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Economic Growth and Government Expenditure in ASEAN Countries: A Threshold Approach

Hoa Thi Nguyen
Faculty of Finance – Banking, University of Finance – Marketing, Ho Chi Minh City, Vietnam

ABSTRACT: This study examines the effect of government spending on the economic growth of ASEAN countries between 2000 and 2020, using estimates for panel data. The results show that government spending responds positively to the economic growth of ASEAN countries. Intriguingly, this study finds a threshold level for government spending that reduces economic growth if governments let it exceeds 26.82 percent of GDP. Therefore, this study recommends that ASEAN governments need to pursue targeted and rational spending policies.

KEYWORDS: ASEAN, Economic growth, Government expenditure, Panel data, Threshold.

1. INTRODUCTION

The role of government spending on output growth has long been debated in the economic literature. This topic is becoming increasingly important now as both developed and developing economies are facing new challenges to meet their fiscal requirements. In advancing economies, such as ASEAN countries, concerns arise from many factors, including growing public debt, high welfare costs, and low tax collection (Khan et al., 2020). While all of these factors require a balance between government spending and tax revenues, the issues regarding the sustainability and effectiveness of government expenditures are still debated in many studies.

Economic theory offers conflicting views on the relationship between government spending and economic growth. Keynesian growth theory and endogenous growth model proposed by Barro (1990) and Barro and Xavier (1992) support the role of expanding fiscal policy in enhancing economic performance. By implementing an expansionary fiscal policy, the government stimulates real GDP mainly by increasing spending through a multiplier effect (Keynes, 1936 in Harcourt and Coddington, 1984). Meanwhile, endogenous growth theory holds that the crowding in the phenomenon of government spending leads to an increase in private investment and thus promotes growth in the long run (Barro, 1990). This model argues that the government influences long-run economic growth through expenditures on human capital formation as well as technological innovation. Subsequent studies include Ram (1987) and Kormendi and Meguire (1986), who report a positive association between government spending and economic growth. These authors argue that large public spending ensures the availability of public goods and provides an insurance function for private investment.

Contrastingly, the classical and neoclassical perspectives consider expanding fiscal policies as futile due to direct and indirect side effects. Fölster and Henrekson (2001), Afonso and Furceri (2010), and Nurudeen and Usman (2010) indicate that the increase in public spending decelerates the advance of the national economy. These theories suggest that increased public expenditures cause the replacement of private goods with public goods, reducing private spending even on key goods and services. Indirectly, the public investment and governmental expenditures create pressure on credit markets, thereby pushing up interest rates (Ahmed and Miller, 2000). Once interest rates rise, they affect the government and everyone else, including the private sector, which stifles private investment and hinders economic growth. Furthermore, this perspective argues that the government may choose to finance its increased spending by raising taxes, which can distort market prices, and resource allocations and even attract tax evasion/avoidance behaviors, eventually negatively impacting the economic growth (Antwi et al., 2013; Widmalm, 2001). Thus, the relationship between the government's spending and economic growth has been controversial empirically and theoretically.

ASEAN countries have close linkages both geographically and economically, and commercially. Therefore, the instability in the economic growth of any member will lead to general instability due to interconnectedness. However, member countries also have their own characteristics in economic and trade activities. Therefore, considering the issues of taxation and government

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spending on economic growth in ASEAN countries, common conclusions can be drawn to apply to the whole bloc to maintain the growth of the whole ASEAN is necessary. This article consists of 5 sections: Section 1 presents an Introduction, Section 2 reviews previous studies and develops the proper models, Section 3 illustrates the data and method, Section 4 shows the main findings, and Section 5 gives the conclusions and policy implications.

2. LITERATURE REVIEW AND DEVELOPED MODELS

Although public spending is considered necessary to provide infrastructure and protect property rights, the large scale of government spending reduces the efficiency of private investment and increases taxes (Christie, 2012). These competing views have been supported by previous empirical literature and are divided into two groups: one group asserts that government spending is necessary and should be increased to ensure stability and support income distribution adjustment. For example, Alexiou (2009) used both the fixed effects model and the random coefficient model to empirically analyze the link between economic growth and government expenditure in the economies of South-Eastern Europe (SEE) from 1995 to 2005. According to the findings, government spending had a beneficial impact on economic growth in the countries studied. Similarly, Kimaro et al. (2017) conducted an empirical study of the influence and efficiency of government spending on economic growth in 25 low-income SSA nations from 2002 to 2015. The study's findings reveal that government spending and economic growth in the study countries are favorably associated. Recently, Ahuja and Pandit (2020) used a larger panel data set spanning 59 nations from 1990 to 2019, and they re-examined the relationship between public spending and economic development. Empirical findings corroborate the Keynesian approach, which emphasizes the role of government spending in promoting economic growth. Furthermore, after controlling for all other variables such as trade accessibility, investment, and inflation, the analysis shows that public spending has a beneficial impact on economic growth.

