UNIVERSITY OF MISKOLC

FACULTY OF ECONOMICS

LEANGHAK HOK

Role of Government Spending in Economic Growth and Competitiveness: Evidence from Cambodia

Theses of the Ph.D. Dissertation

Name of Doctoral School: Enterprise Theory and Practice

Head of Doctoral School: Prof. Dr. Balaton Károly

Scientific supervisor: Assoc. Prof. Dr. Zoltán Bartha

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1 Introduction

The most crucial goal of countries is to achieve sustainable economic growth. Economic policies highly influence the economy, people's wealth, and living standards (Ng, 2018). The exogenous models introduced by Solow (1956) and Swan (1956) only explain the favorable response of economic growth to the enhancement of capital and labor when technology is unchanged. The endogenous model developed by Barro (1990) incorporates government spending in the growth model and concludes that changes in public spending also play a crucial role in economic growth. The role of government spending is drawing the attention of scholars from both industrial and non-industrial countries. The adaptation of various policy options responds to different economic conditions. Many emerging market countries (Brazil, China, and India) has adopted an expansionary fiscal policy and attribute a part of their high economic growth in recent years to the extension of government spending. In several works in the literature, public expenditure policies play an essential role in facilitating economic growth (Aschauer, 1989; Farhadi, 2015; Kodongo & Ojah, 2016), economic development (Iheanacho, 2016; Molnar et al., 2006), competitiveness and other areas of economic activities (Chen & Liu, 2018; Ravn et al., 2012). Several European countries during the period from 2013 to 2015 were involved in contractionary fiscal policy through a reduction in government spending to handle fiscal austerity (fiscal imbalance) as a serious concern (European Parliament, 2017). Less-efficient categories of expenditure can be diverted to financing productive categories or rectifying fiscal imbalance (IMF, 1995).

When government spending is productive has been questioned. Productive government expenditure positively contributes to total factor productivity (TFP) and living standards (Bucci et al., 2012; Facchini & Seghezza, 2018). Government spending introduced to overcome market failures (e.g., collective goods, externalities, and natural monopolies) can be productive (Hansson & Henrekson, 1994). Public spending is especially essential to the output growth of developing countries (Shen et al., 2018; Shonchoy, 2010). Sattar (1993) suggests that governments of developing countries are more effective than developed countries in managing their expenditure to correct distortions and market failures, to offer public goods and services (e.g., economic and social infrastructure), to regulate private activities producing a harmful effect to society, and to engage in highly productive activities. Developed countries mainly focus on redistribution and income security to expand their welfare. Private sectors in developed countries often have enough freedom to carry out highly productive activities (i.e., provision of a communication network, education, health, and R&D) in the market, thus leading to a smaller impact of government spending on productive activities in the market. While a large fraction of government expenditure in developing countries goes to physical and social infrastructure, this productive investment generates a close connection between government spending and productivity growth. But then governments, especially in developing countries, have to limit the level of government spending, thereby allowing their spending, which may produce economic growth (Butkiewicz & Yanikkaya, 2011).

Since the global crisis of 2008, fiscal policy has been used to make a recovery from this crisis. Some governments borrow money to finance their expenditure and bail out the banking industry, therefore rapidly accumulating public debt (e.g., Italy, Spain, the USA, and especially Greece). A result of this is that economic growth may be harmed. For example, Greece in 2010 faced a debt crisis which impinged on not only its own economy but also others, especially the European economy. Some scholars have found that economic growth responds negatively to an increase in government spending (Butkiewicz & Yanikkaya, 2011; Dar & AmirKhalkhali, 2002; Fölster & Henrekson, 2001; Hasnul, 2015; Landau, 1983). Additionally, this negative

result can occur due to the inefficiency of public investment management, thereby leading to unproductive investment.

Most of the literature indicates that economic and social factors taken into account in structural models, econometric methods, the economy of each state, magnitude of government spending, and the length of data can lead to fluctuation in the estimated value of the fiscal multiplier. The estimated value of the government spending multiplier varies: 2.3 (Eggertsson, 2011), 1.8 (Gordon & Krenn, 2010), 1.6 (Romer & Bernstein, 2009), 1.5 (Erickson et al., 2015), 1.2 (Atems, 2019; Ramey, 2011), 0.8 (Barro, 1981), and 0.6 (Guo et al., 2016). If the value of the fiscal multiplier is larger than one, government spending drives not only output but also the activities of private sectors. A value of fiscal multiplier below one indicates that a decrease in output and businesses of private sectors is the response to higher government expenditure. The reason is that a dollar of government spending generates less than a dollar for output.

