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Impact of Government Spending on Private Consumption and on the Economy: The Case of Thailand

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Abstract**—**Government spending is categorized into consumption spending and capital spending. Three categories of private consumption are used: food consumption, nonfood consumption, and services consumption. The estimated model indicates substitution effects of government consumption spending on budget shares of private nonfood consumption and of government capital spending on budget share of private food consumption. However, the results do not indicate whether the negative effects of changes in the budget shares of the nonfood and the food consumption equates to reduce total private consumption. The concept of aggregate demand comprising consumption, investment, government spending (consumption spending and capital spending), export, and import are used to estimate their relationship by using the Vector Error Correction Mechanism. The study found no effect of government capital spending on either the private consumption or the growth of GDP while the government consumption spending has negative effect on the growth of GDP.

Keywords**—** complementary effect, government capital spending, government consumption spending, private consumption on food, nonfood, and services, substitution effect, Vector Error Correction Mechanism.

I. Introduction

THE world financial crisis recently has caused many countries to pay attention to governmental stimulus measures that were designed to stimulate the economy and to combat the recession. The supporting role of the government at the time of the crisis revolved around the fact that the private sector has little ability to purchase. The Thai government announced few fiscal stimulus packages when the economy showed a sign of recession in 2008. Consequently, the fiscal budget ran into deficit-based since then. Government expenditure rose significantly from 12 per cent of GDP in 2008 to 15 per cent of GDP in 2009 (Table 1). The expansionary fiscal policy caused the budget to become deficit-based by 24.2 per cent of the total revenue in 2009 compared to only 2.9 per cent in 2005. Although most economists see the necessity of government spending measures to revive the economy, it is doubtful that increased government spending can really help stimulate the economy so that it will grow more than it otherwise.

Theoretically, the outcome of increased government spending policy will depend on several conditions and economic situations in each particular country such as degree of price rigidity, deficit financing method, future tax expectations, liquidity conditions, and consumers' expectations of the economy. This study examines empirical evidence of how the government spending affects private consumption (by how much and in which direction), and finally to accelerate economic growth.

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TABLE I
Government Expenditure, Tax Revenue (mil. baht), and Private Consumption

Year	Government Expenditure/GDP (%)	Private Consumption/GDP (%)	Tax/GDP(%)
1993	9.98	54.67	15.63
1996	10.18	53.78	18.21
1998	11.08	54.15	15.29
1999	11.50	55.96	14.22
2000	11.33	56.13	14.73
2005	11.89	57.25	17.53
2008p	12.43	55.07	17.90
2009Q1p	12.83	54.78	
2009Q2p	13.18	56.44	
2009Q3p	15.05	55.22	

Source: Author's calculation from National Economic and Social Development Board, *National Income Account*, Bangkok, various issues.

The structure of this paper is organized as follows: Section Two discusses the related theories, related literatures, and econometric models to be used in the study. Section Three presents the empirical results of the study. Microeconomic perspective of demand for private consumption and the impact of government spending on private consumption is estimated and examined. To investigate the macroeconomic impact, the study along the line of aggregate demand compositions will also be estimated for the relationship between government spending, private consumption spending, and the overall economy. The last section- Section Four - briefly concludes all findings.

II. Related Economic Literatures and the Econometric Model

Basically, the economics problem can be analyzed via two major points of view: macroeconomic and microeconomic. Finding outcomes from both aspects are expected to give

complete examination on the impact of government spending. Therefore, both microeconomic and macroeconomic aspects are employed and analyzed in this study.

In microeconomics theory, consumer demand can well be used to investigate the effect of government spending in the study. Pieroni (2009) [1] investigates endogenous consumers' decision, regarding private expenditure, and exogenous public defense and civilian spending. The study found a negative impact of defense spending upon private consumption. Two lines of reasoning can explain this negative impact. First, increased public resource diverted into defense spending means smaller government purchases. The government will have to increase borrowing or raise taxes from the private sector. The trade-off between defense and private consumption (as well as investment under fixed budget constraints) is therefore possible. Second, during the peacetime, reduction of taxes will be credited back to taxpayers for private consumption. Therefore the impact of both defense and civilian government spending on private categories of consumption produces contemporaneous complementary and substitution effects.

Pieroni employed cost function of the Almost Ideal Demand System (AIDS) approach. This long-run dynamic demand model included adjustment response over time to changes in relative prices and to exogenous shocks, verified by specifying a Vector Error Correction Mechanism model.

