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Public Expenditure in a Simple Model of Economic Growth: The Case of Malaysia

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Abstract

This paper develops the public expenditure in a simple model of economic growth in Malaysia. The model investigates the relationship between the development expenditure (DE), investment (I), trade balance (TB) and Gross Domestic Product (GDP). The study used the quarterly data from 2000 to 2016. Simultaneous equation model, in particularly, Two-Stage Least Squares Method (TSLS) applied in this model. The result showed that development expenditure (DE) and trade balance (TB) are the most important variables determine the GDP. In determination of the level of investment (I), it appeared that GDP (Y) and trade balance (TB) are the important factors. GDP and investment (I) are the important factors determine the amount of trade balance (TB). Moreover, the results supported to Wagner's Law of government expenditure generally rises in tandem with income increases.

Keywords: Gross Domestic Product (GDP); Development Expenditure (DE); Investment (I); Trade Balance (TB), Simultaneous Equation Model.

1. Introduction

Despite the relationship of public expenditure and economic growth has been studied extensively, it remains difficult to establish robust conclusions across countries. Some empirical studies showed a robust and positive significant relationship (Wu, Tang, and Lin, 2010; Ram, 1986), while others produced contradicted results (Alfonso and Furceri 2010). Even, some studies concluded non relationship (Durevall and Henrekson, 2011) on public expenditure, taxes, and economic growth. These contradicting results possibly due to discrepancy in definitions and methodology applied in the study (Bergh and Henrekson, 2011).

It is acknowledged in the endogenous growth literature (Romer, 1986; Lucas, 1988) that fiscal policy exerted important impact on the long term growth rate of the economy. Well-functioning fiscal policy enhances the health of the public finances by introducing the principles of counter-cyclicality, ensuring intergenerational fairness, and sustainability of government debts. The effective government fiscal policies playing an important role in ensuring macroeconomic stability and together with monetary policies inhibit inflationary pressures and keep interest rates low. Indeed, fiscal policy serve as an effective mechanism to moderate short term fluctuations of output and employment by alter the aggregate demand to match with economy potential output.(Doraisami, 2011; Frankel, Carlos and Guillermo, 2011; DeLong and Lawrence; 2012).

Fiscal policy remains one of the integral parts of macroeconomic policy in view of its important roles in promote economic growth via capital formation, consumption and total factor productivity. Fiscal policy is closely related with country tax system which leads to amount of tax collected, and the components and productivity of public expenditure. The taxation system and structure had enormous influence in economic growth rate via altering the resources allocation decisions of firms and individuals. Taxes are generally distortive and lead shifted resources from the private sector to the public sector. High tax rate potentially caused harmful effects on the economic activities, and adversely impacted the investment and saving decisions of private agents. On the other hand, low tax rate might slow down the economic growth, because government might not able to generate sufficient resources to channel to essential public services, improve the infrastructure and promote policies that enhance private and human capital. (Acosta and Yoo, 2012).

The quantity of public spending might not be directly link with the level of economic and social development. It is also need to ensure the high quality of public spending which support the economic objectives of reduce poverty, increase welfare, and living standard of the people (Casasnovas, 2010). Nonetheless, the impact of public spending on growth is difficult to gauge, verify and quantify. Indeed, it is an extremely lengthy and complex interaction among the inputs variables such as human and financial resources and the outputs variables like per capita GDP growth within the equation.

Public expenditure consists of aggregate expenditures from the government to facilitate the operation of public services and goods, and application of public fund to support the public services or investment for long term economic development. Broadly speaking, public expenditure can be categorized into operating and development expenditure. Both types of expenditure serve different purposes, as operating expenditure tends to maintain the effectiveness and efficient of current level of public services, it includes payments on goods and services lasted limited period of time. While development expenditure foster the long term growth via capital formation, enhance productivity and total factor productivity included expenditure incurred on producing or purchasing new or existing good like construction of new road, hospital school and others (Devarajan, et al, 1996)

The nexus between public spending and national income had been a contentious and inconclusive issue among the researchers and policy makers surrounding on two approaches of Wagner's Law and Keynesian approach. Wagner's Law stated that increase in national income lead to higher public expenditure, which postulates the elasticity of public expenditure and national income. The ratio of government spending to income tends to increase along with economic development. Meanwhile, Keynesian approach have an opposite view, believed that government intervention needed during depression to revitalize the economy, thus government needs to increase public spending to stimulate the economic activities. The multiplier effect of increased public spending resulted in increase purchasing power of individual, creating more employment opportunity, and causality from public expenditure to national income. Keynes attributed public expenditure as an exogenous rather endogenous variable that generating economic growth. Moreover, Keynes believed the role of the government is crucial in reignite economic growth via multiplier effect, which brings stability in the short run. Nonetheless, it is needed to pursue cautiously as overdone might led to inflationary situations, while too little of it leads to unemployment (Devarajan, et al, 1996).