The magnitude of government spending has been debated during the last decade, especially since the Greek debt crisis. Government expenditure encourages economic growth as long as financing sources of the spending come from the nation's own revenues but not from a deficit (Morozumi & Veiga, 2016). A higher ratio of government expenditure to output diminishes the value of the government expenditure multiplier (Barro, 1990; C. Chen et al., 2017). Most of the recent research has found an inverted-U shaped linkage between government spending and output growth (Altunc & Aydın, 2013; C. Chen et al., 2017; Hok et al., 2014; Makin et al., 2019). The optimal level of government spending varies according to the economy of each country, econometric methods, data set, and other factors included in the regression model.

Government intervention can have a positive or negative influence on economic performance. The direction of a reaction of output growth to public spending typically depends on several factors (e.g., magnitude and types of expenditure). A diminishing rate of economic growth in response to the higher value of public spending leads to a non-linear relation between the magnitude of government spending and economic growth. According to the main development models and experiences around the globe about fiscal policy (government spending), the extension of government expenditure is not certain to lead to economic growth.

Cambodia was classified as a lower-middle-income developing country in 2016 (UNDP, 2018). The Cambodian government intends to maintain economic growth, thereby converging to upper-middle-income states. Well-designed fiscal policy can contribute significantly to Cambodia's sustainable development goals (SDGs) (IMF, 2019). Cambodia faced civil wars during the 70s, 80s, and 90s, so there are some challenges (e.g., weak physical infrastructure and inadequate human capital) in Cambodia's development history (Roy, 2015). Thus, the extension of government expenditure can create more incentive and a pleasant environment for investment in Cambodia. The global crisis in 2008 also worsened Cambodia's economy because the GDP growth rate sharply dropped from 6.7 percent in 2008 to 0.1 percent in 2009. Cambodia's public investment as a share of GDP jumped from 5.73 percent in 2008 to 8.20 percent in 2010. Government consumption as a share of GDP increased by approximately 0.71 percent in the same period. After 2010, Cambodia's government raised taxes because tax revenue as a share of GDP dramatically went up from 7.3 percent in 2010 to 14.6 percent in 2015.

It is necessary to raise three major research questions in this study, which explore the impact of government spending on private consumption, economic growth, and trade competitiveness in Cambodia.

How does government spending affect private consumption?

How does government spending contribute to economic growth?

How does competitiveness react to the expansion of government spending?

