The Impact of Government Expenditure on Economic Growth in Thailand

Wanissa Suanin

***Abstract*—**This paper empirically examine the effects of different types of government expenditure on economic growth in Thailand. We use different econometric techniques to estimate the short- and long- run effects of these expenditures on growth and employ quarterly data over the period 1993-2014. Our finding indicates that while budgetary expenditure has the potential to promote economic growth in the long-run, extra-budgetary expenditure as well as quasi-fiscal spending can also stimulate short-run economic growth. These findings draw some policy implications for Thailand policymakers on maximizing the returns of the government spending on economic growth.

***Keywords*—**economic growth, extra-budgetary expenditure, extra-budgetary expenditure, quasi-fiscal expenditure

I. Introduction

IN recent years, government spending gains research attention with twofold. First, since the outbreak of Asian financial crisis in 1997, there have been a series of financial and economic crises around the globe which have massive effect of people jobs and standard of living. These crises usually call for the increasing role of government in pushing forward the economy while the private sector is in trouble. A clear policy action was observed in the recent recession in the US and European countries. Second, while managing globalization is a subject under heavy debate worldwide, one urgent task is to mitigate its side effects. Among them, the growing income inequality is always on the frontline to fight against. A series of policy measures are introduced on the ground to mitigate inequality, some of which are used by politicians to gain their own popularity. Hence, the government spending increases in GDP composition.

The relationship between economic growth and government spending is at best mixed. Traditionally, the effect of government spending on the economy depends on whether it is substitutes or complement to private investment (crowding out vs. crowding in). The latter could promote long-run economic growth. When technology progress is endogenously determined as in the (new) endogenous growth theory, the government can play a crucial role in strengthening technological capability of firms through their spending on critical infrastructures. This would positively affect firms' productivity countrywide and boost long-run growth. On the other hand, most of government spending is hardly self-financed. A rapid increase in government spending without care could dry up public resources, widens budget deficit and eventually mount public debt crisis. As a consequence, this does not only crowd out private investment, but also raises fiscal liability that will limit the proportion of investment budget in the future. Moreover, government spending could create inflationary pressures and jeopardize the country's macroeconomic stability. All in all, this could dampen long-term economic growth.

Thailand is an interesting case study in hand as the government has increased its spending over time and there was a fiscal deficit in many years. Meanwhile, public investment share in budgetary account was quite small and has declined incessantly, approximately 16 percent in 2011. Moreover, redistribution expenditure as a version of populist policies that are viewed as consumption expenditure which could not contributes productivity on long-run growth has risen continuously. Hence, the question comes up in this note: Does Thailand's government expenditures have the potential to promote economic growth in the long-run?

II. Literature Review

Most researches always pay attention in examining the role of public investment on economic growth. There is traditional consensus about the components of investment, which some kinds of public investment, especially infrastructure, human capital accumulation, have the potential to support private investment and also promote long-run economic growth through enhancing of productivity. For instance, Reference [10] also confirmed that not only public investment, but also healthcare expenditure had the potential to boost the long-run economic growth. Besides, these finding suggested that government expenditure in housing sector can promote growth in the short-run as well.

However, public spending might crowd out private investment and provide less positive or negative impacts on economic growth. Reference [11] in case of Barbados demonstrated that government expenditure created a drag on economic growth particularly in the short run and its budgetary components such as health care and social security expenditures had less influence on per-capita income growth.

Wanissa Suanin, is with Thammasat University, Thailand. (Email ID: wanissa.suanin@gmail.com)

In addition, education expenditure contributed the significant negative impact on growth. In addition, Reference [1] and [6] also found that other components of budgetary expenditure like social security (i.e. compensation of employee, social transfer) contributed negative impact on long-run economic performance.

In short, previous literatures often studied the impact of government outlays based on budgetary account. None of them considered the public expenditure in term of consolidated one. In fact, the presence of Thailand's government spending tends to use non-budgetary instruments increasingly. In addition, prior studies ignored to take into account the control variables that are always consistent in growth regression. Consequently, not capturing these points on the model could provide bias estimated impact of government expenditure on growth.

