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

Paitoon Kraipornsak

***Abstract*—**The recent global financial problem urges government to play role in stimulating the economy due to the fact that private sector has little ability to purchase during the recession. A concerned question is whether the increased government spending crowds out private consumption and whether it helps stimulate the economy. If the government spending policy is effective; the private consumption is expected to increase and can compensate the recent extra government expense. In this study, the government spending is categorized into government consumption spending and government capital spending. The study firstly examines consumer consumption along the line with the demand function in microeconomic theory. Three categories of private consumption are used in the study. Those are food consumption, non food consumption, and services consumption. The dynamic Almost Ideal Demand System of the three categories of the private consumption is estimated using the Vector Error Correction Mechanism model. The estimated model indicates the substituting effects (negative impacts) of the government consumption spending on budget shares of private non food consumption and of the government capital spending on budget share of private food consumption, respectively. Nevertheless the result does not necessarily indicate whether the negative effects of changes in the budget shares of the non food and the food consumption means fallen total private consumption. Microeconomic consumer demand analysis clearly indicates changes in component structure of aggregate expenditure in the economy as a result of the government spending policy. The macroeconomic concept of aggregate demand comprising consumption, investment, government spending (the government consumption spending and the government capital spending), export, and import are used to estimate for their relationship using the Vector Error Correction Mechanism model. The macroeconomic study found no effect of the 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. Therefore no crowding out effect of the government spending is found on the private consumption but it is ineffective and even inefficient expenditure as found reducing growth of the GDP in the context of Thailand.

***Keywords*—**government consumption spending, government capital spending, private consumption on food, non food, and services, Vector Error Correction Mechanism, Almost Ideal Demand System, substitution effect, complementary effect, consumer demand, aggregate demand

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I. Introduction

THE world financial crisis recently has brought many countries to pay interested in the government stimulus measures to stimulate the economy and to get it out of the recession. The support of the role of the government at this time of the crisis is on the fact that private sector and businesses have little ability to purchase. The Thai government has announced few fiscal stimulus packages when the economy showed sign of recession in 2008. Consequently, the fiscal budget has turned to be deficit from then on. The government expenditure rose significantly from around 12% of GDP in 2008 to 15% of GDP in 2009 (Table 1). The expansionary fiscal policy caused the budget to turn into the deficit by 24.2 % of total revenue in 2009 compared to only 2.9% in 2005. Although most economists see the necessity of the government spending measure to revive the economy, it can be doubtful whether the increased government spending can really help stimulate the economy such that the economy will grow up more than it otherwise would be.

TABLE I GOVERNMENT EXPENDITURE, TAX REVENUE (MIL. BAHT), AND PRIVATE CONSUMPTION

Year	1993	1996	1998	1999	2000	2005	2008p	2009Qtp	2009Q2p	2009Q3p
%Gov cons exp/GDP	9.98%	10.18%	11.06%	11.50%	11.33%	11.89%	12.43%	12.83%	13.18%	15.05%
%Priv Cons/GDP	54.67%	53.78%	54.13%	55.96%	56.13%	57.25%	55.07%	54.78%	56.44%	55.22%
Total direct and indirect taxes	567,233	862,028	708,961	700,225	756,162	1,375,933	1,624,287			
%tax/GDP	15.63%	18.21%	15.29%	14.22%	14.73%	17.53%	17.90%			

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

Theoretically, the outcome of the 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 expectation, liquidity condition, and consumers' expectation of the economy. This study examines empirical evidence whether the government spending affects the private consumption, in what details and in which direction, and finally promotes the economy to grow.

The structure of this paper is organized as follows. The next section 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 the 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 the government spending, the 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 in two major points of view: macroeconomic and microeconomic aspects. Finding outcomes from both aspects are expected to give complete examination on the impact of the government spending. Therefore, both microeconomic and macroeconomic aspects are employed and analyzed in this study.

In microeconomics theory, consumer demand theory can well be used to investigate the effect of government spending in the study. Pieroni (2009) [1] investigates endogenous consumer's decision of private expenditure and the exogenous public defense and civilian spending. The study found negative impact of defense spending on private consumption. Two lines of reason can be explained that negative impact. First, increased public resource to defense spending means smaller supplied government purchases. The government will have to increase borrowing or raising taxes in the private sector. The trade off between defense and private consumption as well as investment under fixed budget constraint is therefore possible. Second, during the peace time, reduction in taxes will be turned back to tax payers for private consumption. Therefore the impact of both defense and civilian government spending on private categories of consumption produces contemporaneous complementarity and substitutability effects.