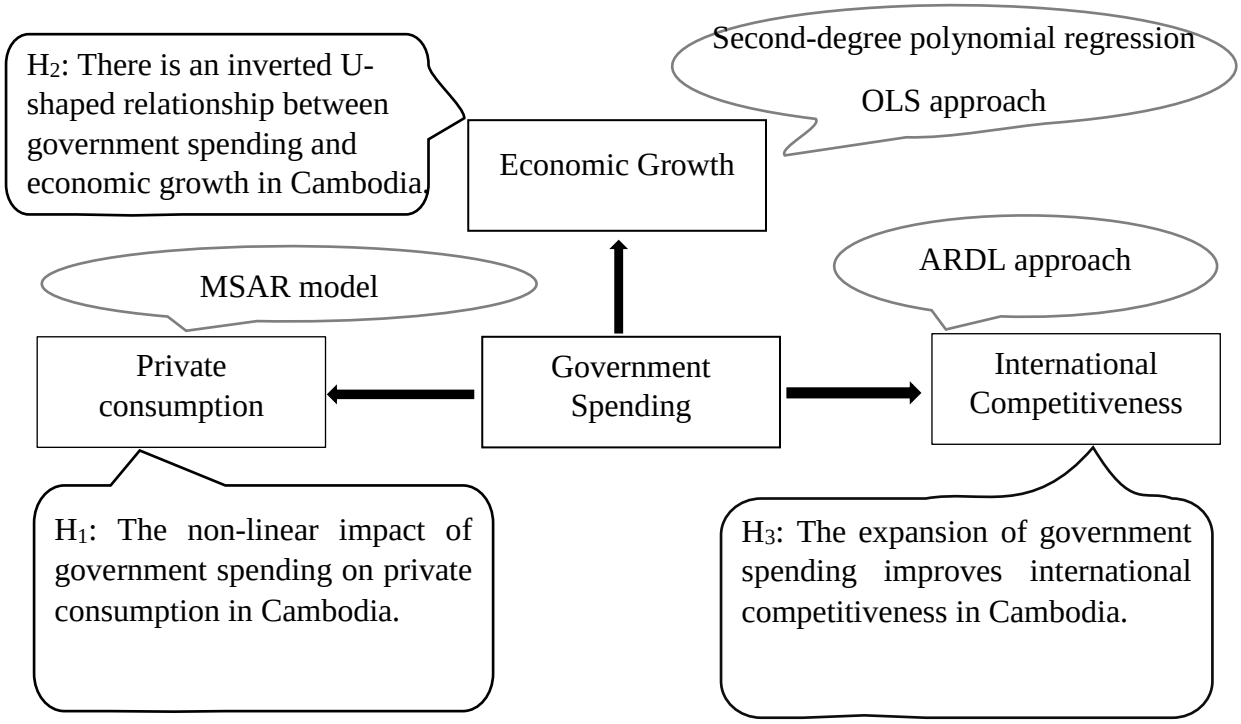
2 Objectives of the Study

There is uncertainty about the impact of government expenditure on economic growth and other areas of the economy, especially private consumption and international competitiveness. This study, therefore, investigates (1) the effect of government spending on private consumption (2) the contribution of government expenditure to economic growth and (3) the reaction of international competitiveness to a change in government expenditure. Three different models are used to conceptualize these three research objectives.

3 Scope of the Study

This study only focuses on the role of government spending in economic activities and uses empirical data from Cambodia. The annual data during the periods 1987-2015, 1971-2015, and 1970-2015 are selectively applied to analyze and to evaluate the first, second, and third hypotheses, respectively.

4 Conceptual Framework



Note: MSAR model stands for Markov-switching autoregressive model. OLS approach represents the Ordinary Least Square approach. ARDL approach denotes the Autoregressive Distributed Lags approach.

Figure 1: Conceptual framework of this dissertation

Source: author's sketch

Figure 1 depicts the proposed hypotheses and methods of analysis. The three hypotheses in this dissertation can be formulated as follows:

Giavazzi and Pagano (1990) and Amano and Wirjanto (1998) propose a non-linear effect (i.e., the occurrence of not only Keynesian but also non-Keynesian impact in a certain period) of government spending on private consumption. The government expenditure follows the

traditional Keynesian theory during the usual time, but a firm contradictory fiscal policy provoked by a high level of debt leads to the existence of a non-Keynesian effect (Giavazzi & Pagano, 1990). The first hypothesis of this study can thus be formed:

H_1: There is a non-linear impact of government spending on private consumption in Cambodia

According to Barro (1990), the optimal level of government spending exists because higher fiscal adjustment reduces the influence of government expenditure on economic growth. If government spending reaches the threshold level, the further extension of government expenditure slows down output growth. The second hypothesis of this study is based on Barro's observation:

H_2: There is an inverted-U shaped relationship between government spending and economic growth in Cambodia.

According to the Redux model of Obstfeld and Rogoff (1995), and the two-country model developed by Giorgio et al. (2018), expansionary fiscal policy depreciates the real exchange rate and thus boosts international competitiveness. The third hypothesis tested in this study is:

H_3: The expansion of government spending improves trade competitiveness in Cambodia.

Three diverse models are judiciously used to test these three hypotheses. Total government expenditure usually is split into two major types (i.e., current expenditure and capital expenditure). Current expenditure contains government final consumption expenditure and other current expenditures (transfer payment). Transfer payment can be identified as expenditure without involvement with the transition of goods and services. Capital expenditure (public investment) focuses on investment in goods and services, especially infrastructure investment (i.e., education, health, research and development, telecommunications, and transport), which generates long-run benefits. In this study, only public consumption as government final consumption expenditure (GFCE) and public investment as government fixed capital formation (GFCF) are investigated because transfer payment data are unavailable for Cambodia.

5 Non-linear Effect of Government Spending on Private Consumption

5.1 Methodology

5.1.1 Specific Model

Government spending can be divided into government consumption and investment. Barro (1981) introduced government consumption into the general model and investigated the consumption utility directly responds to a change in government purchases. Extensive research (seen in studies of Ahmed (1986), Karras (1994), Devereux et al. (1996), Giavazzi and Pagano (1996), and Giavazzi and Pagano (1996)) has demonstrated that government purchases play a direct role in influencing private consumption even though results vary regarding the relationship between them. Some empirical research undertaken by Wang and Gao (2011) and Ambler et al. (2017) suggests that public investment also becomes involved in the elasticity of private consumption via fluctuation in real wages.

The disposable income is not taken into account, thereby lessening the robustness of the linkage between government expenditure and private consumption (Graham, 1993). Ho (2001), Wang and Gao (2011), and Varlamova and Larionova (2015) indicate that disposable income plays a vital role in the elasticity of private consumption because the improvement of households' capability reacts to an increase in disposable income.

Based on the basic concept, the disposable income of households equals the sum of consumption and saving. Under budget constraint (no change of disposable income), a higher interest rate on savings produces more disincentive to households to make expenditures. According to new-Keynesian theory, an alternative explanation is that households usually participate in the credit market to smooth their future expenditure. The growth of interest rates leads to households to reduce the current consumption and to keep their money for spending in the future. A change in interest rates, therefore, affects household behavior towards consumption.