Malaysia as an upper-middle income economy has made a great leap by transformed the country economy from primary commodities based to an energetic and dynamic industrialized nation. Malaysia had recorded average economic growth of 7 per cent for 25 years or more. The national poverty line (Household living below USD 8.50 per day in 2012) decreased from more than 50 per cent in 1960s to below 1.0 per cent currently. Literacy rate (% of people ages 15-24) had improved from 87% in 1980 to 98% in 2010, and life expectancy improved from ages of 64 in 1970 to 74 in 2012. According to World Bank (2013), Malaysia is a highly open economy and among the top exporters of electronic accessories and components, natural gas, palm oil, and electrical appliances. Besides, Malaysia has also grown from merely a raw materials producer like rubber and tin in the early 1970s to become a diversified economy.

The improvement in macroeconomic indicators closely related to the government expenditure. Table 1, showed the government expenditure both in operating and development had increased tremendously over the last four decades. The allocation for security, social and economic related expenses constituted the most important portion of total government expenditure (Figure 1). Nonetheless, other factors such as cost effective and productive workforce, political stability, pragmatic and prudent investor friendly policies, coupled with developed infrastructure had successfully transformed Malaysia becomes an enticing place for foreign investors. According to Malaysia Investment Development Authority, Malaysia had been chosen as one of the world's top country in service-based operations and offshore manufacturing. Many existing foreign corporation have continued choose Malaysia as a strategic investment location for diversification and expansion, especially those MNC involve in high technology sector.

The Gross Domestic Product (GDP) and total government expenditure had increase significantly since 1970. However, the growth of operating expenditure outpaced development expenditure as show in Table 1. In fact, the development expenditure in 2014 reflected a decrease from to 2010.

Table 1: Gross Domestic Product (GDP), Operating, Development and Total Government Expenditure from 1970 to 2014. (RM, million)

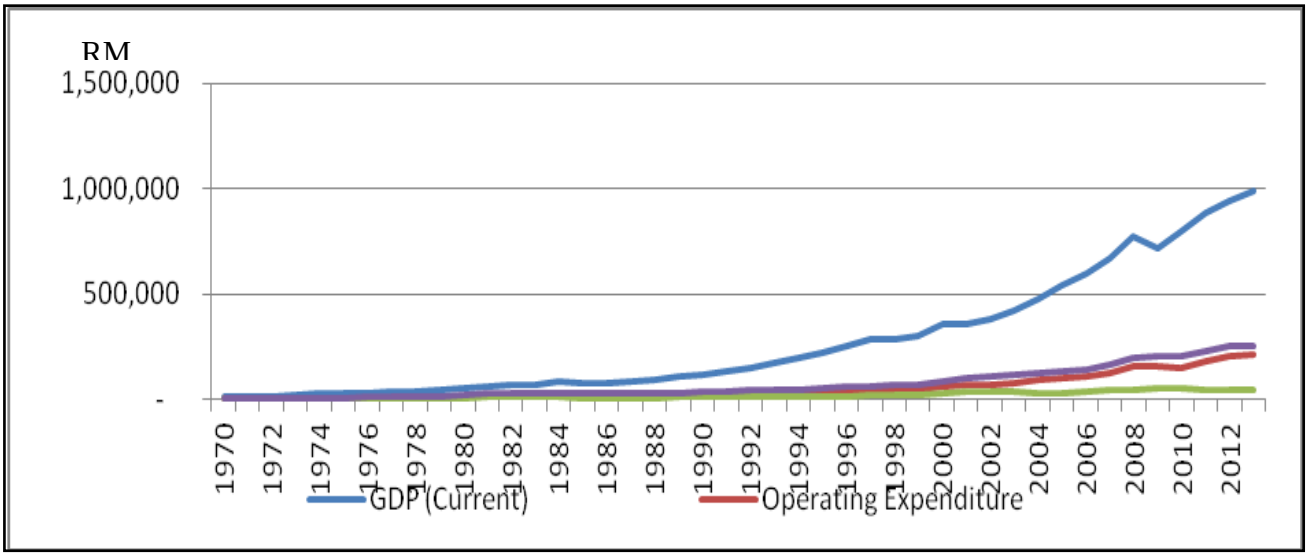
Year	GDP (Current)	Operating Expenditure	Development Expenditure	Total Government Expenditure
1970	13,092	2,163	725	2,888
1980	54,285	10,292	7,470	17,762