III. Methodology

The growth regression in this study is defined as follows:

$$Y_t - Y_{t-1} = \gamma_{1,t} + \gamma_{1,t-i}Y_{t-i} + \gamma_{3,t-i}G^{j}_{t-i} + \gamma_{4,t-i}I_{t-i} + \gamma_{5,t-i}H_{t-i} + \gamma_{6,t-i}TRADE + \gamma_{7,t-i}CPI + \gamma_{8,t-i}TAX_{DIS} + \gamma_{9,t-i}BUDS + D_h + \varepsilon_{y,t} \quad (1)$$

where g_t denotes the per capita income growth; Y_{t-i} denotes the initial income or output; G^{j}_{t-i} represents component j^{th} of public spending as a share of income; I, H, TRADE, TAX_{DIS}, BUDS are the set of control variables including private investment, human capital, trade, tax distortion, budgetary surplus; D_h is the set of deterministic variable including Tomyumkung crisis (D_{TOM}), Tsunami (D_{TSU}), and flooding (D_{FL}); and $\varepsilon_{y,t}$ is the residual or the martingale difference sequence. Note that all variables except deterministic variables are measured in logarithm formula.

The income (Y) is represented by the real gross domestic product per capita (GDP) at constant 1988 price, collected from the Information and Communication Technology center of Ministry of Finance.

Government expenditure can be roughly classified into 3 categories by financial accounts including budgetary expenditure, extra-budgetary expenditure, and quasi-fiscal expenditure. First, budgetary Expenditure in this note is referred to the annual spending in each fiscal year of the government under budget appropriation, which must be approved by parliament and the process established by Budget and Accounting Act. The data are collected from the Information and Communication Technology center of Ministry of Finance (ICTMF). Second, extra-budgetary is generally defined differently across countries. According to Act of Treasury Reserves B.E. 2491, extra-budgetary consists of Extra-budgetary funds (EBFs) and fiscal deficits. However, in this note the term of extra-budgetary expenditure is covered only EBFs because of there in no expenditure transaction of fiscal deposits. The data are collected from ICTMF. Lastly, that is quasi-fiscal expenditure. In Thailand, quasi-fiscal activities is identified as the operation of activities or government policies by others that are not general governments such as specialized financial institutions, state enterprises and so forth, which governments could intervene their decision process in order to implement their policies. Governments need not pass such budget by congress, but they would be fiscal liabilities if such policies perform fiscal loss [9]. In this note Quasi-fiscal expenditure is measured by guaranteed debt of state enterprises. Actually, there is no report of quasi-fiscal activity transaction. Therefore, debt guarantee is treated as a proxy according with the definition of quasi-fiscal activities of Fiscal policy office, indicating that the damages from using quasi-fiscal activities should be regarded as fiscal liabilities. In addition, the rule of debt guarantee is that the Ministry of finance guarantees debts of state enterprises or specialized financial institutions, which debts is incurred for government projects or government plan about public utility or public assistance, project that provide higher economic and social return than financial return, project that price of goods and services under government control[12].

When the budgetary and extra-budgetary outlays are mixed and eliminated the double count of transaction of both accounts, we will get consolidated expenditure. Hence, the consolidated outlay of budgetary and extra-budgetary as share of GDP is represented by G_{BUD+EX}. Similarly, the mix of budgetary expenditure and the outlay through quasi-fiscal activities as a share of GDP is denoted by G_{BUD+QF}. And $G_{BUD+EX+QF}$ is the combination of all types of government expenditure as a share of GDP. Note that these data is seasonally adjusted and measured as logarithm form.

The real gross private domestic investment at constant 1988 price is a proxy for private investment (I), compiling from national income account. In addition, the trade openness (TRADE), capturing the relative important of international trade to domestic transaction, is formulated by the sum of trade value) as share of GDP. These data are collected from the office of National Economic and Social Development Board (NESDB).

Human capital is measured by gross schooling enrollment ratio at secondary level, which is the number of enrollment in secondary education as a percentage of the population of official secondary education age. It is collected from the database of World Bank. Moreover, the inflation is measured by consumption price index (CPI), complied from Bureau of Trade and Economic Indices. Distortionary Tax (TAX_{DIS}) is collected from ICTMF. In general, budgetary surplus/deficit is measure by revenue minus expenditure, which might be positive or negative or zero. However, the logarithm can only apply with the positive number. To avoid this problem, the budgetary surplus variable in this note is measured by the logarithm of the ratio of budgetary revenue to budgetary expenditure. These data are collected from the Bank of Thailand (BOT) and ICTMF.