In microeconomic perspective, the Almost Ideal Demand System (AIDS) model of cost function initiated by Deaton and Muellbauer (1980) [2] is used in this study. The model conforms to the equilibrium of consumer choices under budget constraint. It is recognized as long-run static demand model of consumption equations system. Generally, a flexible translogarithmic functional form of cost function is used in the estimation of consumer demand in the study. The Almost Ideal Demand System of cost function can be expressed as in Equation (1).

$$\ln C(U,P) = \alpha_0 + \sum_j^n \alpha_j \ln P_j + \frac{1}{2}\sum_j^n \sum_k^m \gamma_{jk}^* \ln P_j \ln P_k + U\beta_0 \prod_j^n P_j^{\beta_j} \quad (1)$$

Where C = cost
U = utility
P = prices
j = 1, 2, …, n
k = 1, 2, …, m

The equation shows that the cost C(U, P) is linearly homogeneous in prices (P) provided that

$$\sum_j^n \alpha_j = 1, \sum_k^m \gamma_{jk}^* = \sum_j^n \gamma_{jk}^* = \sum_j^n \beta_j = 0 \quad (2)$$

And symmetry,

$$\gamma_{jk}^* = \gamma_{kj}^* \quad (3)$$

Applying Shepherd Lemma to Equation (1) gives budget share of consumption of good j (w_j). Therefore the budget shares of consumer demand for good j can be written as function of prices and utility (Equation (4)).

$$w_j = \alpha_j + \sum_k^m \gamma_{jk} \ln P_k + \beta_j U \beta_0 \Pi P_j^{\beta_j} \quad (4)$$

Where

$$\gamma_{jk} = \frac{1}{2}(\gamma_{jk}^* + \gamma_{kj}^*)$$

The linearly approximated Almost Ideal Demand System function in the form of budget shares can then be derived (Deaton and Muellbauer, 1980: 313) [2]. By given a utility maximizing consumer, total expenditure (X) is equal to consumption and is inverted to give the indirect utility function, U is a function of P and X, as written in Equation (5).

$$w_j = \alpha_j + \sum_k^m \gamma_{jk} \ln P_k + \beta_j \ln(\frac{X}{P}) \quad (5)$$

Where, X/P is real expenditure on all goods. The restriction according to the consumer demand theory known as adding up, homogeneity of degree zero in all prices and income, and symmetry condition are held.

Price index (P) can be defined as in Equation (6).

$$\ln P = \alpha_0 + \sum_j \alpha_j \ln P_j + \frac{1}{2}\sum_i \sum_j \gamma_{ji} \ln P_j \ln P_i \quad (6)$$

The price index (P) is approximated by using Stone's geometric price index as in Equation (7) (Akmal and Stern, 2001) [3].

$$\ln P = \sum_j w_j \ln P_j \quad (7)$$

From Equation (7) above, own price elasticity (ε_{jj}), cross price elasticity (ε_{jk}), and income elasticity (η_j) of consumer demand for good j can be calculated as follows.

$$\varepsilon_{jj} = -1 + \frac{\gamma_{jk}}{w_j} - \beta_j \quad (8)$$

$$\varepsilon_{jk} = \frac{\gamma_{jk}}{w_j} - \beta_j(\frac{w_K}{w_j}) \quad (9)$$

$$\eta_j = 1 + \frac{\beta_j}{w_j} \quad (10)$$

j, k = 1, 2, 3, …, n; j ≠ k

The Almost Ideal Demand System model provides a structured framework based on the consumer demand theory and the long-run static equilibrium. The more flexible dynamic type of the demand system for non stationary time series can be applied to the system demand model using the Error Correction Mechanism model and can well be estimated long-run coefficients of the Almost Ideal Demand System (Anderson and Blundell (1993) [4], Blundell (1988) [5], Pesaran and Shin (1999) [6]).

Pattern of consumer demand was also examined by Tridimas (2000) [7] using data of Greece during 1958-1994. He introduced short-run dynamics into the demand functions of the study due to the assumption of habit formation effects and allowed serial correlation in the error terms of the demand

function to be incorporated into the model. The general dynamic Almost Ideal Demand System model for 4 categories of consumer nondurable good was estimated. The study investigated a search over the appropriate model to test the theory of consumer demand, the appropriate demand structure, and the empirical validity of the constraints of homogeneity and symmetry. The specification test rejected the static Almost Ideal Demand System model. The general dynamic model of Almost Ideal Demand System fitted the data better than that of the Rotterdam functional form model. The restrictions of homogeneity and symmetry of the dynamic demand function also were not rejected.