1990	119,080	25,026	10,689	35,715
2000	356,400	56,547	27,941	84,488
2010	797,327	151,633	52,792	204,425
2014	1,070,007	218,896	46, 500	265,396

Source: (Bank Negara Malaysia, 2015)

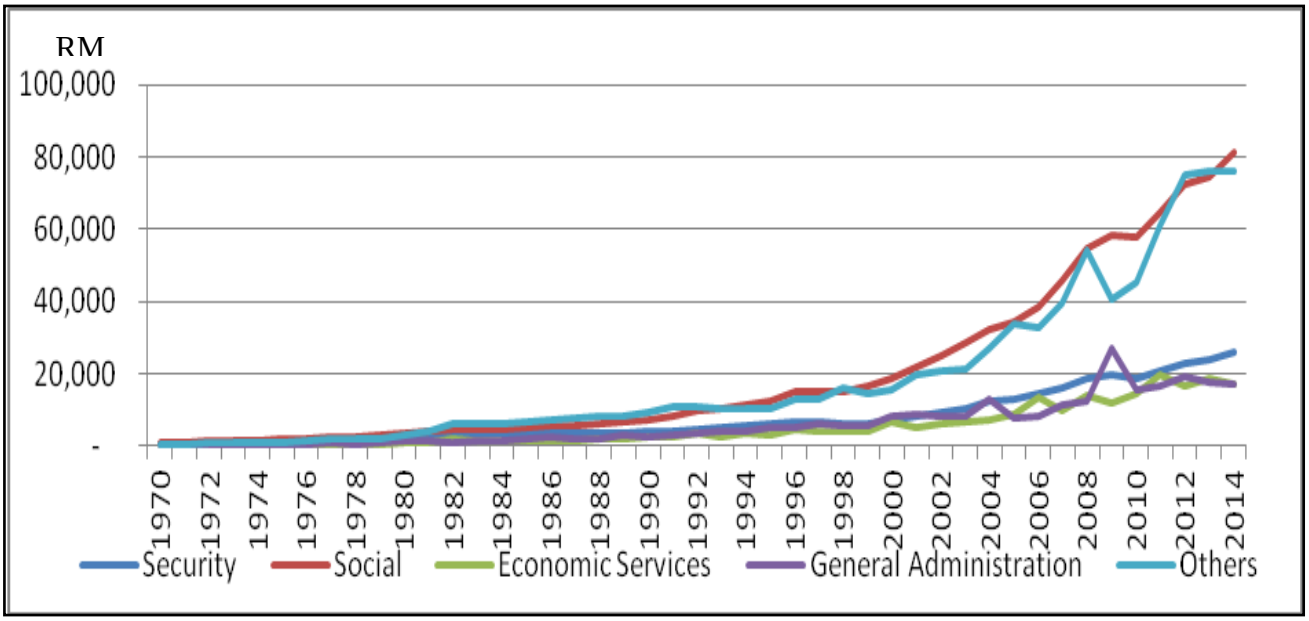
Total government expenditure had rose since 1970 to 2014 in line with the increase of Gross Domestic Product (GDP). Meanwhile, both operating and development expenditure showed upward trend with merely RM2,163 million and RM725 million in 1970 to RM218,896 million and RM46,500 million respectively in 2014 (Figure 2).

Figure 1: GDP, Total Government Expenditure, Development Expenditure and Operating Expenditure



Source: (Bank Negara Malaysia, 201he operating expenditure incurred for security, social, economic services and general administration showed upward trend over the period from 1970 to 2014 (Figure 2).

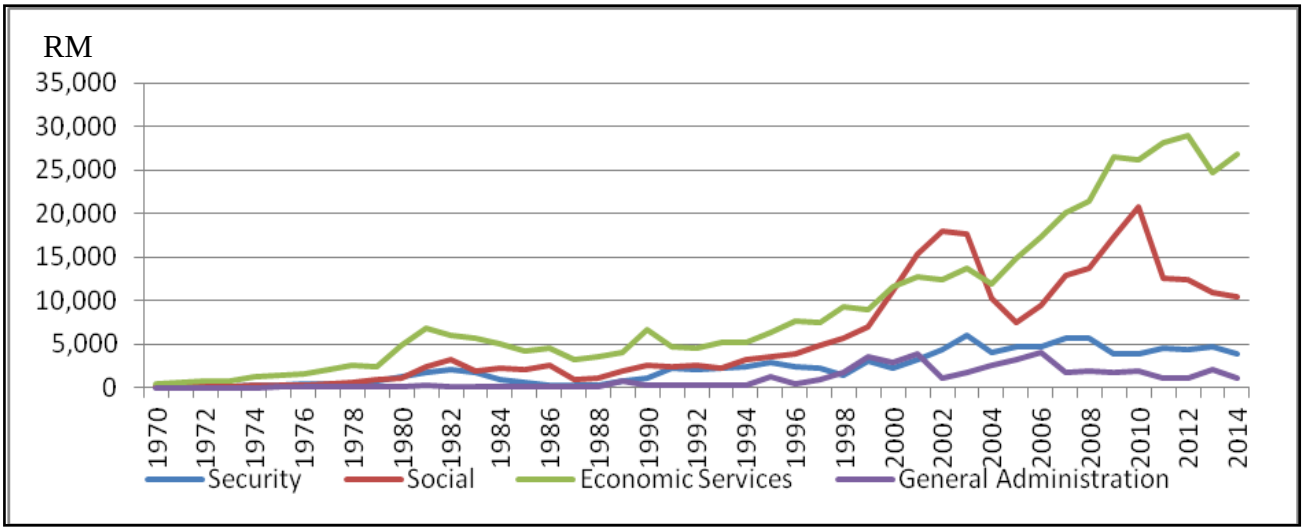
Figure 2: Operating Expenditure for Security, Social, Economic Services and General Administration and Others from 1970 to 2014