Because the period of analysis covers the domestic unusual situations influencing public spending and GDP growth to

divert from normal behavior, the deterministic variables are included as exogenous ones in the model. Each dummy takes 1 for a particular time and 0 otherwise so as to capture some specific shocks. More clearly, DTOM is the dummy for Tomyumkung crisis so it take 1 during Q4 in 1997-Q3 in 1998 since Bank of Thailand declared to float the currency on 2 July 1997 and then around the last quarter in 1998 there was a sign of economic recovery. In addition, over the two past decades there were shocks of natural disaster in Thailand so that we decide to include the dummy variables in the model. DTSU denotes the Tsunami impact in 2005 as well as DFL is the flooding in 2011.

For the econometric procedure, first of all, we will start the process with the nature of data. In practice, the important property of time-series analysis is whether such data is stationary. To test the stationary of data the popular method Augmented Dickey-Fuller (ADF) unit root test and Phillip-Perron (PP) test are employed. The results of unit roots tests indicate that all variables are non-stationary in level and stationary in first-difference or integrated order one, I(1). Since all variables are integrated at the same order, they might have the long-run relationship. Therefore, it is necessary to test cointegration.

TABLE I
UNIT ROOT TEST

	Augmented Dickey-Fuller Test				Philips-Perron Test			
	Level		First Different		Level		First Different	
	Stat	p-value	Stat	p-value	Stat	p-value	Stat	p-value
GDP	1.51	0.96	-3.60	0.00**	2.53	0.99	-9.08	0.00**
G_{BUD}	-1.93	0.05	-15.78	0.00**	-2.57	0.10	-27.34	0.00**
G_{EX}	-1.55	0.11	-9.60	0.00**	-1.56	0.11	-9.59	0.00**
G_{OF}	-1.31	0.61	-12.02	0.00**	-1.62	0.46	-15.94	0.00**
G_{BUD-EX}	-1.45	0.55	-9.86	0.00**	-2.25	0.18	-23.65	0.00**
G_{BUD-OF}	-1.63	0.46	-12.37	0.00**	-1.85	0.35	-13.11	0.00**
G_{ALL}	-1.62	0.46	-12.45	0.02*	-1.83	0.36	-13.12	0.00**
I	-2.73	0.07	-2.59	0.01**	-1.43	0.55	-8.78	0.00**
H	-1.31	0.17	-2.21	0.02*	-5.80	0.00**	-9.97	0.00**
CPI	-1.98	0.29	-7.92	0.00**	-2.06	0.25	-7.85	0.00**
TAX_{DIS}	-0.43	0.89	-36.85	0.00**	-1.21	0.20	-18.39	0.00**
BUDS	-1.57	0.10	-18.82	0.00**	-8.11	0.00**	-21.78	0.00**
Trade	-1.31	0.61	-5.03	0.00**	-2.09	0.24	-10.65	0.00**

** and * indicate significance at 1% and 5% levels, respectively. The optimal lag length for ADF test is determined by SIC, with maximum of eleven lags considered. The PP test is selected using a Newey-West Bandwidth

For the cointegration analysis, we use two methods of cointegration tests including two-step residual-based test, proposed by Engle and Granger [2], and the full information maximum likelihood technique proposed by Johansen and Juselius [4]-[5]. Note that because of the limit of data available, the lag order for all models is set to 4 that is the frequency of quarterly data. Using LM test, these number of lags are enough for ensuring that there is no serial correlation in residuals.

For the results of cointegration test, the residual based tests strongly confirm at 0.01 significant levels that there is at least 1 cointegrating vector in all models. Similarly, Johansen-Juselius cointegration test also confirms the existence of cointegration relation among variables in the model.

TABLE II
COINTEGRATION TEST

Model	Residual based Tests				Johansen-Juselius cointegration test			
	ADF test		PP test		Hypothesized [1]	Trace	Hypothesized [2]	Max
	Stat	Prob.	Stat	Prob.	No. of CE(s)	Statistics	No. of CE(s)	Eigen
1	-4.28	.00***	-6.66	0.00***	At most 3	87.31***	At most 3	40.69***
2	-4.27	.00***	-6.95	0.00***	At most 4	65.40***	At most 4	36.80***
3	-3.69	.00***	-7.25	0.00***	At most 4	74.68***	At most 5	33.28***
4	-3.33	.00***	-6.27	0.00***	At most 4	129.48***	At most 4	46.46***
5	-3.13	.00***	-7.53	0.00***	At most 4	81.70**	At most 4	35.37***
6	-3.69	.00***	-7.26	0.00***	At most 4	64.03***	At most 4	41.12***
7	-7.16	.00***	-7.13	0.00***	At most 4	192.19***	At most 4	60.48***

1/ and 2/ are the Hypothesized No. of CE(s) for trace test, and Maximum eigenvalue test, respectively.