The fluctuation of inflation (i.e., a change in the price of commodities on a day-to-day basis) influences the cost of living and the capacity for household consumption. Some empirical studies carried out by Varlamova and Larionova (2015) and Sulekha et al. (2019) also indicate the existence of the connection between inflation and private consumption.

In this study, public investment and consumption, disposable income, interest rates, and inflation are taken into account. Thus, the regression model of private consumption can be written as follows:

$$CC_t = \beta_{0S} + \alpha_1 DIS_t + \alpha_2 RATE_t + \alpha_3 INF_t + \beta_{1S_t} GI_t + \beta_{2S_t} GC_t + \varepsilon_t, \quad (1)$$

where $t = 1987, 1988, ..., 2015$;

CC_t is private consumption as a share of GDP of Cambodia at time t;

DIS_t stands for disposable income as a share of GDP of Cambodia at time t;

$RATE_t$ refers to saving interest rate of Cambodia at time t;

INF_t represents inflation of Cambodia at time t;

GI_t is government investment as a share of GDP of Cambodia at time t;

GC_t stands for government consumption as a share of GDP of Cambodia at time t;

ε_t is residual at time t.

s as subscript of coefficient represents state (regime). If coefficients have this subscript, it means that the value of coefficients depends on regime.

5.1.2 Data Collection

Gross fixed investment as a percent of GDP can be a substitution for interest rates on savings (as seen in the studies of Solow (1956, 1957), Phelps (1961), Mankiw et al. (1992), and Hajamini and Falahi (2018)). To avoid multicollinearity between public investment and gross fixed investment, private investment as a share of GDP serves as a proxy for the interest rate on savings. Cambodian data from 1987 to 2015 equals 29 observations. Variables collected for this analysis are:

- Household final consumption expenditure (private consumption) as a share of GDP: consumption of goods and services made by resident households;
- Government final consumption expenditure (government purchases) as a share of GDP: general government consumes goods and services and spends on collective consumption services;
- Gross domestic product (GDP) at constant price 2011: total value of goods and services produced during a year;
- Government fixed capital formation (public investment) at constant price 2011: gross fixed capital formation only provided by central and subnational governments;

- Gross national saving as a percentage of GDP: the sum of savings from individuals, businesses, and government;
- Private investment at constant price 2011: infrastructure services delivered by private sectors;
- Inflation: rate of change in the general price level of goods and services sold in the country.

The three principal sources report the data of variables mentioned above:

- The United Nations Statistics Division's National Accounts Main Aggregates Database. The data of household final consumption expenditure as a share of GDP and government final consumption expenditure as a share of GDP are retrieved from the link:
  https://unstats.un.org/unsd/snaama/dnlList.asp
- The International Monetary Fund's (IMF) World Economic Outlook 2017 database. The link to access the data of gross national saving as a share of GDP and inflation is:
  http://www.imf.org/external/pubs/ft/weo/2017/02/weodata/index.aspx
- The Investment and Capital Stock Dataset of the IMF offers the data of the rest of the variables via the link:
  https://www.imf.org/external/np/fad/publicinvestment/

The transformation made to obtain the independent variables for this regression can be explained as follows:

- Disposable income as a share of GDP is the sum of household final consumption expenditure as a share of GDP and gross national savings as a share of GDP,
- Government investment at a constant price 2011 and private investment at a constant price 2011 divided by GDP at a constant price 2011 is government investment as a share of GDP and private investment as a share of GDP, respectively.

The data analysis is performed in STATA 15.1.

5.1.3 Markov-Switching Autoregressive Model

Identifying and defining potential periods of the nonlinear impact of fiscal adjustment becomes a sensitive issue in testing the non-linear effect of fiscal policy (government expenditure) on private consumption[1]. Based on the empirical studies in this area, researchers usually adopt two methods. In the case of the first method, the possible periods of the nonlinear effect of fiscal adjustment are pinpointed exogenously. Some empirical studies typically use various indicators as the identification of the potential periods. Cour et al. (1996) and McDermott and Wescott (1996) consider the primary structural balance to be one of the indicators, that causes trouble with inflation and real interest rates. The second indicator is the adjustment of government debt or purchases as a percent of GDP (Bertola & Drazen, 1993; Perotti, 1999). Distinctive indicators produce different definitions of time length for expansionary or contractionary fiscal policy. A year in length is used for the fiscal policy adjustment in the study of Alesina and Ardagna (1998). To reduce the possible occurrence of fiscal adjustment lasting a year, Giavazzi and Pagano (1996) impose some stringent conditions that refer to dummy variables of the