However, others, such as Landau (1983), Guseh (1997), Fölster and Henrekson (2001), and Dar and Amirkhalkhali (2002), argue that government spending reduces the growth rate. Recently, Ndambiri et al. (2012) investigated the causes of economic growth in a panel of 19 Sub-Saharan African countries. Surprisingly, government spending causes negative economic development in the nations using the Generalised Moments (GMM) method. Sáez et al. (2017) examined the relationship between government spending and economic development in European Union countries and used the data from 1994 to 2012. The study's findings found that, while the relationship between government spending and economic growth can be positive or negative depending on the nations included in the sample, it is generally positive. Government expenditure negatively influences economic growth in European Union countries, regardless of the period of estimation or the variables used to proxy the public spending. Thus, these contrasting views suggest that the relationship between government spending and economic growth needs to be further examined in a specific spatial and temporal context.

Therefore, this study uses neoclassical theory to evaluate the relationship between spending and growth, according to the Cobb-Douglas production function as the following equation:

$$Y_t = A_t L_t^{\varepsilon} K_t^{\omega} \text{ với } \omega + \varepsilon = 1 \quad (1)$$

Model (1) is then converted to a natural logarithmic form:

$$\ln Y_t = \ln A_t + \varepsilon \ln L_t + \omega \ln K_t \quad (2)$$

So next, the model that considers the effect of public spending on economic growth is determined from equation (1) where K_t, assuming that capital is financed by government spending and foreign investment, then we have:

$$K_t = \alpha_{11} GOVE_t + \alpha_{12} FDI_t \quad (3)$$

Substituting into equation (3), we have

$$\ln Y_t = \ln A_t + \varepsilon \ln L_t + \omega \ln(\alpha_{11} GOVE_t + \alpha_{12} FDI_t) \quad (4)$$

where A_t is a composite factor of productivity, and this study uses economic openness to productivity with the argument that the more comprehensive the openness, the higher the connectivity between capital and technology, thereby boosting productivity. L_t represents the growth of the labor force and is measured by population growth. $GOVE_t$ represents the government spending, including current expenditure and public investment. In addition, to control for unobservable factors of the model (3), the study introduces the variable FDI_t, foreign direct investment, as in previous studies for ASEAN countries in the period 2002 – 2020, as suggested by Nguyen et al. (2020), Van et al. (2020), Phung et al. (2019), Luu et al. (2017), and Omri and Sassi-Tmar (2015). Thus, equation (4) is rewritten as follows:

$$Y_{i,t} = \beta_{11} GOVE_{i,t} + \beta_{12} FDI_{i,t} + \beta_{13} POPG_{i,t} + \beta_{14} OPEN_{i,t} + \beta_{15} INF_{i,t} + \varepsilon_{i,t} \quad (5)$$

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Other research suggests that the opposing effects of public spending on economic development exist at different levels of government spending, supporting an inverse U-shaped relationship between public spending and GDP growth (Barro, 1990; Scully, 1995). Armey argues that when government size is close to zero, additional public spending is required to provide infrastructure, law, and administrative layers. Inversely, excessive government spending leads to higher taxes and public debt levels (Asimakopoulos and Karavias, 2016). Also, excessive government size reduces output growth by reducing export performance (Bournakis and Tsoukis, 2016). These findings suggest that the government's share of the economy is optimal. In other words, optimal government spending generates a benefit equal to its replacement cost and should not exceed a certain level.