Pieroni employs cost function of the Almost Ideal Demand System (AIDS) approach. This long run dynamic demand model included adjustment response over time to shifts in relative prices and to exogenous shocks can be obtained 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 = consumption
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, $\gamma_{jk}^* = \gamma_{kj}^*$ (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 (C(U, P)) 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 goods 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 in the model. The general dynamic Almost Ideal Demand System model for 4 categories of consumer non durable good was estimated. The study investigated a search over the appropriate model to test 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 was found 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 aggregate demand in the economy. The government spending is an important instrument of fiscal policy to influence the economy. The government spending is expectedly effective especially under recession when the economy is under severe unemployment and low interest rate so that there does not exist crowding out effect on the private sector and investment. Under full employment and limited resources, increase in government spending can crowd out other demand elements to grow. Arguably, under dynamic approach, the economy is growing steadily so that it is possible the increased government spending can have no crowding out effect on the elements of the aggregate demand.

Many empirical studies in macro impact of the government spending were based on Vector Autoregressive model of major macroeconomic variables. Many of the studies were focused on the estimate of fiscal multiplier and the effect of government spending on output. The multiplier is found small if interest rate rises in response to increase in inflation as a result of the expansionary government spending (Woodford 2010) [8]. On the other hand, the government spending can be effective if prices and wages can adjust slowly to the spending. The estimated multiplier effect of the government spending on the GDP is found 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 of the United States in the post war 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 impact on output and private consumption in low statistical significance and the effect of the government expenditure has short lived. Werner (2004) [12] modified Fisher equation of the monetarist model to evaluate the Japanese economy. He discussed on various issues of why fiscal policy is either ineffective or effective, such as real interest rate based crowding out effect and Ricardian equivalence, the condition when debt required to be fully paid off in the future. The general Autoregressive Distributed Lag model of nominal GDP growth that included money supply, wholesales price index, and various types of interest rate as explanatory variables was used to estimate for nominal GDP growth model. To test the ineffective fiscal policy, he proceeded by substituting 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 found supported his argument that the private demand is reduced one yen for one yen increase in the government spending.

Fiscal policy can be ineffective in an open economy if under flexible exchange rate system and perfect capital mobility. Once the interest rate increases causing capital inflow to increase and 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 which found negative long run effect. Positive effect of the government expenditure multiplier could only be found 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.

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

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 measuring 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. The government spending is an exogenous variable as to see the impact of its change on the other endogenous variables. In this study, the 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 the government capital spending.

In microeconomic consumption study, the private consumption consists of private food consumption, private non food consumption, and private consumption on services. The microeconomic consumer demand system of equations used in the study can be written in line 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 so as 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

GC = government consumption spending

GK = government capital spending

P = prices

E = total expenditure per head

j, k = 1 (private food consumption: PFD), 2 (private non food consumption, PNF) and 3 (private consumption on services, PSV)

w_j = budget share of the private consumption on j

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 non food consumption (NF) are used in the estimation. The homogeneity degree zero property of the microeconomic consumer demand requires relative prices of food and non food with respect to the services price to be used 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 non food)

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, non food, 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 non food consumption) are estimated and showed below (Table 1). Own price elasticity, cross price elasticity, and income elasticity of food, non food, and services can then be calculated using Equation (8) – (10) (Table 2).

TABLE I 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.

Remark 1/ Equation of the budget share of the private consumption on services can be derived using the restriction conditions.

* 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

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 can not be rejected. The study concludes that the estimated VECM model of Almost Ideal Demand System has all the properties of the microeconomic demand function.

TABLE II ESTIMATED AVERAGE ELASTICITIES OF CONSUMER DEMAND FOR FOOD (FD), NON FOOD (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 estimationon.

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 can not 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 non food (-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 little falls if the price falls and the demand little rises when the price rises.

Income effects of food and services are found inelastic implying that demand for these two goods do not increase much by proportion when consumers' income increases. By comparison with these two types of consumption, the income elasticity of demand for non food is found highly elastic (greater than one). The finding implies that along the continual growth of the economy, the private consumption on non food is relatively getting larger share compared to the other two consumption items, given relative prices among them being unchanged. Relatively higher income elasticity of demand consumption for non food suggests also that the budget share of non food consumption fell significantly during the economic crisis (1997-1999) and it went up clearly after the economic recovered. It is noted as the result of the estimation suggests, the own 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 can be observed, as an evidence, slightly higher throughout the period of the study (Fig. 1).