Source: (Bank Negara Malaysia, 2015)

The development expenditure for economic services had increased more significant compare to security and general administration. Meanwhile, development expenditure for social services showed downward trend from 2003 and after 2010 (Figure 3).

Figure 3: Development Expenditure for Security, Social, Economic Services and General Administration from 1970 to 2014



Source: (Bank Negara Malaysia, 2015)

2. Literature Review

Despite its apparent importance, the effects of each component of public expenditure on economic growth have been rarely examined in developing countries. According to Akitoby *et al.* (2006) most of the existing empirical studies in conducted in developed countries supported Wagner's law approach, but less likely so for developing countries. According to Wagner's Law (1893), the percentage of public expenditure in relative to total expenditure increased in tandem with the industrialization process associated with the rose of real income per capita (Srinivasan, 2013). Public sector activity replace private sector activity during the industrialization process due to increase state administrative and protective functions, such as providing welfare services like education, pension scheme, retirement insurance, environmental preservation, public health, natural disaster aid and other social services. Moreover, increased industrialization tends to intensified technological change and provides opportunity for large firms to monopolize the market as a result of scale and scope competitive advantage.

The government expenditure was explicitly modeled in the endogenous growth model (Barro, 1990). Endogenous growth theory explains new technological knowledge creation sustained long-run growth of economic activities (Glass, 2009). In a nutshell, long run the growth rate of productivity relies on the improvement of total factor productivity (TFP) that associated with economic factors. Technological progress occurs via innovation, either in the forms of new processes, innovative products or creates niche markets as a result of economic activities. Through economic activities firm learn through the experience curve to improve efficiency, highly competition market lead to process and product innovation undertake by the firm to outperform competitors. Economic related policies in regard to competition, trade, taxes and intellectual property influence firm budgeting for costs, productions as well as resources allocation for research and development activities.

Neoclassical growth theory postulate the extent of technological progress was determined by a scientific process that is independent and separate from economic forces (Solow, 1956; Swan 1956). Neo-classical theory implied that long-run growth rate can be achieved given that variables exogenously from outside the economic system. The physical capital accumulation is critical given that additional unit of capital tends to generate lower return compared to previous ones assumed fixed labor. The process of physical capital accumulation is unsustainable due to the diminishing returns of capital. Ultimately, the progress of economic reach a point, where investment fuelled from saving just sufficient to cover depreciation and incremental capital no longer spur economic growth (Afonso *et al*., 2005). Productivity growth is the only source of long-run economic growth under neoclassical model, and population and technological progress is the exogenous determinant factors of the growth rate of output. Fiscal policy can only impact of level of output, but not long-run growth rates.

However, the studies of the nexus between economic development and government spending had produced inconclusive results. Wu *et al* (2010) found that government expenditure had a significant and positive relationship to economic development, and government expenditure promoted economic growth in developing and developed countries, but not in low-income countries. Bose *et al* (2007) found that the the size of government capital expenditure was positively relate to GDP, but the same did not hold for current expenditure.

Some studies had produced contradiction results. Alfonso and Furceri (2010) recorded a negative relationship in economic growth and public spending, while Durevall and Henrekson 2011 found no relationship between public spending and economic growth. According to Bergh and Henrekson (2011) the contradicting results were possibly caused by different definitions and variations in the countries studied, and likely caused by generally poor institutions and high levels of corruption (Wu, Tang, and Lin, 2010). Also, prior studied unsuccessfully reached a consensus on the nexus between economic growth and government spending, due to discrepancy in measuring government spending, selection of sample as well as economic model specification.