** and * indicate significance at 1% and 5% levels, respectively.

A. Long-run Growth: VECM

Cointegration test of the relevant variables suggests that all variables are integrated at the same order I(1) and there also exists the long-run relationship among them, the Vector autoregressive (VAR) model will be modified to be the Vector Error Correction Model (VECM). VECM is better to handle simultaneity problem well and we can treat all as endogenous variable in the model. In addition, it can link the long-run equilibrium relationship implied by cointegration with short-run dynamic adjustment mechanism that describes how variance reacts when they move out of long-run equilibrium. Since there is cointegrating vectors that make the residual in VECM are I(0), the model may be consistently estimated by using least squares method [5]. The standard form of VECM is as follows:

$$\Delta X_t = \Gamma_0 + \Gamma_u \hat{u}_{t-1} + \Gamma_1 \Delta X_{t-1} + ... + \Gamma_{p-1} \Delta X_{t-p+1} + v_t \quad (3)$$

where Γ_u is the adjustment coefficient capturing the reaction of X_t on disequilibrium error. However, this error ($\hat{u}_{t-1}$) is equal to zero in the long run.

B. Short-run Stability: VAR

To assess the dynamic interaction among variables and changing impact of government spending on growth over time, the VAR model is useful for describing the dynamic behavior of economic time series and for forecasting [8]. VAR performs a dynamic system of endogenous variables in the model, which each current variable depends on its lag and the lag of other endogenous variables in the model. In other words, all variables except deterministic term are treated as endogenous ones so that we have no concern on endogeneity problem. The (p-lag) vector autoregressive model (as a reduce form) with controlling exogenous shocks is:

$$\Delta X_t = C + \pi_1 \Delta X_{t-1} + \pi_2 \Delta X_{t-2} + ... + \pi_p \Delta X_{t-p} + \varphi D + u_t \quad (4)$$

where ΔX_t is the (Nx1) vector of endogenous variables at time t; ΔX_{t-p} denotes the (Nx1) vector of endogenous variables at time t-p; D is the (3x1) vector of deterministic variables for

controlling exogenous shocks from the domestic unusual circumstances; u_t is the (Nx1) multivariate of white noise error term; and N is the number of endogenous variable in the model.

In addition, VAR is more useful since it is extended to the impulse response function (IRF), which is useful to find the response of output to the shock of any types of government spending. The impulse response function in lag operator form is the following equation:

$$\Delta X_t = \mu + \theta(L)\varepsilon_t \quad (5)$$

The previous is the structural moving average (SMA) representation that ΔX_t is based on infinite moving average of the error term (ε_t) in the structural vector autoregressive model (SVAR). In addition, each elements of parameter θ gives the impulse response of any variables in the system to change in structural error.

IV. Estimated Results

A. Long Term Growth: VECM Results

TABLE III
VECTOR ERROR CORRECTION RESULTS (MODEL1-5)

	Scenario 1	Scenario 2		Scenario 3	
Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Coint eq.1	-0.32	-0.20	0.24***	-0.17	-0.04
Coint eq.2	0.10***	0.31***	-0.00	0.22***	0.23***
Coint eq.3	0.11***	-0.01	0.14***	-0.00	-0.00
Coint eq.4		0.23***	0.06*	0.15***	0.17***
ΔY(lag)	-0.33***	-0.37***	-0.61***	-0.38***	-0.64***
ΔG_{BUD}(lag)	0.99**			0.05**	0.12***
ΔG_{EX}(lag)				0.00**	
ΔG_{QF}(lag)					0.00***
ΔG_{BUD+EX}(lag)		-0.23***			
ΔG_{BUD+QF}(lag)			0.01*		

*,**,*** indicate statistical significance levels , respectively. The dependent variable is per capita GDP growth. Other control variables are not presented to preserve space.

TABLE IV
VECTOR ERROR CORRECTION RESULTS (MODEL6-7)

	Scenario 4	Scenario 5
Variables	Model 6	Model 7
Coint eq.1	-0.03	0.26***
Coint eq.2	-0.00	0.12**
Coint eq.3	0.01***	-0.00
Coint eq.4	0.01	-0.00
ΔY(lag)	-0.86***	-0.91***
ΔG_{BUD}(lag)		0.18***
ΔG_{EX}(lag)		0.00**
ΔG_{QF}(lag)		0.00**
ΔG_{ALL}(lag)	0.02***	

*,**,*** indicate statistical significance levels , respectively. The dependent variable is per capita GDP growth. Other control variables are not presented to preserve space.

