of Monetary Policy in East Asia. Bank for International Settlements.** (Bank for International Settlements Working Papers, No 119).

Gali, J. 1992. "How Well Does the IS-LM Model Fit Postwar U.S. Data?." **Quarterly Journal of Economics** 107: 709-738.

Hesse, H. 2007. **Monetary policy, structural break, and the monetary transmission mechanism in Thailand.** (World Bank Policy Research Working Paper, No.4248).

Keating, J. 1992. "Structural approaches to vector autoregressions." **Review, Federal Reserve Bank of St. Louis** (9): 37-57.

Kubo, K. 2008. "Macroeconomic impact of monetary policy shocks: Evidence from recent experience in Thailand." **Journal of Asian Economics** 19 (1): 83-91.

Lütkepohl, H. 2005. **New Introduction to Multiple Time Series Analysis.** Berlin: Springer-Verlag.

Ouliaris, S., Pagan, A., & Restrepo, J. 2016. **Quantitative Macroeconomic Modeling with Structural Vector Autoregressions - An EViews Implementation.** Retrieved from www.eviews.com/StructVAR/structvar.html.

Pongsaparn, R. 2008. **Small Semi-structural Model for Thailand: Construction and Applications.** Retrieved from www.bot.or.th/Thai/.../22Paper_SmallModel.pdf.

Patrawimolpon, P., Rattanalankar, T., Charumilind, C., & Ngamchant, P. 2001. **A Structural Vector Autoregressive Model of Thailand: A Test for Structural Shifts.** (Bank of Thailand Working Paper WP/01/01/).

Sims, C. 1980. "Macroeconomics and Reality." **Econometrica** 48: 1-48.

United Nations. 2017. **World Population Prospects: The 2017 Revision, Key Findings and Advance.** New York: Department of Economic and Social Affairs, Population Division.