Recently, there are growing interest for researchers to move to investigate the effects of changing the composition of government expenditure, and the impact of reallocation of public spending on long-term economic growth. In particularly, assessing components of public expenditure that has the most profound impact on economic growth and development. Lucas (1988) stated the important role of human capital accumulation on long term economic growth. Public education spending promotes the accumulation of human capital, and thus, enhances economic growth. According to endogenous growth theory, differences in cross-country level of development and growth are mainly resulted by level of investment in physical capital, infrastructure development, human capital and knowledge spillovers effect. Agenor (2010) concluded that reallocating expenditures from "unproductive" public spending to infrastructure spending would lead to higher steady state growth.

Bose *et al* (2007) investigate the composition of government spending and found a significant relationship in economic growth and investments and spending on education sector. Gemmell, *et al* (2012) and Acosta-Ormaechea and Morozumi (2013) stated the importance of reallocating funds to education and infrastructure for long-term growth. Similarly, Alam *et al* (2010) investigated 10 developing countries in Asia concluded that greater social expenditure on education, health, and social welfare led to improvement in productivity, and thus, fostering long term economic growth. Moreover, by shifting more public resources to education spending will yield a sizable growth dividend. Therefore, the government of developing Asia countries must ensure that the proper mix of both their revenue and expenditures in order to optimum the contribution of fiscal policy toward long term economic development.

The size of government tends to rise as income increases (Wagner's Law) until certain level of income. Then, government expenditure flattens and then slightly decreased. According to Acosta *et al* (2013), the so call "non-monotonic relationship" of economic development and public expenditure expected to happen around per capita income of $20,000 (PPP terms). Meanwhile, Halicio˘glu (2003) conducted a study in Turkish from 1960 to 2000 found no causal relationships between government expenditure and per capita GDP.

Bayraktar *et al* (2015) investigates a group of developing countries consist of fast growing and moderate developing countries with different growth patterns. By taking into account the government budget constraint, the empirical result showed that the core components of public spending strongly influence the level of economic growth. In particular, those countries characterized by GDP per capita growth dynamics as well as strong macroeconomic stability are effective in term of channeled public funds for productive purposes. The studied also reiterated the important of government economic policy in creating conducive business and investment environment that were capable of attracting private sector investment.

Dritsakis (2004) conducted similar study in Greece and Turkey found causality relationship from income to government spending. Narayan *et al* (2008) investigated central and western and central provinces of China, and the results supported Wagner's law. Guerrero and Parker (2007) investigate on US data since 1792, supported the hypothesis the size of the public sector Granger causes economic growth. Odhiambo (2015) investigate the dynamic causal relationship between economic growth and government spending in South Africa. The methodology of Auto-regressive distributed lag model (ARDL)-bounds testing approach applied in this study. The empirical results concluded the unilateral causality relationship exists between government expenditure and economic growth in short term, but in long term economic growth that Granger-causes government expenditure.

Andrew (2014) assesses the impact of public funded big infrastructure project against economic growth in low income countries. The studied found that public investment triggered higher economic growth, productivity improvement and economic growth in low income countries in short term, but there is little evidence of long term positive impacts. Alshahraniand (2014) investigate components of public expenditure in relation to economic growth in Saudi Arabia. The studied showed that expenditure in health care sector, private domestic investments and housing sector contributed to economic growth. Gemmell *et al* (2014) study long term relationship of Gross Domestic Product and total government spending in some OECD countries. The results showed positive relationship in public expenditure in education and long

term economic growth. Olulu *et al* (2014) investigated the link of public spending and economic growth in Nigeria. The results concluded existence of inverse relationship, and public spending increased local and foreign investments.

Torki (2015) conducted a study in Jordan, the results showed that current government expenditure and total government expenditure positively promote economic growth. The results also suggested government spending should be allocated primarily to current productive economic activities that drive the overall economic growth. Janelle and Peter (2015) investigated various sets of public expenditure (education, health care, and housing, defense,) impact real non-oil GDP in Saudi Arabia. The results found that public spending on health care and defense reduced real non-oil GDP, and public spending in health tends to crowds-out private investment. Additionally, public spending on housing and education showed little impact inn related to GDP growth.

3. Research Methodology

Simultaneous equation models are a form of statistical model of a set of linear simultaneous equations. The two-stage least squares method (TSLS) estimation method for the simultaneous equations model is developed by Theil (1953) and Basmann (1957). It is an equation-by-equation technique, where the endogenous regressors on the right-hand side of each equation are being instrumented with the regressors X from all other equations. The method is called "two-stage" because it conducts estimation in two steps.

