The Relationship between Government Expenditures and Economic Growth in Thailand

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THE RELATION BETWEEN GOVERNMENT EXPENDITURES AND ECONOMIC GROWTH IN THAILAND

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ABSTRACT

The notion that more government expenditures can stimulate growth is controversial. The causation between government expenditures and economic growth in Thailand was examined using the Granger causality test. There was no cointegration between government expenditures and economic growth. A unidirectional causality from government expenditures to economic growth existed. However, the causality from economic growth to government expenditures was not observed. Further more, estimation results from the ordinary least square confirmed the strong positive impact of government spending on economic growth during the period of investigation.

INTRODUCTION

According to the macroeconomic literature, budget deficits are expansionary to the economy while budget surpluses are contractionary. However, the notion that more government expenditures can stimulate growth is controversial. When considering the appropriate policy measures that stimulate growth, policymakers are usually interested in demand management policies and supply side policies. Demand management policies concentrate on the management of money supply and government expenditures. Controlling money supply will affect the level of liquidity in the financial market, and thus alters private spending. A change in level of government spending directly affects aggregate demand in the economy. Besides the role of export on economic growth, the economic success of the Newly Industrialized countries (NICs) in East Asia has been

often attributed to the role of government. Thailand has strived to achieve an NIC status. However, that goal has not yet been attained.

Economic growth rate reached its peak in 1995 at 15.34 percent (Table 1). Then, it increased at a slower rate until reaching the lower turning point in 1998. This recession registered a negative growth of 2.24 percent as a result of the Asian financial crisis. The sagging economy eventually recovered at a remarkable pace approaching 9.69 percent in 2004 and 9.22 percent in 2005.

[Insert Table 1 about here]

The Thai government realized that fiscal stimulation is deemed necessary in stabilization policy and economic development. As a result, chronic budget deficits were observed from the past up to 1987. The policy has been revised in response to changing economic conditions. From 1988 to 1996, the budget showed a surplus. A budget deficit occurred in 1997, the year of financial crisis, and continued through 2000. While the government has recently monitored its budget deficits, the nominal government expenditures have been steadily increased until the present time. Government expenditures grew at a fast pace of 12.77 percent in 1993, but the rate of increase had gradually declined to 1.53 percent in 1997. Spending increased steadily to 16.29 percent in 2005.

A similar pattern can be seen in money supply (M2). From 1993 to 1999, M2 grew at a decreasing rate from 18.38 to 2.13 percent. The economic slow down prompted the Bank of Thailand to increase money supply at an increasing rate from 3.67 percent in 2000 to 9.22 percent in 2005.

During 1993 and 2005, the average annual growth rates of GDP, government expenditures and money supply were 7.45, 8.92 and 9.07 percent, respectively. Overall, government expenditures and money supply increased steadily every year while economic growth rate presented more dramatic ups and downs.

LITERATURE REVIEW

In earlier empirical studies, Ram (1986), Holmes & Hutton (1990) and Aschauer (1989) found positive relationship between government expenditures and growth. On the contrary, Grier & Tullock (1989) used pooled regression on five-year averaged data in 113 countries to analyze the relationship between cross-country growth and various macroeconomic variables. They found that the mean growth of government share of GDP generally had a negative impact on economic growth. This finding implies that an increase in the government size as measured by a share of government expenditures to GDP hampers economic growth. Barro (1990) also discovered the negative relationship between the size of government and economic growth. Miller & Russek (1997) indicated that debt-financed increases in government expenditure retarded growth. Using the data from 43 developing countries over 20 years, Devarajan, et. al. (1996) found the positive relationship between current government expenditure and economic growth. In addition, the negative relationship between capital expenditure and per-capita growth was also observed.

Recent studies employed cointegration and error correction models to study the relationship between government size and growth. Islam & Nazemzadeh (2001) examined the causal relationship between government size and economic growth using long annual data of the United States. They indicated that the causal linkage was running from economic growth to relative government size. However, Dahurah & Sampath (2001) found no common causal relationship between military spending and growth in 62 countries. Abu-Bader & Abu-Qarn (2003) investigated the causal relationship between government expenditures and economic growth for Egypt, Israel, and Syria. They found that overall government expenditures and growth exhibit bidirectional causality with a negative long-run relationship in Israel and Syria. A unidirectional negative short-run causality from economic growth to government spending was discovered in Egypt. These findings might stem from a military burden in these countries. Kalyoncu & Yucel (2006) used cointegration and casuality test to investigate the relationship between defense and economic growth in Turkey and Greece. The results showed unidirectional causality from economic growth to defense expenditure in Turkey, but not in Greece. However, cointegration between defense expenditure and growth existed in both countries.