Recent empirical research on the topic supports positive, negative, and non-linear connections between public size and economic growth. For example, Dar and Amirkhalkhali (2002), Bergh and Karlsson (2009) found that public expenditure has a negative impact on output growth. A positive relationship between the two factors was shown in various research, including Bose et al. (2007) and Romero-Ávila and Strauch (2008). Some researchers use country-specific datasets to examine the non-linear relationship between variables. According to Rezk (2005) and Facchini and Melki (2013), some countries, such as Argentine and French economies, have an inverted U-shaped relationship. These two studies found that 30% government expenditure is ideal for some economies. They observed non-linear effects of government size on export performance in 18 OECD nations. Most studies recommend keeping government spending below 16% of GDP to maximize exports. Therefore, this study establishes the following model by approaching this non-linear argument:

$$Y_{i,t} = \beta'_{11} GOVE_{i,t} + \beta'_{12} GOVE^2{}_{i,t} + \beta'_{13} FDI_{i,t} + \beta'_{14} POPG_{i,t} + \beta'_{15} OPEN_{i,t} + \beta'_{16} INF_{i,t} + \varepsilon_{i,t} \quad (6)$$

Taking the first derivative of the above equations, according to GOVE, we have:

$$Y' = \beta'_{11} + 2\beta'_{12} GOVE \quad (7)$$

To find the highest value of Y according to $GOVE$, $Y' = 0$ is required, from which we have the highest value of the $GOVE$ (ζ_1) as follows: $\zeta_1 = \frac{\beta'_{11}}{-2\beta'_{12}}$. From the threshold value ζ_1 of the $GOVE$, we can determine two separate equations according to the threshold as follows:

$$Y_{i,t} = \beta'_{11A} GOVE_{i,t} + \beta'_{12A} FDI_{i,t} + \beta'_{13A} POPG_{i,t} + \beta'_{14A} OPEN_{i,t} + \beta'_{15A} INF_{i,t} + (\zeta_{1_{i,t}} + \varepsilon_{i,t}) \text{, với } GOVE_{i,t} < \zeta_1 \quad (7)$$

$$Y_{i,t} = \beta'_{11B} GOVE_{i,t} + \beta'_{12B} FDI_{i,t} + \beta'_{13B} POPG_{i,t} + \beta'_{14B} OPEN_{i,t} + \beta'_{15B} INF_{i,t} + (\zeta_{1_{i,t}} + \varepsilon_{i,t}) \text{, với } GOVE_{i,t} \geq \zeta_1 \quad (8)$$

3. DATA

This study structures data in the form of panel data, which results from a combination of time series and cross-sectional data used in many social sciences today (Baltagi, 2008; Gujarati et al., 2017). In other words, panel data represent characteristics of embedded units or individuals over time or vice versa, and each time point is fixed on different characteristics of the units (Petersen, 2008). Therefore, to ensure information maximization, including observable and unobserved information in both spatial and temporal dimensions, the data of the study are organized as panel data with higher degrees of freedom (Gujarati et al., 2017). Data is collected from 08 countries in ASEAN (including Brunei, Cambodia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam) in the period 2002 - 2020, extracted from the Worldbank database. The methodology is applied by the fixed-effect model (FEM), random-effect model (REM), and instrumental variables regression (IVREG), which have been used widely in previous studies.

Table 1. Definitions and descriptive statistics of variables

Variable	Variable	Definition and description
The logarithm of economic growth	LNGDPC	The logarithm of gross domestic product at current prices, from Worldbank
The ratio of total government expenditure to GDP	GOVE	Ratio of total government expenditure to gross domestic product, from Worldbank (%)
Foreign investment ratio	FDI	Ratio of foreign investment capital to gross domestic product, from Worldbank (%)
Inflation rate	INF	*Changes in consumer prices*, from Worldbank (%)
Population growth rate	POPG	Population growth rate, from Worldbank (%)
The level of integration of the economy	OPEN	Including the ratio of exports and imports to gross domestic product, from Worldbank (%)

(***Source**: The author summarizes)*

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4. RESEARCH RESULTS AND DISCUSSIONS

4.1. Descriptive statistics

Study data is defined and described in Table 2 below.

Table 2. Descriptive statistics of variables

Variable	Observation	Mean	Standard deviation	Min	Max
LNGDPC	152	24.932	1.588	21.288	27.023
GOVE	152	21.703	6.090	9.015	41.558
FDI	152	6.358	6.600	-1.321	32.170
INF	152	3.340	3.884	-2.315	24.997
POPG	152	1.365	0.693	-1.475	5.322
OPEN	152	148.651	90.422	55.825	437.327

*(So**urce:** Author's calculations)*

4.2. The correlation matrix

Table 3 below presents the correlation between the variables in this study. It can be seen that the variable representing government expenditure is correlated and statistically significant with the remaining control variables in the model. This can lead to autocorrelation and endogenous when performing regression estimates with lagged variables.