Table III shows the VECM results, indicating that all statistically significant error correction adjustment coefficients, implying the convergence to the long-run equilibrium in each specification, are positive. All speed adjustments are positive meaning that when there is an increase in government spending, output will grow faster than its long-run rate to restore government expenditure-output ratio to its long-run mean. All three categories of government expenditures have the potential to promote long-run economic growth. However, the magnitude of budgetary spending is largest while other categories have very small positive impacts on economic growth over the long-term

B. Short-Run Stability

The results focusing on the short-term stability illustrates that only the response of output in budgetary expenditures is persistent. That is, budgetary outlay can stimulate growth for a few first years and will fade out after 3 years. On the other hand, extra-budgetary expenditure and quasi-fiscal outlay have the potential to stimulate economic growth over the short term. An increase in extra-budgetary expenditure can boost economic growth immediately while there is the fluctuation of output during the first two years in response to an increase of quasi-fiscal expenditure, but eventually both of them can stimulate short-run economic growth.

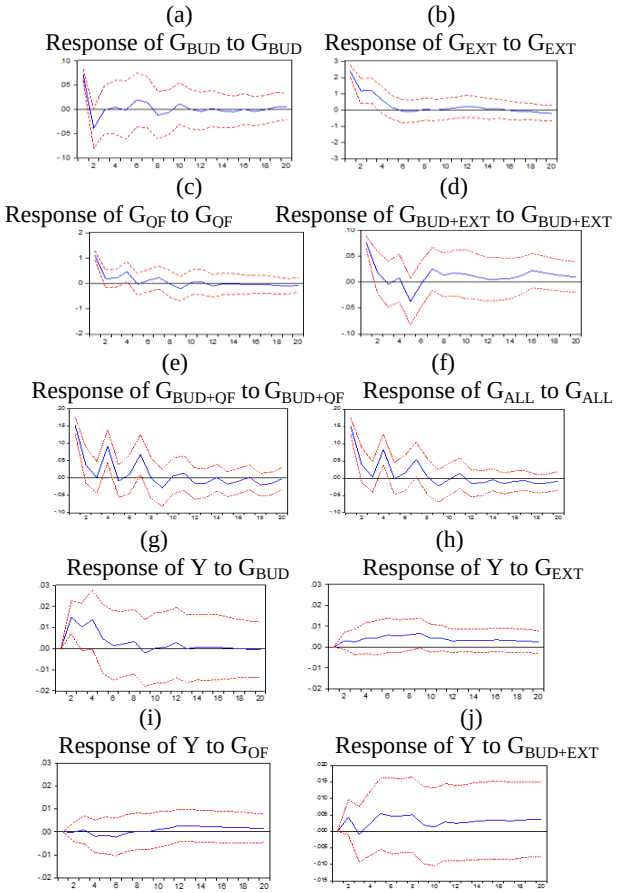

Fig.1 Impulse Response of GDP growth to a one standard deviation spending shock

C. Post Estimation Analysis

To make sure that all VECMs are appropriate for interpreting, first is the stability Diagnostic by using Inverse Roots test of AR Polynomial. The results indicate that Inverse Roots of AR Characteristic Polynomial of all models are inside the unit circle implying that the stability of model. Second is

Residual Diagnostic. That is to test the serial correlation in the residuals of estimation by using LM test. The results indicate that all models cannot reject the null hypothesis that is no serial correlation for all four orders. The other is to check heteroskedasticity by using White test. The result indicates that for all models we cannot reject the null hypothesis that there is no heteroskedasticity problem.