In macroeconomy, the government expenditure is a significant element of the economy's aggregate demand. The government spending is an important instrument of fiscal policy to influence the economy and it is effective particularly during recessions, when the economy is suffering from severe unemployment and low interest rates so there is no crowding-out effects on the private sector and investment. Under full employment and limited resources, an increase in government spending can crowd out other demand elements. Arguably, under the dynamic approach, the economy can grow steadily, so it is possible that the increased government spending can have no crowding-out effect on the elements of aggregate demand.

Many empirical studies of macro impact on government spending were based on the Vector Autoregressive model of major macroeconomic variables. Numbers of the studies were focused on the estimate of fiscal multiplier and the effect of government spending on output. The multiplier is found to be small if interest rates rise in response to increases in inflation as a result of expansionary government spending (Woodford 2010) [8]. On the other hand, government spending can be effective if prices and wages can adjust slowly to the spending. The estimated multiplier effect of government spending on GDP is found to be larger than one (Fatas and Mihof, (2001) [9]). They also found that the effect of the government spending on investment is insignificant.

Blanchard and Perotti (1999) [10] used data pertinent to the United States during the postwar period for Vector Autoregrressive specification of taxes, government spending and GDP in real per capita terms and showed that government spending shocks can have positive effect on output but the spending multiplier is rather small. On the contrary, they found a strong negative effect on investment spending. Heppke-Falk, Tenhofen and Wolff (2006) [11] used Structural Vector Autoregressive approach to investigate short-run effects of fiscal policy shocks on the German economy and found that the shocks could have an impact on output and private consumption in low statistical significance and the effect of the government expenditure was short-lived. Werner (2004) [12] modified the Fisher equation (of the monetarist model) to evaluate the Japanese economy. He discussed various issues of why fiscal policy is either ineffective or effective, such as real interest rates based upon crowding-out effect and Ricardian equivalence, the condition when debt is required to be fully paid-off in the future. The general Autoregressive Distributed Lag model of nominal GDP growth that included money supply, wholesale price index, and various types of interest rate as explanatory variables was used to estimate nominal GDP growth models. To test the ineffective fiscal policy, he proceeded to substitute the empirical formulation of GDP on the left-hand side of the equation by consumption, investment and net export and examined whether the coefficient of government spending on the right hand side be equal to one. His modified Fisher model was empirically supporting his argument that private demand is lowered by one yen proportionately to every single one yen increases in government spending.

Fiscal policy can be ineffective in an open economy if under flexible exchange rate system and with perfect capital mobility. Once the interest rate increases causing capital inflow to rise; exchange rate appreciates. Wealth effect on consumption can also explain the reduction in consumption if an increase in interest rate due to expansionary fiscal policy reduces financial asset value. Capet (2004) [13] showed in his review of the literatures that many studies using structural macro models including studies of MULTIMOD of IMF, QUEST of European Commission, and NiGEM of NIESR for Germany, France, and Italy found that government expenditure multiplier has no long-run multiplier effect except that of INTERLINK of OECD that found a negative long-run effect. Positive effect of the government expenditure multiplier could only be seen in the short-run (in one year).

For Vector Autoregressive model of macroeconomic perspective, the basic macroeconomic relationship of the aggregate demand composition is used in this study to estimate the relationship between the GDP, private consumption, import and export while government spending is exogenously given. It can be written as Equation (11) below.

$$y_t = A_0 + \sum_{i=1}^{P} A_i y_{t-i} + \sum_j \Psi_j x_{jt} + \varepsilon_t \quad (11)$$

Vector $\mathbf{y}_t$ is $\begin{bmatrix} GDP_t \\ PRC_t \\ INVEST_t \\ EX_t \\ IM_t \end{bmatrix}$; and $\mathbf{x}_t$ is vector of exogenous variables $\begin{bmatrix} GC_t \\ GK_t \end{bmatrix}$,

Here, j = 1 (GC), 2 (GK).

GDP, PRC, INVEST, EX, and IM are output, private consumption, investment, export and import respectively. Here, $\mathbf{x}_t$ or GC and GK are government consumption spending and government capital spending, respectively. All variables are used in logarithmic form for simple interpretation of the result. These additional exogenous variables ($\mathbf{x}_t$) allow measurement of the effect of the government spending on the endogenous variables, $\mathbf{y}_t$, especially attention on the GDP, and on the private consumption.

For any stable VAR (P), the root of this equation must lie within the unit circle.

$$| I - A_1 Z - A_2 Z^2 - ... - A_p Z^P | = 0 \quad (12)$$

Where Z is the root of this equation and all $\mathbf{y}_t$ are Integrated process of order 0.