A fundamental assumption of regression analysis of the simultaneous system equation of the expenditure method of Gross Domestic Product (GDP) is the right-hand side variables are uncorrelated with the disturbance term. If this assumption is violated, both ordinary least squares (OLS) and weighted least squares (WLS) are biased and inconsistent. There are a number of situations where some of the right-hand side variables are correlated with disturbances (Davidson and MacKinnon, 1993 and Johnston and DiNardo, 1997). For simplicity, variables are correlated with the residuals as *endogenous*, and variables that are not correlated with the residuals as *exogenous* or *predetermined*. The standard approach in cases where right-hand side variables are correlated with the residuals is to estimate the equation using *instrumental variables* regression. The idea behind instrumental variables is to find a set of variables, termed *instruments*, that is both (1) correlated with the explanatory variables in the equation, and (2) uncorrelated with the disturbances. These *instruments* are used to eliminate the correlation between right-hand side variables and the disturbances.

Two-stage least squares (TSLS) is a special case of instrumental variables regression (Gujarati and Porter, 2009). There are two distinct stages in two-stage least squares. In the first stage, TSLS finds the portions of the endogenous and exogenous variables that can be attributed to the instruments. This stage involves estimating an OLS regression of each variable in the model on the set of instruments. The second stage is a regression of the original equation, with all of the variables replaced by the fitted values from the first-stage regressions. The coefficients of this regression are the TSLS estimates. The separate stages of TSLS will estimate both stages simultaneously using instrumental variables techniques. Any right-hand side variables that are not correlated with the disturbances should be included as instruments. The constant, C, is always a suitable instrument. The expenditure method of Gross Domestic Product (GDP) stated that Gross Domestic Product (Y) consists of private consumption (C), government spending (G), investment (I) and trade balance (TB), represented by:

$$Y_t = f(C,G, I, TB) \quad (1)$$

Whereby,

Y = Gross Domestic Product, (GDP) (RM, thousand million)

C = Private consumption (RM, thousand million)

G = Government spending (RM, thousand million)

I = Investment, (RM, thousand million)

TB= Trade Balance, (RM, thousand million)

This study will exclude the private consumption (C) and consider the government spending (G). "G" is the combination of operating expenditure (OE) and development expenditure (DE), such as:-

$$G = OE + DE \quad (2)$$

The equation (2) substituted in equation (1) and as follows:

$$Y_t = \beta_0 + \beta_1 DE_{t-1} + OE_{t-1} + \beta_2 I_{t-1} + \beta_3 TB_{t-1} + e_t \quad (3)$$

Where,

OE = Operating Expenditure (RM, thousand million)

DE = Development Expenditure (RM, thousand million)

t = Time trend, data range from 2000 to 2016 Quarterly.

e = error term

The equation (3) had been rewritten (reduced form) in log and differenced as simultaneous equation for GDP (Y) to detect of multicollinearity of OE:-

$$InY_t = \beta_0 + \beta 1InDEt_{-1} + \beta 2InIt_{-1} + \beta 3InTBt_{-1} + e_t \quad (4)$$

Thus, the main three (3) hypotheses draw from public expenditure model as follows:

Hypothesis 1:

H_0: There is no significant relationship between development expenditure (DE) and GDP (Y).

H_A: There is a significant relationship between development expenditure (DE) and GDP (Y).

Hypothesis 2:

H_0: There is no significant relationship between investment (I) and GDP (Y).

H_A: There is a significant relationship between investment (I) and GDP (Y).

Hypothesis 3:

H_0: There is no significant relationship between trade balance (TB) and GDP (Y).

H_A: There is a significant relationship between trade balance (TB) and GDP (Y).

Therefore,

Two-stage least squares method (TSLS) of GDP Simultaneous equation:-

$$InDE_t = \beta_{4+} \beta_5 InY_{t-1} + \beta_6 InI_{t-1} + \beta_7 In\ TB_{t-1} + e_t \quad (5)$$

$$InI_t = \beta_8 + \beta_9 InY_{t-1} + \beta_8 InDE_{t-1} + \beta_9 InTB_{t-1} + e_t \quad (6)$$

$$InTB_t = \beta_{10} + \beta_{11} InY_{t-1} + \beta_{12} InDE_{t-1} + \beta_{13} InI_{t-1} + e_t \quad (7)$$

3.1 Data Sources

The quarterly time series secondary data for Gross Domestic Product (Y) consists of government spending (G), investment (I) and trade balance (TB) are collected from the national summary data page of Bank Negara Malaysia (BNM). The data estimation period covers from 2000 to 2016 quarterly, which has total 68 observations. The time series data are then fetched into the analysis tool, Eviews.