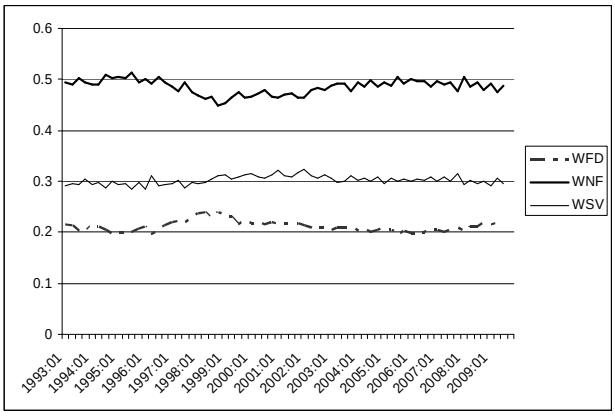

Fig. 1 The budget shares of consumption on food, non food, and services

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

Regarding the effect of the government spending on the private consumption, the model estimation indicates the substituting impact (negative effect) on the private consumption spending. The government consumption spending is found substituting the private non food consumption. The one per cent increase of the government consumption spending (Δln(GC)) will reduce the change of budget share of the private non food consumption (Δd(WNF)) by 0.02 point. Furthermore, the government capital spending is found substituting the private food consumption. The one per cent increase of the government capital spending (Δln(GK)) will reduce the change of budget share of the private food consumption (Δd(WFD)) by 0.009 point. Remark that the mentioned findings is 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 the private consumption would change. Although the consumption shares of non food and of food account for about 70 per cent of the total consumption, it cannot been concluded that the amount of consumption will fall due to the increased government spending effect as total consumption growth is not yet known.

In general, the microeconomic consumption model found the negative impacts of the government spending on the private spending in terms of consumers' budget share. Nevertheless the finding of the microeconomic study is not adequate 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.

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

Where

GDP = gross Domestic Product
PRC = private consumption
INVEST = investment spending
IM = import
EX = export
GC = government consumption spending
GK = government capital spending

As above mention, all the variables were tested and found unit root while the first difference of them 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 showed below (Table 3). 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 that both the government consumption spending and the government capital spending do not have any significant impact on the private consumption, neither substitution effect nor complementary effect. However, the government consumption spending does have significant substituting impact (negative impact) on the GDP. A one per cent increase in the government consumption spending will lower the change (growth) of the GDP by 0.11 per cent.

Besides, import leads to increase in the private consumption while export leads to reduce the private consumption. Consumption and export are substitutable component 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 point) on the change in the GDP growth. In the other word, among the demand expenditure, export is found the most influential factor in stimulating the Thai economy.

TABLE III MACRO RELATION OF THE 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

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 crowd out the aggregate private consumption. The study concludes that no evidence of the effect of government capital spending on either the private consumption or the GDP while the government consumption spending has the negative effect on the GDP.

IV. CONCLUSION

The role of government spending has been placed into attention recently after the world financial problem due to the fact that 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 sign of recession in 2008. Consequently, the fiscal budget has turned from previously being surplus to being deficit from then on. Although most economists see the necessity of the government spending measure to revive the economy, it can be doubtful that the increased government spending can really help stimulate the economy such that the economy will grow up more than it otherwise would be. Theoretically, the effectiveness of the government spending policy depends very much on several specific conditions and economic situations. This study investigates empirical findings whether the government spending affects the private consumption and the GDP, in what details, and in which direction.

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

The microeconomic private consumption is divided into private food consumption, private non food consumption, and private consumption on services and is estimated in the study in line with the dynamic Almost Ideal Demand System model. Both types of the government spending used in the study; i.e., government consumption spending, and government capital spending, are exogenous in the model so as to examine the effect of them on the private consumption. The macroeconomic study is additionally taken to examine the effect of the government spending on the private spending and 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, non food, 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.

The microeconomic consumption model indicates the substituting effect (negative impact) of the government spending on the private consumption. Specifically, the government consumption spending is found substituting the private non food consumption budget share. Furthermore, the government capital spending is found substituting the private food consumption budget share. Note that the findings refer to the changes in the consumption budget shares' slope, it however cannot tell whether and by how much the amount of the private consumption would change.

In the study of macroeconomic relationship among aggregate expenditure variables, the Vector Error Correction Mechanism model is used in the estimation. The variables in the model include GDP, private consumption, investment, import, export, and government consumption spending and government capital spending, where both types of the

government spending are exogenous in the model. The result indicates that the government capital spending does not have any significant effect on either the GDP or the private consumption. However, the government consumption spending has a negative significant effect on the growth of GDP.

To conclude, the microeconomic consumption model indicates the substituting effect (negative impacts) of the government consumption spending and government capital spending on the budget share of private non food 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 non food and the food consumption means to lower the total private consumption. 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 macroeconomic study in addition concludes that no effect of the government capital spending is found on either the private consumption or the GDP while the government consumption spending has the negative effect on the growth of GDP. Furthermore, both types of government spending do not have significant effect on the private consumption; no crowding out effect is found. The demand stimulus policy using the government spending is found ineffective and even reducing growth of the GDP perhaps due to inefficient government spending. Strategies to increase the other demand expenditure such as private consumption and business investment can be an efficient spending policy to stimulate growth in the longer run. Furthermore, the estimated relationship indicates that export is found to be the most effective factor for growth.

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APPENDIX

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

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 estimation