In case if $\mathbf{y}_t$ is Integrated process of order 1 and no cointegration exists, it is not expected to have long-run relationship between them. The first difference of Equation (11) will be the most suitable model. If all $\mathbf{y}_t$ are Integrated process of order 1, the system of this equations exists long-run relationship at least 1 relation of which it can be written as equation (13) below.

$$\Delta y_t = A_0 - \alpha Z_{t-1} + \sum_{i=1}^{P-1} \Gamma_i \Delta y_{t-i} + \Psi \Delta x_t + \varepsilon_t \quad (13)$$

Or,

$$\Delta y_t = A_0 - \alpha \beta^{/} y_{t-1} + \sum_{i=1}^{P-1} \Gamma_i \Delta y_{t-i} + \Psi \Delta x_t + \varepsilon_t \quad (14)$$

Where

$$\Pi = \alpha \beta^{/} \quad (15)$$

Rank ($\prod$) = r; r is cointegrating vectors (β)

III. The Empirical Results

All variables are used in real terms (valued in constant price). Quarterly data drawn from the National Income Account of Thailand during 1993:1 and 2009:3 is used in the model estimation. Government spending is an exogenous variable so as to see the impact of its change on the other endogenous variables. In this study, government spending is composed of government consumption spending and government capital spending. Data of public gross fixed capital formation of construction and equipment is used for government capital spending.

In microeconomic consumption study, private consumption consists of private food consumption, private nonfood consumption, and private consumption of services. The microeconomic consumer demand system of equations used in the study can be written along with the dynamic Almost Ideal Demand System model as in Equation (16) below. In the estimation of the microeconomic consumer demand model here, both types of the government spending (GC and GK) are exogenous in the consumption model in order to examine the effect of them on the private consumption, according to the main purpose of the study.

$$w_j = \alpha_j + \sum_{k}^{3} \gamma_{jk} \ln P_k + \beta_j \ln(\frac{E}{P}) + \psi_1 \ln(GC) + \psi_2 \ln(GK) + \mu_j \quad (16)$$

Where

w_j = budget share of the private consumption on j

GC = government consumption spending

GK = government capital spending

P = prices

E = total expenditure per head

j, k = 1 (private food consumption: FD), 2 (private nonfood consumption, NF) and 3 (private consumption on services, SV).

As total of the budget share is one, the only two out of the three equations of the budget share of private food consumption (FD) and of private nonfood consumption (NF) are used in the estimation. The homogeneity degree zero property of the microeconomic consumer demand requires relative prices of food and nonfood with respect to the services price to be utilized as explanatory variables in the model. The system of equations to be estimated is therefore written as in Equation (17).

$$w_j = \alpha_j + \sum_{j=1}^{2} \gamma_{jk} \ln \frac{P_j}{P_k} + \beta_j \ln(\frac{E}{P}) + \psi_1 \ln GC + \psi_2 \ln GK + \mu_j \quad (17)$$

Here, P_k is price of services.

j = 1 (price of food), 2 (price of nonfood)

The Vector Error Correction Mechanism approach is employed in the estimation for the dynamic Almost Ideal Demand System equations. In the Vector Error Correction Mechanism estimation, the study also imposed the symmetry property of the coefficients as the restriction along the line of the consumer demand function properties in microeconomics theory as in Equation (3). Own price elasticity, cross-price elasticity, and income elasticity of food, nonfood, and services can then be calculated using the estimated budget share equation (17).

All variables were tested and found unit root while the first difference of them were found stationary. All series are said to be I (1) (Table A1 in Appendix). The Vector Autoregressive equation system of the model (17) was firstly examined for the preferred lag length using the statistical standard criteria; i.e., LR Statistic, Final Prediction Error (FPE), Akaike Information Criterion, Schwarz Information Criterion, and Hannan Quinn Information Criterion by selecting the longest significant lag length among all the criteria. The test indicates 5 lags to be used in the estimated model. The cointegrating rank was tested and cointegrating equations were then estimated. The study selected the case of cointegrating equation estimation under the level data and linear trend in the cointegrating specification as these variables exhibit trend over time. In this case, both the Trace Statistic and the Max-Eigen Statistic indicate 3 cointegrating vectors. Note however that the critical values calculated here (using EVIEWS) assume no exogenous series; it does not account for these exogenous variables. The number of significant cointegrating equations reported is therefore not very reliable. Two meaningful cointegrating equations (the budget share of food consumption and the budget share of the nonfood consumption) are estimated and shown below (Table2). Own price elasticity, cross price elasticity, and income elasticity of food, nonfood, and services can then be calculated using Equation (8) – (10) (Table 3). Equation of the budget share of the private consumption on services can be derived using the restriction conditions.