3.2 Preliminary Analysis

Descriptive Analysis

Descriptive statistics helps to establish an initial understanding of data in terms of the basic features. It has two types of measures: i) central tendency which includes mean, medium and mode; ii) variability which includes variance, standard deviation, maximum and minimum variables, kurtosis and skewness (William, 2006).

Correlation

The purpose is to measure the strength of a linear or nonlinear relationship between two variables. The coefficient correlation is known as "r" which depicts how strong or how weak pairs of variables are connected. In this research, it is essential to have r equals 0.4 to 0.8 at the first place, no matter it is positive correlation or inverse correlation (Cohen *et al*., 2013).

H_0: $\rho = 0$ H_A: $\rho \neq 0$

3.3 Diagnostic Checking

Diagnostic checking involves the application of four tests: i) multicollinearity test (Variance inflation factor) ii) heteroscedasticity (White) test; iii) serial autocorrelation (LM) test; and iv) normality (Jarque- Bera) test (Gujarati and Porter, 2009).

4 Results and Discussion

4.1 Descriptive Analysis

Table 4.1: Descriptive Analysis				
	InGDP	**InDE**	**InI**	**InTB**
Mean	12.02603	9.095294	10.45338	10.00029
Median	12.07500	9.090000	10.55000	10.01500
Maximum	12.70000	9.940000	11.32000	10.68000
Minimum	11.32000	7.670000	8.960000	8.990000
Std. Dev.	0.421317	0.495036	0.625676	0.332382
Skewness	-0.138969	-0.49567	-0.310167	-0.549895
Kurtosis	1.687837	3.255001	1.936262	3.334022
Jarque-Bera	5.097227	2.968710	4.296336	3.743144
Probability	0.078190	0.226648	0.116698	0.153882
Sum	817.7700	618.4800	710.8300	680.0200
Sum Sq. Dev.	11.89303	16.41909	26.22852	7.401994
Observations	68	68	68	68

Source: Eviews

Table 4.1 negative skewness values suggested that GDP, Development Expenditure (LNDE), Total Investment (LNTI) and Trade Balance (LNTB) skewed to the left or left- tailed since the skewness values are negative. For normal distribution, the kurtosis coefficient is expected to be 3. Both GDP (LNGDP) and Trade Balance (LNTI) have a platykurtic distribution which means flatter and broader looks of distribution shape. Their low kurtosis implied that the distribution have relatively low peak compare to LNDE and LNTB. They might consist of lesser outliers, or light tails due to the low kurtosis values.

Correlation

Table 4.2				
	InGDP	**InDE**	**InTI**	**InTB**
InGDP	1.000000	0.469737	0.364275	0.391457
InDE	0.469737	1.000000	0.790775	0.202908
InTI	0.364275	0.790775	1.000000	0.019575
InTB	0.391457	0.202908	0.019575	1.000000

Source: Eviews

The correlation among variables was shown in table 4.2. The strength of the correlation is rearranged as GDP (InGDP) > Trade Balance (InTB)> Total Investment (InTI), by an order from the strongest to the weakest. The variables namely

GDP, Development Expenditure, Trade Balance and Total Investment are having moderate positive correlation with exchange rate (ER).

The simultaneous system equation model reviewed the relationship of supply and demand in establishing prices and estimated by the Two Stage Least Square equations as in (Ferris, 1998) and (Gujarati and Porter, 2009) and which a set of variables was related to lagged values (Pindyck and Rubinfeld, 1998). Equation (8) shows the results of the simultaneous system equation of the expenditure method of Gross Domestic Product (GDP) by using the system equations and all the estimated coefficients in the equations show the expected signs.

The results show that explanatory variables accounted for about 31 percent of the variation in the In*GDP (Y) model (equation 8)*. Estimations reveal that the explanatory variables, namely development expenditure (InDE) and trade balance (InTB), were the most important explanatory variables with statistically significance at the 0.10 level and 0.05 in the In*GDP (Y) model* (Table 1).

$$InY_t = 0.019 + 0.019InDE_{t-1} + 0.0151InI_{t-1} + 0.053InTB_{t-1} + 0.004\ e_t \quad (8)$$

t-statistic = [1.805*] [0.0585^{ns}] [2.958**]

$R^2 = 0.315$; Adjusted $R^2 = 0.283$; d = 1.7701

The equation (8) shows that 1 unit increase in trade balance (TB) will lead to 0.053 increases in GDP (Y). Similarly, 1 unit increase in Development Expenditure (DE) and Investment (I) will lead to 0.019 and 0.015 increase in GDP (Y) respectively.