Table 3. Correlation matrix of variables

	LNGDPC	GOVE	FDI	INF	POPG	OPEN
LNGDPC	1.000					
GOVE	-0.170**	1.000				
FDI	0.137*	-0.446***	1.000			
INF	-0.191**	-0.306***	-0.084	1.000		
POPG	-0.189**	-0.172**	0.076	0.079	1.000	
OPEN	0.370***	-0.419***	0.760***	-0.126	0.184**	1.000

***(Source:** Author's calculations)*

4.3. Empirical results between government expenditure and economic growth

Hausman test results with a p-value of 0.001 show that FEM estimation is appropriate. Then, the authors conducted testing of variance by Breusch and Pagan Lagrangian tests for the FEM model; the results showed that the p-value is 0.000 (value only reached 27.81), rejecting the null hypothesis can be concluded that the FEM regression model has the phenomenon of heteroscedasticity. Furthermore, the Durbin-Wu-Hausman test for the FEM regression model suggests that the OLS estimate maybe not be robust, indicative of an endogenous problem. Sargan-Hansen test yields a p-value of 0.510, accepting the null hypothesis of a set of suitable instrument variables. Therefore, the IVREG estimation model with instrumental variable and fixed effect gives optimal results and can be used to explain the effect of public expenditure on economic growth.

Table 4. Public expenditure and economic growth: FEM, REM, and IVREG methods (Dependent variable: The logarithm of current GDP)

Variables (LNGDPC)	FEM		REM		IVREG	
	Coef	p-value	Coef	p-value	Coef	p-value
GOVE	0.031	0.027	0.029	0.042	0.070	0.001
FDI	0.064	0.000	0.062	0.000	0.026	0.069

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INF	-0.027	0.003	-0.029	0.030	-0.026	0.033
POPG	-0.046	0.575	-0.072	0.380	-0.066	0.472
OPEN	0.001	0.780	0.001	0.463	0.001	0.963
Const	23.915	0.000	23.900	0.000	23.509	0.000
Hausman test	Chi2 (5) = 15.31 (Prob > Chi2 = 0.009)					
Modified Wald test	Chibar2 (8) = 27.81 (Prob > Chibar2 = 0.001)					
Durbin–Wu–Hausman test	Prob > F = 0.044					
Sargan-Hansen test					Chi-sq(1) = 0.433 (p-value = 0.510)	

*(**Source:** Author's calculations)*

Based on the regression results, the impact of the source $GOVE$ on economic growth is positive, reaching 0.070 points with a statistical significance of 1%. This result was not different in both previous FEM and REM regression models, but IVREG gave more optimal results based on the presented tests. Based on this, we can see that economic growth increases as government expenditure increases, in line with the study of Kormendi and Meguire (1986); Ram (1987); Schaltegger and Torgler (2006), Osborne (2006); and Aydın et al. (2016). The authors of this school explain that government expenditure is necessary and should be increased in such cases to ensure stability and support the adjustment of the income distribution. Next, based on the previous literature on the debate about the effect of public spending on economic growth, this study estimates the threshold regression model for the variables representing public expenditure on economic growth as equation (6). The estimated results are presented in Table 5.

Table 5. Thresholds for public expenditure and economic growth: FEM, REM, and IVREG methods (Dependent variable: The logarithm of current GDP)

Variable (LNGDPC)	FEM		REM		IVREG	
	Coef	p-value	Coef	p-value	Coef	p-value
GOVE	0.155	0.001	0.157	0.001	0.388	0.037
$GOVE^2$	-0.003	0.008	-0.003	0.006	-0.007	0.055
FDI	0.061	0.000	0.061	0.000	0.015	0.386
INF	-0.024	0.061	-0.024	0.054	-0.019	0.188
POPG	0.001	0.987	-0.013	0.868	-0.044	0.670
OPEN	0.001	0.867	0.001	0.633	0.001	0.592
Const	22.536	0.000	22.476	0.000	20.147	0.000
Hausman test	Chi2 (6) = 8.32 (Prob > Chi2 = 0.216					
Modified Wald test	Chibar2 (01) = 456.36 (Prob > Chibar2 = 0.000)					
Durbin–Wu–Hausman test	Prob > F = 0.0000					
Sargan-Hansen test					Chi-sq(2) = 0.172 (p-value = 0.678)	
Threshold value					26.816***	

*(**Source:** Author's calculations)*

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Estimates show that both variables $GOVE$ and variables $GOVE2$ have opposite impacts and are statistically significant at 5%. Empirical results for ASEAN countries confirm a non-linear relationship between public expenditure and economic growth, consistent with Barro (1990). Therefore, to determine the threshold level of$GOVE$, by taking the first-order derivative of both variables and by$LNGDPC$, we have:

$$Y' = 0.388 - 2 * 0.007GOVE$$

To find the highest value of the required variable$Y' = 0$, we have the highest value of the variable (ζ) reached is 26,816.