To test whether the estimated demand model of Equation

(17) after being imposed all restrictions of Equation (2) and (3) are significant, the LR test is used. The estimated LR statistic of Chi Squared distribution is 0.1605 (Prob. = 0.6887); the null hypothesis of the restrictions cannot be rejected. The study concludes that the estimated VECM model of Almost Ideal Demand System has all the properties of the microeconomic demand function.

The result of model estimation conforms to all the properties of consumer demand theory. The restrictions are imposed into the model in-line with the properties of the microeconomic demand function and all conditions cannot be rejected by statistical test. The estimated consumption equation is therefore ensured to represent the consumer demand function.

Own price elasticities of the consumer demand are found to be negative and inelastic for food (-0.2674), negative and about unitary elastic for nonfood (-1.0982), but positive and inelastic (0.0217) for services. Unexpected positive and inelastic demand for services consumption indicates services to be a kind of special goods for the Thai people in the sense that the demand for services slightly increase if the price rises and vice versa.

TABLE II
THE RESULT OF VECM ESTIMATION OF THE EQUATION (17)
Lag length = 5, Trace Statistic indicates 3 cointegrating equations, Max-Eigen Statistic indicates 3 cointegrating equations
Trace Statistic at most 2 = 56.8598 Critical value = 42.9153 at 5% significance level [prob = 0.0012]; Max-Eigen Statistic at most 2 = 32.7850 Critical value = 25.8232 at 5% significance level [prob = 0.0051]

Coefficients\ Cointegrating equation ($\alpha\beta'$)	WFD_{t-1} (1)	WNF_{t-1} (2)
WFD_{t-1}	1.0000	0.0000
WNF_{t-1}	0.0000	1.0000
$\ln(PFD/PSV)_{t-1}$	-0.1300*	-0.0312****
(t ratio)	[-7.7165]	[-1.5371]
$\ln(PNF/PSV)_{t-1}$	-0.0312****	-0.0758**
(t ratio)	[-1.5371]	[-1.9559]
$\ln(E/P)_{t-1}$	0.1196*	-0.2542*
(t ratio)	[11.8863]	[-14.7582]
Trend	-0.0004*	0.0017*
(t ratio)	[-4.8172]	[11.9778]
C	-0.4047	-0.1168
Exogenous variables (Ψ)		
$\ln(GC_t)$	0.0103	-0.0213**
(t ratio)	[1.0834]	[-1.8936]
$\ln(GK_t)$	-0.0090****	0.0086
(t ratio)	[-1.4295]	[1.1498]

Source: Author's estimation
* means 2.5% of two-tailed significant level, ** means 5% of two-tailed significant level, and *** means 10% of two-tailed significant level, **** means 20% of two-tailed significant level.

Income effects of food and services are found to be inelastic implying that demand for these two goods does not increase as much with the same proportion when consumers' income increases. By comparing these two types of consumption, the income elasticity of demand for nonfood is found to be highly elastic (greater than one). The finding implies that along with the continual growth of the economy, the private consumption share of nonfood is relatively larger compared with the other two consumption items (given that relative prices among them remain unchanged). Relatively higher income elasticity of demand consumption for nonfood suggests that the budget share of nonfood consumption fell significantly during the economic crisis (1997-1999) and it drastically increased after the economy recovered. It is noted (as the result of the estimation suggests) that the price elasticity of demand consumption for services and the income elasticity of demand for services are both positive and small; the budget share of services consumption is observed to be slightly higher throughout the period of the study (Figure 1).

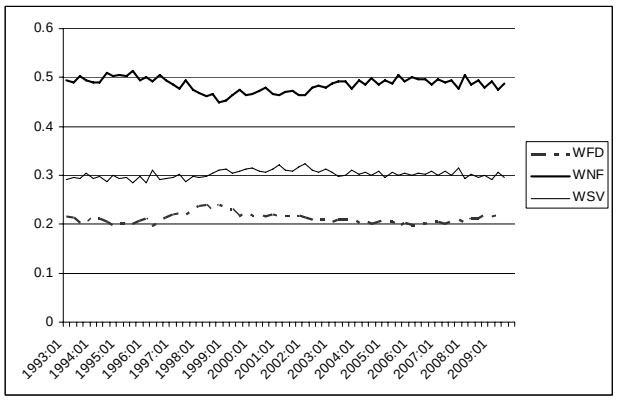

Fig. 1 The budget shares of consumption on food, nonfood, and services

The estimated cross price elasticities of demand suggest that services is complementary goods for food but nonfood is substitution goods for food. Both food and services are complementary goods for nonfood. Both food and nonfood are complementary goods for services. To sum up these findings, almost all goods are found to be complementary except for nonfood that is substituting consumption for food. The findings suggest when the price of any good rises, there will be less demand for all those complementary goods, except for the case of nonfood (when its price rises; the demand for nonfood consumption will fall but the demand for food will rise).