[1] The non-linear effect of government spending on private consumption means that there are Keynesian and non-Keynesian effects in certain period. Some years of this certain period have Keynesian effect or non-Keynesian effect. Keynesian effect indicates that the expansionary government spending encourages private consumption via the improvement of real wages. Non-Keynesian effect refers to a slowdown in private consumption in response to the extension of government spending.

cumulative change in structural deficit (see their study for more details). The methods of exogenous identification of the potential period of nonlinear fiscal effects are seemingly no different but generate disparate empirical outcomes. Based on the study of Kamps (2001) of 14 European countries, the significant level of this nonlinearity sensitively relies on the definitions of time length for nonlinear fiscal effects. The endogenous identification of possible periods of nonlinear fiscal impact is another method that does not limit the number of this nonlinearity's potential periods, which are estimated based on the real dataset (Höppner & Wesche, 2000; Wang & Gao, 2011).

The method of exogenous identification can generate an excessive number of possible periods of nonlinearity or miss fiscal adjustment periods of less than a year in length. Thus, this study adopts the Markov-Switching Autoregressive (MSAR) model (see Hamilton (1989) and Chang et al. (2017)) as the method of identifying the potential periods of nonlinear fiscal effects endogenously. The MSAR model refers to a discrete-time process, which depends on two components, such as dynamics of the observed process (i.e., dependent variable's process) and hidden process (i.e., finite-state or finite-regime Markov chain). The MSAR model is also conditional upon autoregressions and classifies sample observations into a small number of homogenous groups, so-called regimes. The Markov regime-switching model with AR improves the accuracy of estimated transition probabilities and the effectiveness of parameter estimates.

In our model, we do not deal with systematic errors due to tag time series. The measurement errors can be recorded from two components (i.e., random and systematic error). We had no technical information to qualify the systematic error, so it was assumed to be null. The MSAR model in our study is a homogenous hidden Markov chain and autoregressive model. AR term in this MSAR model becomes an AR(p) process of residual time series. p denotes the number of AR. Based on the literature, scholars argue that two effects (negative or positive) of government spending on private consumption may exist in a certain period. Wang and Gao (2011) used two regimes (i.e., $s_t = 1$ and $s_t = 2$) of the Markov regime-switching model and estimated with annual data and time interval from 1978 to 2008. Thus, we propose two regimes and assume the errors to be homogenous across the regime in our analysis. The optimal lags selected by BIC (Bayesian Information Criterion developed by Schwarz (1978)) are one ($p = 1$). This study only uses the first level of AR. Therefore, equation (3.1) can be rewritten under the MSAR model with the first level of AR:

$$CC_t = \beta_{0s_t} + \alpha_1 DIS_t + \alpha_2 RATE_t + \alpha_3 INF_t + \beta_{1s_t} GI_t + \beta_{2s_t} GC_t$$
$$+\phi_{1,s_t}\left(CC_{t-1} - \beta_{0s_{t-1}} - \alpha_1 DIS_{t-1} - \alpha_2 RATE_{t-1} - \alpha_3 INF_{t-1} - \beta_{1s_{t-1}} GI_{t-1} - \beta_{2s_{t-1}} GC_{t-1}\right) + \varepsilon_{s_t}, \qquad (2)$$

where β_{0s_t}, β_{1s_t}, and β_{2s_t} are the parameters with characteristics of regime-switching or state-dependence. α_1, α_2, and α_3 assume no change with states (regimes) and are included in the regression model to increase the number of degrees of freedom. ϕ_{1,s_t} refers to the first AR term of state s_t. ε_{s_t} is residual with zero mean and state-dependent variance $iid(0, \sigma^2)$.

5.2 Results and Discussion

5.2.1 Estimation

It is strictly necessary to identify the natural data trend before executing the time series analysis. The unit-root test demonstrates that the time series of data consists of a deterministic trend (stationary data in order zero) or stochastic trend (stationary data in order one) (Kirchgässner

et al., 2013). The Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979), like the famous unit-root test, is based on differencing to transform non-stationarity to stationarity. However, the ADF test heavily depends on lag length, so choosing the optimal time lag is subject to minimizing the value of Bayesian Information Criterion (BIC) proposed by Schwarz (1978). The null hypothesis of this test suggests a unit root or non-stationarity. The result of the unit-root test reported in Table 1 indicates that explained and explanatory variables are stationary at order zero I(0). Exceptionally, a predictor (*RATE*) is stationary at first order I(1).

Table 1: Unit root test

Test	Augmented Dicky-Fuller (ADF) with intercept	
	X_i	ΔX_i
CC	-2.264**	
DIS	-2.358**	
RATE	-1.208	-3.473***
INF	-1.871**	
GI	-1.671*	
GC	-3.691 ***	

Note: Δ is the first difference. * , **, and *** represent the significance level at 10, 5, and 1 percent, respectively.