The next two sections present methodology and empirical results. The last section provides summary and policy implications.

DATA AND METHODOLOGY

The quarterly data on aggregate real output or real GDP (Y), real government expenditures (G), real money supply by broad definition (M2) during 1993 to 2006 are retrieved from the International Monetary Fund's International Financial Statistics and Thailand National Economic and Social Development Board. M2 is the sum of M1 and quasi-money. The data are analyzed according to the following estimation procedures:

Unit Root Test

The unit root test for stationarity of time series, so called PP test, proposed by Phillips and Perron (1988) is employed prior to cointegration and causality tests. This test determines the existence of a unit root in each series.

The series are examined whether they are stationary or integrated in the same order. If the two variables are non-stationary in level, but stationary in first difference i.e. I(1), cointegration test can be performed. Engle & Granger (1987) discussed the theory of cointegration in details. In brief, cointegration determines if the linear combination of these variables is stationary. When a linear combination of these series exists, the series are cointegrated or have a long-run relationship. Davidson & MacKinnon (1993) provide the critical values for unit root and cointegration tests. When there are more than two variables in the equation, Johansen cointegration test proposed by Johansen & Juselius (1990) is utilized. Even if cointegration does not exist, unit root tests are still helpful in further causality test. Hafer & Kutan (1977) indicated that to appropriately perform the standard Granger causality test, the variables that entered into the system should be stationary even though they were integrated in different order. Furthermore, using the

ordinary least square (OLS) method also requires stationary variables in the estimated equation as generally described in the literature of time series model.

Standard Causality Test

The Granger causality tests are performed by the following two equations:

$$x_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i y_{t-i} + \sum_{i=1}^{k} \beta_i x_{t-i} + \varepsilon_t \qquad (1)$$

and $$y_t = \gamma_0 + \sum_{i=1}^{k} \gamma_i x_{t-i} + \sum_{i=1}^{k} \delta_i y_{t-i} + \nu_t \qquad (2)$$

In (1), $H_O : \alpha_i = 0$ *for* $i = 1,.....,k$ *and* $H_a : \alpha_i \neq 0$ *for at least one* i*, and*
in (2), $H_O : \gamma_i = 0$ *for* $i = 1,.....,k$ *and* $H_a : \gamma_i \neq 0$ *for at least one* i*.*

The variable 'x' Granger causes variable 'y' if the null hypothesis (H_o) in equation (1) is rejected. Similarly, the variable 'y' Granger causes variable 'x' if the null hypothesis in equation (2) is rejected.

The standard Granger causality test developed by Granger (1969 & 1980) is popularly used to test whether past changes in one variable help explain current changes in other variables. Equation (1) is used to test whether 'y' Granger causes 'x' while equation (2) is used to test whether 'x' Granger causes 'y.' The bivariate Granger causality test requires that two variables used in the test must be stationary even though they are not integrated in the same order. However, various economic variables are non-stationary in level. The causality test can be applied even when one variable is stationary in level while the other is stationary in different order. For example, 'x' is stationary in level while 'y' is stationary in first difference. The more sophisticated test of causality is the test within the framework of cointegration and error-correction mechanism. This framework considers the possibility that the long-run relationship of the two variables exists when the lags of one variable affect another variable (see Islam & Nazemzadeh, 2001).

Ordinary Least Square Method

The ordinary least square (OLS) method was employed in the simple lag-adjustment equation with distributed lags of independent variables. The equation below determines the impacts of government expenditures and money supply on output growth.

$$y_t = a_0 + a_1 y_{t-1} + \sum_{i=0}^{k} \alpha_i G_{t-i} + \sum_{i=0}^{k} \beta_i M_{t-i} + e_t \qquad (3)$$

where

- y, growth rate, is the first difference of log of real GDP,
- G is log of real government expenditures,

- M is log of real money supply by broad definition (M2) and
- e is the error term.