TABLE III
ESTIMATED AVERAGE ELASTICITIES OF CONSUMER DEMAND FOR FOOD (FD), NONFOOD (NF), AND SERVICES (SV)

Elasticity \ With respect to	FD	NF	SV
Price elasticity of FD	**-0.2674**	0.4211	-0.5900
Price Elasticity of NF	-0.0467	**-1.0982**	-0.3788
Price Elasticity of SV	-0.4387	-0.1377	**0.0217**
Income Elasticity	0.4361	1.5237	0.5547

Source: Author's calculation

Regarding the effect of government spending on private consumption, the model estimation indicates the substitution impact (negative effect) on private consumption spending. Government consumption spending is found to be substituting private nonfood consumption. A one per cent increase in government consumption spending ($\Delta\ln(GC)$) will reduce the

change of budget share of private nonfood consumption (Δd(WNF)) by 0.02 point. Furthermore, government capital spending is found to be substituting private food consumption. A one per cent increase in government capital spending (Δln(GK)) will reduce the change of budget share of the private food consumption (Δd(WFD)) by 0.009 point. The mentioned findings referred to the effects on (negative) changes in the budget shares slope, however it is hard to tell whether (and by how much) the amount of private consumption would change. Although the consumption shares of nonfood and of food account for about 70 per cent of total consumption, it cannot be concluded that the amount of consumption will fall due to the increased government spending effect since total consumption growth is not yet known.

In general, the microeconomic consumption model found negative impacts of government spending on private spending in terms of consumers' budget share. Nevertheless the finding of the microeconomic study is inadequate to conclude the government spending effect on the aggregate consumption and the macroeconomy. Microeconomic consumer demand analysis therefore indicates changes in component structure of aggregate expenditure in the economy as a result of the government spending policy. The overall impact can be examined by its macro effect of the government spending on the components of the aggregate demand expenditure and the GDP. The macroeconomic impact study is therefore taken to examine the aggregate effect of whether the government spending crowds out the private consumption and its impact on the overall economy (GDP).

In the estimation of macroeconomic relationship between macroeconomic variables, the Vector Error Correction Mechanism model is used in the study as written in Equation (18) below. Both types of the government spending (GC and GK) are exogenous in the consumption model.

$$\begin{bmatrix} \Delta\ln(GDP)_t \\ \Delta\ln(PRC)_t \\ \Delta\ln(INVEST)_t \\ \Delta\ln(IM)_t \\ \Delta\ln(EX)_t \end{bmatrix} = A_0 - \alpha\beta' \begin{bmatrix} \ln(GDP)_{t-1} \\ \ln(PRC)_{t-1} \\ \ln(INVEST)_{t-1} \\ \ln(IM)_{t-1} \\ \ln(EX)_{t-1} \end{bmatrix}_t + \sum_{i=1}^{p-1} \Gamma_i \begin{bmatrix} \Delta\ln(GDP)_{t-i} \\ \Delta\ln(PRC)_{t-i} \\ \Delta\ln(INVEST)_{t-i} \\ \Delta\ln(IM)_{t-i} \\ \Delta\ln(EX)_{t-i} \end{bmatrix} + \varphi \begin{bmatrix} \Delta\ln(GC)_t \\ \Delta\ln(GK)_t \end{bmatrix} + \varepsilon \quad (18)$$

Where

GDP = gross Domestic Product

PRC = private consumption

INVEST = investment spending

IM = import

EX = export

GC = government consumption spending

GK = government capital spending

As mention above, all the variables were tested and found unit root while their first differences were found stationary. All series are said to be I(1). The Vector Autoregressive equation system of the model was firstly examined for the preferred lag length using the various statistical standard criteria. The test indicates 5 lags to be used in the model estimation. The study selected the case of cointegrating equation estimation under the level data and linear trend in the cointegrating specification. The Trace Statistic indicates 3 cointegrating vectors while the Max-Eigen Statistic indicates 2 coinetgrating vectors. Two meaningful cointegrating equations (of the GDP and of the private consumption) from the estimation are shown below (Table 4). In case of the GDP cointegrating equation, the study estimated for both cases of cointegration: exclusion of the private consumption and inclusion of the private consumption; so that the case of inclusion of private consumption can be comparable with the aggregate demand relation in macroeconomics theory.