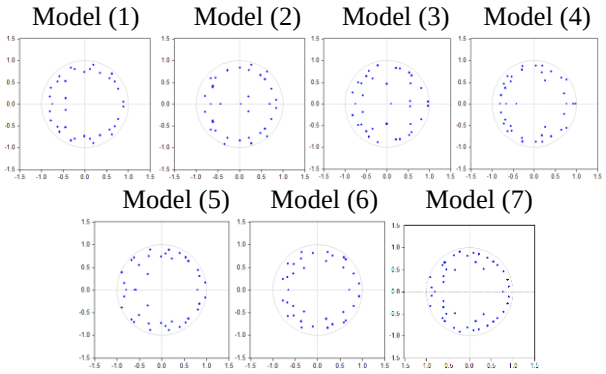

Fig.2 Inverse Roots of AR Characteristic Polynomial

V. Conclusion

Policy implications may be obtained in this study. Firstly, it is appropriate that government will fulfill their policy through budgetary expenditure to stimulate long-run economic growth. One of possible reasons is that the process of budgetary seems more transparent than other categories of government expenditures, which must be approved by congress. It could enhance quality of spending toward to activities having the potential to improve productivity of firms. Secondly, extra-budgetary and quasi-fiscal expenditure should be used only for short-term to push an economy out of recession because in the long-run both of them contribute very little impact on growth, it could lead to fiscal deficits and pressure on higher inflation in the future. Lastly, although quasi-fiscal expenditure can stimulate economic growth over the short term, its impact on output still fluctuated during the first-second quarter after spending. Then, it is better to use extra-budgetary funds instead forcing policies through state enterprises. May be, it comes from the inaccurate size of quasi-fiscal expenditures since there is no censorial account like extra-budgetary outlay. Therefore, for improving transparency government should start forcing state-owned enterprises and specialized financial institutions to create compulsory accounts of quasi-fiscal activities in order to classify which burden resulted from government enforcement to fulfill their policies.

However, two caveats are found in this study. Firstly, there is no account of quasi-fiscal spending over two past decades. Although sometimes governments might not guarantee full debts resulting from quasi-fiscal activities, higher quasi-fiscal spending possibly tends to higher burden as debt guarantee of states-owned enterprises. However, it is better for future researches to confirm the impact of quasi-fiscal outlay on growth when the data are more appropriate. Secondly, there are some kinds of government expenditure that are not included in three categories of this study and also unavailable as quarterly data. For example, the budget for Thai Khem Kang, and the budget for flooding management are amount of money that government directly borrows as a royal enactment. However, this kind of projects has implemented since 2010 and was special plans that are occasionally created. Therefore, it seems appropriate to explore its impact on growth as project by project.

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References

[1] Afonso, A., & Alegre, J. G. (2011). Economic growth and budgetary components: a panel assessment for the EU. Empirical Economics, 41(3), 703-723. http://dx.doi.org/10.1007/s00181-010-0400-9

[2] Engle, R. F., Granger, C. W. J. (1987): Co-integration and error correction: Representation, estimation and testing, Econometrica, 55(2), 251-76. http://dx.doi.org/10.2307/1913236

[3] Granger, C. W. (1969). Investigating causal relations by econometric models and cross-spectral methods. Econometrica: Journal of the

[4] Johansen, S. (1988). Statistical analysis of cointegration vectors. Journal of economic dynamics and control, 12(2), 231-254. http://dx.doi.org/10.1016/0165-1889(88)90041-3

[5] Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. Oxford Bulletin of Economics and statistics, 52(2), 169-210. http://dx.doi.org/10.1111/j.1468-0084.1990.mp52002003.x

[6] Kneller, R., Bleaney, M. F., & Gemmell, N. (1999). Fiscal policy and growth: evidence from OECD countries. Journal of Public Economics, 74(2), 171-190. http://dx.doi.org/10.1016/S0047-2727(99)00022-5

[7] Sims, C. A. (1972). Money, income, and causality. The American Economic Review, 540-552.

[8] Sims, C. A. (1980). Macroeconomics and reality. Econometrica: Journal of the Econometric Society, 1-48. http://dx.doi.org/10.2307/1912017

[9] Fiscal Policy Office (2010). Quasi fiscal activity in Thailand.

[10] Alshahrani, M. S. A., & Alsadiq, M. A. J. (2014). Economic Growth and Government Spending in Saudi Arabia: an Empirical Investigation. International Monetary Fund. http://dx.doi.org/10.5089/9781484348796.001

[11] Carter, J., Craigwell, R., & Lowe, S. (2013). Government Expenditure and Economic Growth in a Small Open Economy: A Disaggregated Approach.

[12] Public debt management section 17 report, (2014). Public debt office.

The author is Thai that was born in Phuket, Thailand in 1990. For my educational background, I graduated the bachelor degree in economics from Thammasat University (Thai program), right now the author am a candidate of M.A. program in economics major from Thammasat University, Thailand (International program).