EMPIRICAL RESULTS

Unit Root Test

In Table 2, the PP test for unit root reveals that the null hypothesis of unit root in level, with and without trend, is rejected for government expenditures (G) at the 1 percent level of significance. Therefore, the variable G is stationary at level. With respect to real GDP (Y), the probability of accepting the null hypothesis of unit root implies that real GDP is non-stationary in level. However, real GDP first difference (ΔY) is stationary at the 1 percent level of significance. Real money supply (M2) without a linear trend is stationary. As a result, M2 and G are I(0) while Y is I(1). All three series are plotted in Figure 1. The two-step Engle and Granger cointegration test between the two variables i.e. G and Y, can be performed only when two variables are integrated in the same order or I(1). That is they are nonstationary in level but stationary in first difference. Thus, a standard Granger causality test is employed instead.

[Insert Table 2 about here]

[Insert Figure 1 about here]

Causality Test

With no long-run relationship between government expenditures and economic growth, the standard Granger causality test is performed using G variable at level and first difference of real GDP or ΔY. The optimal lag length for the causality test is determined by a vector autoregressive (VAR) form. When government expenditures and economic growth are endogenous variables in an unrestricted VAR, the optimal lag length using Akaike information criterion (AIC, see standard econometrics textbook for detail) is the lowest number which is four in this case. The standard Granger causality test results between government expenditure and growth rate are reported in Table 3.

[Insert Table 3 about here]

The null hypothesis of government spending does not Granger cause economic growth is rejected at the 1 percent level of significance. Thus, unidirectional causality from government expenditures to economic growth exists. On the contrary, the null hypothesis of economic growth does not Granger cause government expenditures is accepted. Therefore, the causality from economic growth to government expenditures is not observed. This result supports the Keynesian view which stipulates that causation runs from government expenditures to growth.

The PP test shows that log of real money supply (M2) is stationary without trend (-5.135, p=0.000), but is non-stationary with trend (-1.015, p=0.917). It can be concluded that real money supply is stationary around its level or I(0). Taking into account of

stationarity property of economic growth, government expenditures and real money supply, cointegration will not exist because the three variables are integrated in different order. Recall that only economic growth is I(1). Therefore, a standard Granger causality test between real money supply and economic growth is performed. The result from Granger causality test shows that real money supply does not Granger cause economic growth with F statistics of 1.107. The probability of accepting the null hypothesis of no causality (p-value) is 0.369. However, economic growth Granger causes real money supply to increase at the 5 percent level of significance or p-value of 0.047 and F statistics of 2.696. In effect, economic growth influences the central bank to accommodate the liquidity in the economy.

Ordinary Least Square Estimation

The estimated results from equation (3) are shown in Table 4. The results show that real economic growth is affected by its lag value, real government expenditures and lag real money supply. All are significant at one percent level. However, one period lag of real money supply imposes a strong negative effect on economic growth. The significant positive effect of real government expenditures on growth is obvious. From over all observation of their coefficient, the negative impact of lag real money supply is offset by the positive impact of lag output growth and real government expenditures and perhaps real money supply itself.

[Insert Table 4 about here]

It may not be unreasonable to say that contemporaneous money (M_t) has an insignificant positive effect on economic growth because it is significant only at the 10 percent level. Normally, this would be considered to be only marginally significant or insignificant.

Although it is difficult to say with certainty about the negative impact of lag real money supply. Is it because of money supply shocks or uncertainty? The inflation rate is relatively low even in the presence of an oil crisis because the Bank of Thailand has set up an inflation target for a long time. Bear in mind that money supply does not Granger cause economic growth, but economic growth Granger causes money supply. When the international investment funds were interested in Thai investments, those foreign flows could overwhelm domestic monetary policy in a small open economy with a relatively small reserves position. Past money supply, particularly unanticipated changes in money supply such as capital inflows, creates uncertainty. Uncertainty increases risk which, in turn, reduces economic activity.

SUMMARY AND POLICY IMPLICATIONS

Even though money supply is included as part of demand management policies, the focus of this study is to examine the relationship between government expenditures and economic growth. Several researchers use Granger causality test to determine whether government expenditures cause economic growth or economic growth causes government expenditures. Previous empirical studies give different conclusions. The

results from Thailand show that aggregate government expenditures cause economic growth, but economic growth does not cause government expenditures to expand. In other words, there is a unidirectional causality between government expenditures and economic growth. Further investigation using the ordinary least square method shows that government spending and its one-period lag variable impose a highly significant impact on economic growth, which confirms the results from causality test.