The result of the macro relation study indicates (from the consumption cointegrating equation) that both government

TABLE IV
Macro relation of impact of the government spending on consumption and GDP
Lag length = 5, Trace Statistic indicates 3 cointegrating equations, Max-Eigen Statistic indicates 2 cointegrating equations
Trace Statistic at most 2 = 48.7110 Critical value = 42.9152 at 5% significance level [prob = 0.0119]; Max-Eigen Statistic at most 1 = 41.5210 Critical value = 33.1183 at 5% significance level [prob = 0.0.0027]

Cointegrating equation ($\alpha\beta'$)	ln (GDP_{t-1}) (1)		$Ln(PRC_{t-1})$ (2)
$\ln(GDP_{t-1})$	1.0000	1.0000	0.0000
$\ln(PRC_{t-1})$	-0.5861*	0.0000	1.0000
(t ratio)	[-4.0659]		
$\ln(INVEST_{t-1})$	-0.5867*	-0.5558*	0.0529
(t ratio)	[-12.9035]	[-7.8001]	[0.5081]
$\ln(IM_{t-1})$	1.2152*	0.9837*	-0.3950***
(t ratio)	[11.8594]	[5.7168]	[-1.5711]
$\ln(EX_{t-1})$	-1.3801*	-1.1130*	0.4556**
(t ratio)	[-12.9488]	[-6.1304]	[1.7176]
Trend	0.0049*	-0.0015	-0.0110*
(t ratio)	[3.3258]	[-0.8141]	[-4.0325]
C	3.4271	-4.9011	-14.2092
Exogenous variables (Ψ)			
$\Delta\ln(GC_t)$	-0.1087*	-0.1127*	-0.0441
(t ratio)	[-1.8590]	[-1.9697]	[-1.1514]
$\Delta\ln(GK_t)$	0.0203	0.0178	-0.0070
(t ratio)	[0.7814]	[0.7023]	[-0.4125]

Source: Author's estimationon.

* means 2.5% of two-tailed significant level, ** means 5% of two-tailed significant level, and *** means 10% of two-tailed significant level

consumption spending and government capital spending do not have any significant impact on private consumption, neither substitution effect nor complementary effect. This implies that there is no crowd-out effect on private consumption. However, (from the GDP cointegrating equation) government consumption spending does have significant substitution impact (negative impact) on the GDP. A one per cent increase in growth of government consumption spending will lower the GDP by 0.11 per cent. The rapidly expansion of government consumption causes slowdown growth of the economy. Besides, import leads to increase in private consumption while export leads to lower private consumption. Consumption and export are substitutable components of expenditure. Export of the Thai economy is

partly a portion of production apart from those produced for domestic consumption. Moreover, among all expenditure components of the GDP (from the GDP cointegrating equation), export is the largest positive influential factor (in percentage points) of the change in GDP growth. In the other words (among the demand expenditure), export is found to be the most influential factor in stimulating the Thai economy. This equivalently says that the world economy (the world demand) is essential to the Thai economic growth.

It should be noted that the overall result of the estimation is consistent with the relation of the aggregate demand composition; i.e., the first cointegrating equation of the GDP indicates significant effects of the positive impact of the private consumption, positive impact of the investment, negative impact of the import and positive impact of the export on the GDP. Nevertheless, both types of government spending are not found to significantly crowd out the aggregate private consumption. But government consumption spending is found to reduce the GDP growth. This finding of slower GDP growth is consistent with the current economic conditions in Thailand, where it is experiencing full employment (unemployment rate approximately 1 per cent) with flexibility in prices and exchange rate, and capital mobility.

IV. CONCLUSION

The role of government spending has received a special attention recently since after the world financial problem due to the fact that the private sector and businesses have little ability to purchase and invest. The Thai government has announced few fiscal stimulus packages when the economy began showing the signs of recession in 2008. Consequently, the fiscal budget has shifted from a surplus previously into deficit from then on. Although most economists perceive the necessity of government spending measures to revive the economy, it is doubtful that increased government spending can really help stimulate the economy so that it will grow more than otherwise. Theoretically, the effectiveness of government spending policy depends very much on several specific conditions and economic situations. This study investigated empirical findings (whether the government spending affects the private consumption and the GDP, by how much, and in which direction).