4.4. Robustness check

From the threshold value of the variable $GOVE$, we can determine 02 separate equations according to the IVREG threshold regression method as follows:

Table 6. Thresholds for public expenditure and economic growth: IVREG methodology (Dependent variable: The logarithm of current GDP)

Variable (LNGDPC)	**IVREG**		**IVREG**	
	Coef	**p-value**	**Coef**	**p-value**
GOVE	0.081	0.000	0.028	0.026
HGOVE > 26.816	-0.016	0.033		
LGOVE ≤ 26.816			0.032	0.077
FDI	0.013	0.367	0.013	0.360
INF	-0.021	0.063	-0.028	0.015
POPG	-0.132	0.145	-0.0=137	0.142
OPEN	0.002	0.230	0.002	0.323
Const	23.212	0.000	23.847	0.000
Sargan-Hansen	Chi-sq(1) = 3.037 (p-value = 0.081)		Chi-sq(1) = 2.400 (p-value = 0.121)	

*(**Source:** Author's calculations)*

Consistent with previous studies, it is argued that when government expenditure decreases close to zero, additional public expenditure is needed to provide legal, administrative, and governance infrastructure. Conversely, when government expenditure exceeds certain levels (found in this study to be 26,816%), undue government expenses will cause more taxes and increase public debt. Moreover, too large government expenditure reduces output growth due to its negative impact on the export performance of economies (Bournakis and Tsoukis, 2016). This study found that the results were consistent with some previous studies, such as Rezk (2005) and Facchini and Melki (2013) reported that 30% of government size was optimal for selected economies.

5. CONCLUSIONS AND POLICY IMPLICATIONS

This study examines the relationship between government spending and economic growth, taking into account the non-linear effects of the rate of expenditure, using macro data for nine ASEAN countries (Brunei, Cambodia, Indonesia, Laos, Malaysia, Philippines, Singapore, Thailand, and Vietnam) from the World Bank database for the period 2000-2020. This study employs panel data estimations that account for endogenous and heteroscedasticity problems.

The study results show that government spending contributes to economic growth, supporting the Keynesian theory of the significant role of the government. The study also found that government spending is limited. Like Armey's theory with the argument of diminishing factor returns, it holds that initially, when government size is close to zero, additional public spending is needed to provide infrastructure as well as technology, thereby boosting the productivity of other inputs, such as labor and private capital. As a result, it reduces unit output costs, increases capital gains, and promotes economic growth (Cohen and Paul, 2004; Agénor, 2004). Conversely, when the government's expenditure exceeds a certain threshold, it will increase the budget deficit and increase the level of public debt (Asimakopoulos and Karavias, 2016). Furthermore, excessive government spending causes crowding out of other sectors, reducing output (Bournakis and Tsoukis, 2016). In this study, the optimal spending threshold was 26.816% of GDP, which

is consistent with some previous studies, such as Rezk (2005) and Facchini and Melki (2013), which reported 30% of government size as optimal for selected economies.

Therefore, this study offers some recommendations for policymakers. As a result of this study and some previous studies by Ahmed and Miller (2000), Farla et al. (2016), and Nguyen and Trinh (2018), public spending can crowd out other forms of capital investment in the economy, so it becomes necessary to control government spending. The government needs to improve accountability and transparency in the management and use of public investment capital and in current spending activities at all levels of management. This requires the government to keep a top priority on reforming the public financial system. In addition, it is necessary to continue to have supportive policies in terms of capital, technology, human resources, and the market to encourage investment activities in the economy. Besides, the selection, evaluation, and approval of an investment portfolio should be made carefully and appropriately.

This study is limited by looking at government spending and economic growth, ignoring the expenditure structure due to the lack of necessary data on ASEAN countries. The following studies need to clarify the structure of expenditure in order to determine which types of spending have negative/positive impacts on economic growth, thereby providing the necessary incentives, solutions, and support from the government.

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