Further research might include the disaggregate data of military spending and non-military spending to compare the impacts of military and non-military expenditures. These data from 1993 to 2006 are not available for this paper. Even without disaggregated data, the positive impact of government expenditures on economic growth is confirmed. The findings here support the Keynesian approach which stipulates that causality runs from government spending to economic growth. In essence, this paper provides relevant information for policy makers to pursue appropriate demand management policies and to develop action plans in response to the change in economy and political climates.

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Table 1 Selected Macroeconomic Variables			
Year	Economic Growth	Government Expenditure (trillions, Baht)	Money Supply (trillions, Baht)
1993	11.81	0.316	2.507
1994	14.66	0.354	2.829
1995	15.34	0.414	3.311
1996	10.15	0.470	3.727
1997	2.64	0.477	4.339
1998	-2.24	0.512	4.753
1999	0.23	0.533	4.855
2000	6.16	0.558	5.033
2001	4.28	0.581	5.244
2002	6.18	0.604	5.379
2003	8.78	0.635	5.642
2004	9.69	0.721	5.948
2005	9.22	0.839	6.439
Source	International Monetary Fund's International Financial Statistics		

Table 2 Test for Unit Root		
Variables	PP Statistic	
	Without Trend	With Trend
Real Government Expenditures (G)	-4.357 [2] (0.001)	-9.267 [28] (0.000)
Real Money Supply (M2)	-5.513 [17] (0.022)	-1.015 [46] (0.917)
Real GDP (Y)	-1.509 [28] (0.520)	-2.424 [10] (0.363)
Growth Rate (ΔY)	-6.054 [23] (0.000)	-5.911 [23] (0.000)
Note: The number in bracket is the optimal bandwidth determined by Newey-West using Bartlett Kernel. The number in parenthesis is the probability of accepting the null hypothesis of unit root provided by MacKinnon (1996).		

Figure 1
Movement in Economic Growth, Government Expenditures (G) and Money Supply (M)

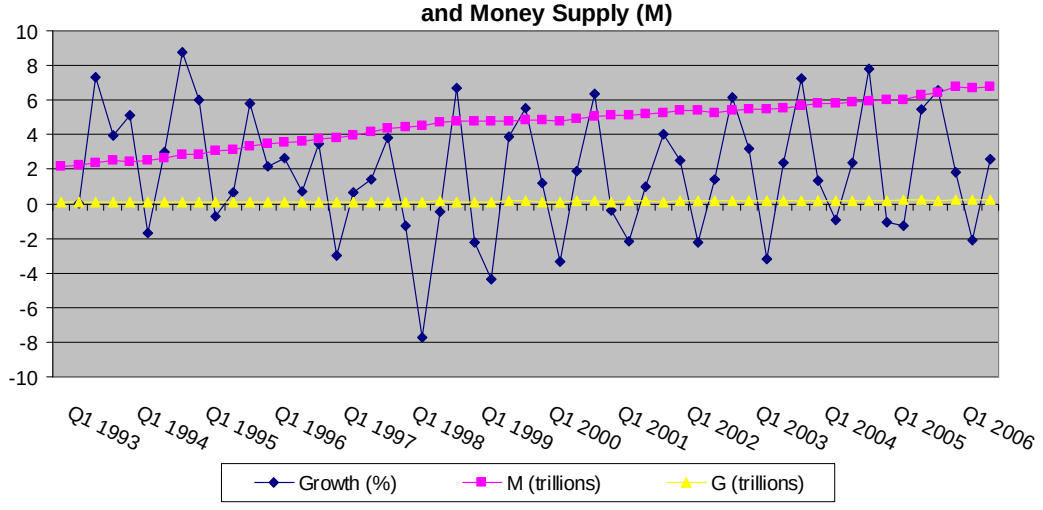

Table 3 Standard Causality Test Results		
Direction of Causation	F Statistic	P-value
From Government Expenditures to Economic Growth	4.867	0.004
From Economic Growth to Government Expenditures	0.244	0.911
From Real Money Supply to Economic Growth	1.107	0.369
From Economic Growth to Real Money Supply	2.696	0.047

Table 4 OLS Coefficient Estimates						
Dependent	Independent Variables					
y_t	Constant	y_{t-1}	G_t	G_{t-1}	M_t	M_{t-1}
Coefficient	0.081	0.314***	0.143***	0.264***	0.324	-0.549***
t-values	0.420	2.584	2.797	5.129	1.694	-3.221
$R^2 = 0.599$			F = 11.934		D-W = 1.853	
Notes	*** denotes significance at 1 percent.					