In the Development Expenditure (DE) model. The explanatory variables accounted for about 0.667 percent of the variation. Estimations reveal that the explanatory variables Investment (I) is the most important variable at significant level 0.01 and GDP (Y) and Trade Balance (TB) were not important explanatory variables with statistically significance at the 0.05 level in the (*DE) model*

$$InDE_t = -0.089 + 2.489InY_{t-1} + 1.762\ I_{t-1} + 0.349TB_{t-1} + 0.055611\ e_t \quad (9)$$

t-statistic = [1.805*] [9.434***] [1.640^{ns}]

$R^2 = 0.667$; Adjusted $R^2 = 0.661$; d = 2.719

The equation (9) shows that 1 unit increase in Investment (InI) will lead to 1.762 increases in Development Expenditure (InDE). Similarly, 1 unit increase in GDP (InY) and Trade Balance (InTB) will lead to 2.489 and 0.349 increases in Development (DE) respectively.

In the Investment (InI) model. The explanatory variables accounted for about 0.647 percent of the variation in the Investment Expenditure (I) model. Estimations reveal that the explanatory variables, namely Development Expenditure (InDE) and Trade Balance (InTB) were the most important explanatory variables with statistically significance at the 0.01 level and 0.05level in *(I) model*.

$$InI_t = 0.019 + 0.358InY_{t-1} + 0.332InDE_{t-1} - 0.183InTB_{t-1} + 0.024\ e_t \quad (10)$$

t-statistic = [0.585^{ns}][9.434^{***}][-2.008^{**}]

$R^2 = 0.647$; Adjusted $R^2 = 0.631$; d = 2.750

The equation (10) shows that 1 unit increase in Development Expenditure (InDE) will lead to 0.332 unit increase in Investment (InI). Similarly, 1 unit increase in GDP (InY) and Trade Balance (InTB) will lead to 0.358 and 0.024 unit increase in Development (InDE) respectively.

In the Trade Balance (InTB) model. The explanatory variables accounted for about 0.204 percent of the variation in the Trade Balancel. Estimations reveal that the explanatory variables, namely GDP (InY) and Investment (InI) were the most important explanatory variables with statistically significance at the 0.05 level in the (In*TB) model.*

$$InTB_t = -0.31 + 0.117InY_{t-1} - 0.327InDE_{t-1} - 0.031InI_{t-1} + 0.032\ e_t \quad (11)$$

t-statistic = [2.958**][1.640^{ns}] [-2.008^{**}]

$R^2 = 0.204$; Adjusted $R^2 = 0.1667$; d = 2.195

The equation (11) shows that 1 unit increase in GDP (InY) will lead to 0.3117 unit increase in Trade Balance (InTB). Similarly, 1 unit increase in Development Expenditure (InDE) and Investment (InI) will lead to 0.327 and 0.032 unit increase in Trade Balance (InTB) respectively.

The residual diagnosis of normality test (Jarque- Beta), heteroscedasticty (white test), Serial Correlation test and Multicollinearity test showed in table 4.3.

Table 4.3: Summary of Residual Diagnosis

Diagnostic Tests	Results	Hypothesis	Decision
Normality test (Jarque-Bera)	JB statistics: 0.5056 Prob. value: 0.8731	Normality test H_0: error term is normally distributed H_A: error term is not normally distributed	P-value >0.05 H_0 is accepted. H_A is rejected.
Heteroscedasticity test (White)	Prob. F(3,64): 0.0130 Prob. Chi-Square (1): 0.0147	H_0: The variance is homoscedasticity H_A: The variance is heteroscedasticity	P-value >0.01 H_0 is accepted. H_A is rejected.
Serial Correlation test (LM)	Prob. F(1,62): 0.4177 Prob. Chi-Square (1): 0.4019	H_0: There is no autocorrelation among the residuals H_A: There is autocorrelation among the residuals	P-value >0.05 H_0 is accepted. H_A is rejected.
Multicollinearity test (Variance Inflation Factor)	VIF	H_0: No multicollinearity among the variables H_A: There is multicollinearity among the variables.	1<VIF<5 H_0 is accepted. H_A is rejected.

5. Conclusion

The simultaneously equation model applied in this study to examine the relationship between GDP and development expenditure (DE), investment (I) and trade balance (TB). The result showed that Development Expenditure (DE) and Trade Balance (TB) are the most important variables determine the GDP, but development expenditure (DE) appeared to be not significant to GDP, trade balance and investment. Thus, the results contradict to Wagner's Law of government expenditure generally rises in tandem with income increases. The possible explanations that can be draw from the results either the size of government is driven by from non-economic factors, or insufficient public expenditure is channel toward development expenditure, and the development expenditure (DE) is simply not productive or supportive toward long term economic growth in Malaysia. Thus, realign the allocation of public expenditure in operating and development expenditure and assess the effectiveness of each components of public expenditure can lead to more effectiveness fiscal policy in support long term economic growth.

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