Table 2: Results of Markov-switching Autoregressive model

CC_t	Coefficient	Standard Error	T-statistic
α_1	0.243***	0.025	9.59
α_2	-1.944***	0.090	-21.43
α_3	0.009	0.006	1.33
AR(1)	-0.844***	0.111	-7.55
Regime 1			
$\beta_{1s}(s_t=1)$	0.319**	0.144	2.21
$\beta_{2s}(s_t=1)$	-1.461***	0.123	-11.87
$\beta_{0s}(s_t=1)$	81.901***	2.451	33.41
Regime 2			
$\beta_{1s}(s_t=2)$	-1.735***	0.130	-13.31
$\beta_{2s}(s_t=2)$	-2.020***	0.148	-13.56
$\beta_{0s}(s_t=2)$	97.477***	3.482	27.99
Log-likelihood	-53.081		
sigma	0.988		

Note: *, ** and *** indicate the significance level at 10, 5, and 1 percent, respectively.

Table 2 reveals the results of the Markov-Switching Autoregressive (MSAR) model subject to gradient-based optimization. The value of log-likelihood equals -53.081. All of the predictors with the exception of inflation are statistically significant at the 5 percent level. Disposable income has a positive impact on private consumption because an increase in disposable income improves the household capacity to consume. A higher saving interest rate reduces private consumption. From a fundamental perspective, household saving and expenditure are substitution goods subject to no change in disposable income. Thus, a rise in the interest rate

on savings encourages households to save rather than to make expenditures. There is a linear effect of government purchases on private consumption because the result in both regimes provides the same negative sign but different values of the coefficients ($\beta_{2s}(s_t=1)$=-1.461 and $\beta_{2s}(s_t=2)$ =-2.020). The extension of government purchasing crowds out private consumption--that is, public consumption was a substitute for household expenditure in Cambodia. In the case of government investment, there is a different sign of coefficient in regime 1 ($\beta_{1s}(s_t=1)$=0.319) and regime 2 ($\beta_{1s}(s_t=2)$=-1.735). This result indicates that a non-linear effect of government investment on private consumption exists in the Cambodian economy. The main reasons for the occurrence of this nonlinearity can be explained in the part of identifying non-Keynesian years and discussion. The coefficient of AR(1) is statistically significant at 5 percent level and means that residual at the time t depends on its first lag.

Table 3: Regime-switching probability matrix

i / j	Regime 1	Regime 2
Regime 1	0.5819	0.4180
Regime 2	0.3645	0.6354

Note: i and j represent different regimes.

The estimated results of the regime-switching probability matrix presented in Table 3 offer a valuable clue to identify the average duration for the existence of the same regime. The calculation of average duration follows the formula:

$$D(s)=\frac{1}{1-p_{ii}}, \tag{3}$$

where $D(s)$ stands for the average duration of the regime (state), and p_{ii} denotes regime-switching probability.

Table 4: Estimation of duration in each regime

	Sample size	Frequency	Average duration
Regime 1	12	0.429	2.391
Regime 2	16	0.571	2.742

Table 4 reports frequency and average duration for the two regimes: 57.1 percent of the total sample belongs to the regime with non-Keynesian impacts, but the rest of this sample comprises 12 observations in the regime with Keynesian effects. The average duration is 2.391 years for Keynesian impacts and 2.742 years for non-Keynesian effects.

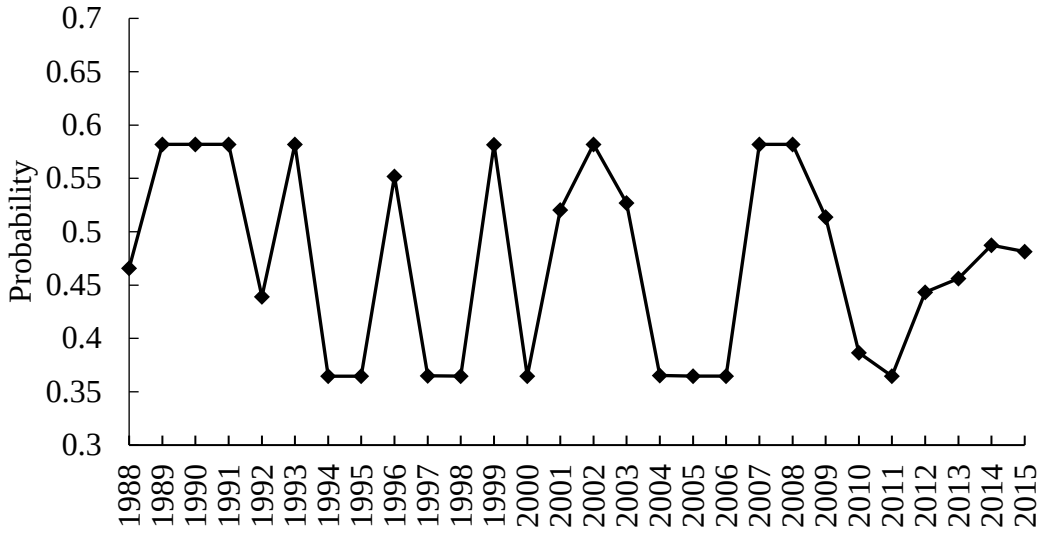


Figure 2: Smooth switching probability of Keynesian effect regime, 1988-2015
Source: Author's estimation