Microeconomic approach of the consumer demand is firstly estimated to examine (in detail) the impact of government spending on private consumption. The estimated consumer demand however is inadequate to conclude the effect of government spending on aggregate consumption and the economy. The macroeconomic study is therefore taken to examine the effect of whether (and how much) government spending crowds out private spending and the overall economy (GDP). Macroeconomic analysis of aggregate demand compositions is investigated for its relationship between government spending, private consumption spending, and the economy (GDP).

Microeconomic private consumption is divided into private food consumption, private nonfood consumption, and private consumption of services. It is estimated in the study in line with the dynamic Almost Ideal Demand System Model. Both types of government spending used in the study; i.e., government consumption spending, and government capital spending, are exogenous in the model in order to examine the effects of them on private consumption. The macroeconomic analysis of aggregate demand is further employed to examine the effect of government spending on private spending and on the overall economy (GDP).

The Vector Error Correction Mechanism approach is used in the estimation for the dynamic Almost Ideal Demand System equations in the microeconomic consumption study. In the Vector Error Correction Mechanism estimation, the study imposed all the properties of the consumer demand theory as the restriction conditions into the estimation of the dynamic consumption Almost Ideal Demand System model. Own price elasticity, cross price elasticity, and income elasticity of food, nonfood, and services are then calculated from the estimated consumption model. The result of the estimated model conforms to all the properties of consumer demand in microeconomics theory.

To conclude, the microeconomic consumption model indicates the substituting effect (negative impacts) of government consumption spending and government capital spending on the budget share of private nonfood and food consumption, respectively. Nevertheless the microeconomic consumption model does not necessarily indicate whether the result of the negative impact on changes of budget share of the nonfood and the food consumption means lower total private consumption. Microeconomic consumer demand analysis therefore indicates changes in component structure of aggregate expenditure in the economy as a result of government spending policy. The macroeconomic analysis concludes that government capital spending has an insignificant effect but government consumption spending has a negative effect on the GDP growth. This implies that the rapid expansions of government consumption can slowdown growth of the economy. Furthermore, both types of government spending do not have significant effect on the private consumption; no crowding-out effect on consumption is found. The demand stimulus policy (using government spending) is therefore ineffective and even reducing growth of GDP (perhaps due to inefficient government spending). Strategies to increase other components of demand expenditure (such as private consumption and business investment via tax policy) and efficient spending are other alternatives to stimulate growth in the longer run. Last but not least, the estimated relationship indicates that export is found to be the most effective factor for demand growth strategy in Thailand.

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APPENDIX

TABLE A1
TEST FOR THE UNIT ROOT OF VARIABLES IN LEVEL AND IN FIRST DIFFERENCE USING AUGMENTED DICKEY FULLER

Variables	Lags	τ Stat	Prob	Intercept	Trend
Wfd	4	-1.8502	0.3530	Y	N
D(Wfd)	0	-2.3930	0.0174	N	N
Wnf	1	-1.7519	0.4008	Y	N
D(Wnf)	0	-2.2785	0.0232	N	N
Wsv	3	-1.2215	0.6601	Y	N
D(Wsv)	0	-3.2308	0.0017	N	N
Ln(Pfd/Psv)	0	-1.4147	0.1450	N	N
D(ln(Pfd/Psv)	0	-1.8523	0.0614	N	N
Ln(Pnf/Psv)	2	-2.3261	0.4140	Y	Y
D(ln(Pnf/Psv)	1	-3.1831	0.0264	Y	N
Ln(E/P)	8	-2.2745	0.4404	Y	Y
D(ln(E/P)	7	-2.1244	0.0334	N	N
Ln(GC)	2	-0.8146	0.8081	Y	N
D(ln(GC))	7	-1.7099	0.0825	N	N
Ln(GK)	3	-1.1628	0.6853	Y	N
D(ln(GK))	0	-2.7289	0.0072	N	N
Ln(RGDP)	4	-2.0343	0.5701	Y	Y
D(ln(RGDP))	4	-2.4239	0.0160	N	N
Ln(RPRC)	4	-2.4013	0.3750	Y	Y
D(ln(RPRC))	5	-3.3645	0.0162	Y	N
Ln(INVEST)	0	-2.1854	0.2135	Y	N
D(ln(INVEST))	0	-2.0264	0.0419	N	N
Ln(RIM)	4	-2.2922	0.4310	Y	Y
D(ln(RIM))	0	-7.7918	0.0000	N	N
Ln(REX)	8	-2.3257	0.4135	Y	Y
D(ln(REX))	9	-3.4216	0.0143	Y	N

Source: Author's estimationon.