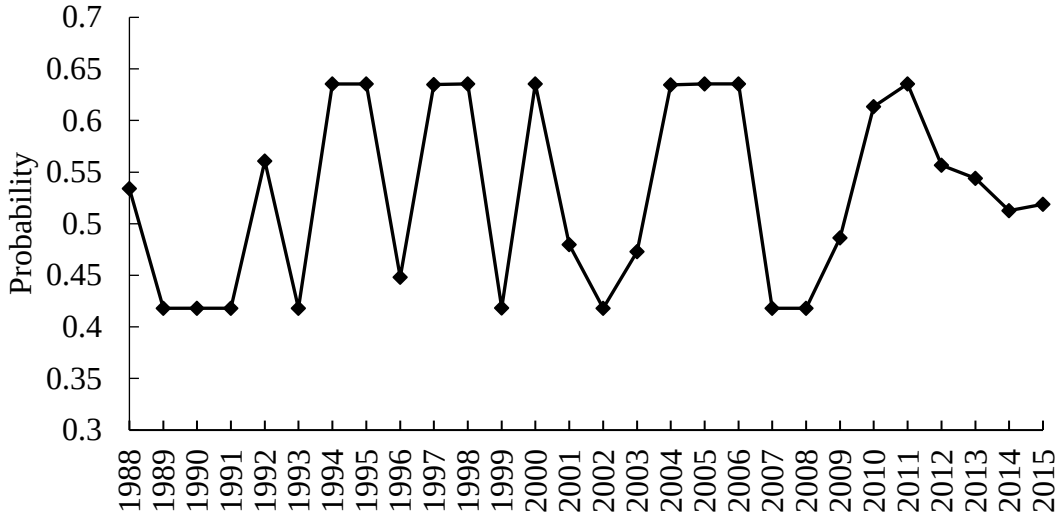


Figure 3: Smooth switching probability of Non-Keynesian effect regime, 1988-2015
Source: Author's estimation

Figures 2 and 3 show that some years and periods, those with the probability of Keynesian impacts more than 0.5 or close to 1 and the probability of non-Keynesian effects less than 0.5 or close to 0, lead to the existence of the Keynesian effects. However, some years and periods in the time interval of this study have the probability of non-Keynesian impacts higher than 0.5 and Keynesian effects' probability lower than 0.5, thus generating the occurrence of non-Keynesian effects for those years and periods. As a result, there is a non-linear influence of fiscal policy, mainly public investment, on private consumption in Cambodia's economy.

Table 5: Identification of regimes

	Years	Probability
Non-Keynesian regime	1988	0.5342
	1992	0.5608
	1994-1995	0.6354
	1997-1998	0.6351
	2000	0.6354
	2004-2006	06351
	2010-2015	0.5635
Keynesian regime	1989-1991	0.5819
	1993	0.5819
	1996	0.5519
	1999	0.5816
	2001-2003	0.5430
	2007-2009	0.5592

Source: Author's estimation

The precise identification of regimes shown in Table 5 illustrates in which periods Keynesian or non-Keynesian effects of government spending exist. The existence of the Keynesian effects in the 1989-1991, 2001-2003, and 2007-2009 periods indicates that expansionary fiscal policy enhances private consumption. However, the 1994-1995, 1997-1998, and 2004-2006 periods have non-Keynesian effects, probably because political instability discourages households from increasing their expenditures. During 1994-1995, Cambodia faced political uncertainty because the Cambodia People's Party (CPP) leaders intended to refuse to accept the election outcome. The disagreement about the national election 1993's result spun out political turmoil and led to a political impasse during 1994-1995. Before the national election of 1998 came, a political stalemate had seemingly started to increase since March 1997. After the national election in 2003, Cambodia reached political deadlock because it was unable to form the new government until July 2004. The non-Keynesian impact of government expenditure also occurs during 2010-2015 because Cambodia's government seemingly used countercyclical fiscal policy at that period. According to the ADB database, the tax revenues as a share of GDP progressively and dramatically grew from 7.3 percent in 2010 to 14.6 percent in 2015. Increasing the present value of taxes contributes negatively to the private wealth effect (i.e., a change in household consumption based on asset value via price level, disposable income, and interest rates) because a higher present value of taxes can increase the price of goods and services in the market and decrease disposable income, thereby harming household spending.

5.2.2 Discussion

The result of this study, which highlights the nonlinear effect of government spending on private consumption, agrees with the outcomes of Giavazzi and Pagano (1990), Blanchard (1990), Alesina and Ardagna (1998), Perotti (1999), Höppner and Wesche (2000), Aarle and Garretsen (2003), and Wang and Gao (2011). However, various reasons are raised to point out the emergence of the non-Keynesian effect of government expenditure on private consumption. This study emphasizes two main reasons – political instability and increasing the present value of taxes – which causes a negative influence on the wealth effect through inflation and a reduction in disposable income. Giavazzi and Pagano (1990) spotlight the substitution between public and private consumption because government consumption, which seems to be a waste of resources, does not offer consumers any utility. They raised an example of the Danish

government in 1983-84—that is, Danish private consumption increases in response to contractionary government consumption. Also, agent (household) expectations about the future policy cause the existence of non-Keynesian effects. Based on perfect knowledge and rational expectation, households cut down their expenditures in response to the extension of government expenditure because they anticipate that the government will raise the present value of taxes to finance its spending and intends to balance its budget. In term of fiscal consolidation, Ho (2001) suggests that issuing government bonds to finance its own expenditure leads to speed up increases in the interest rates, thereby slowing down household consumption as well as other components of aggregate demand. In another case, the initial value of government spending above a threshold level (optimal value) triggers the non-Keynesian effects – that is, the positive or negative influence of government expenditure relies on the magnitude of that expenditure (Bertola & Drazen, 1993). Wang and Gao (2011) propose personal characteristics (i.e., a quota restriction plan for comodities, minumum employment programes and like this) of commodities and labor market as an important reason leading to the existence of non-linear effects in China's economy. It is possible to demonstrate conclusively that the structure and magnitude of government expenditure, agent expectations, characteristics of commodities and labor market, and environment change (political instability) contribute to the occurrence of the non-linear effect of government spending on private consumption.

Most studies found that non-linearity exists on government purchases (seen in Cour et al., (1996), Perotti (1999), Aarle and Garretsen (2003), and Wang and Gao (2011)). On the other hand, the outcome of this study indicates that public investment can have a non-linear effect on private consumption. This study provides insight into the non-linear effect, which can occur in government investment as well.

Thesis I

Government expenditure contributes significantly to private consumption. An increase in the present value of taxes and political instability can prevent the efficacy of government expenditure and cause the non-linear effect (i.e., the occurrence of not only Keynesian *but also non-Keynesian impact in a certain period) of government spending (mainly public investment) on private consumption.*

6 Relationship between Government Expenditure and Economic Growth

6.1 Methodology

6.1.1 Specific Model

Solow (1956) and Swan (1956) highly credit production's two inputs (labor force and capital) to enhance economic growth. An accumulation of capital can be determined by government spending. Most countries are open economies nowadays; therefore, export also plays an important role in the determination of economic growth. This paper tries to test the connection between government spending and output growth as follows:

$$GGDP_t = f\left(LAB_t, EXPO_t, GOV_t\right), \quad (4)$$

Armey (1995) and Barro (1990) point out the linkage between government expenditure and output growth as a quadratic function. The regression model can be written as follows:

$$GGDP_t = \beta_0 + \beta_1 LAB_t + + \beta_2 EXPO_t + \beta_3 GOV_t + \beta_3 GOV_t^2 + \varepsilon_t, \quad (5)$$

where $t = 1971, 1972 \ldots 2015$;

$GGDP_t$: GDP growth rate of Cambodia at time t;

LAB_t: labor force growth rate of Cambodia at time t;

$EXPO_t$: growth rate of export of goods and services of Cambodia at time t;

GOV_t: government spending as a share of GDP of Cambodia at time t;

GOV_t^2: square of government spending as a share of GDP of Cambodia at time t;

ε_t: error term at time t.

Each component (i.e., government final consumption expenditure (GFCE) and public investment as government fixed capital formation (GFCF)) of total government spending is analyzed separately.

6.1.2 Data Collection

Cambodian data from 1971 to 2015 generates 45 observations for analysis. The list of variables is:

- Government final consumption expenditure (GFCE) as a share of GDP: the general government consumes goods and services and spends money on collective consumption services, and then this sum is divided by the GDP;
- Government fixed capital formation at a constant price 2011: disposals of produced fixed assets subtracted from the sum of acquisitions (purchase of new or second-hand assets) and specific expenditure on services adding value to non-produced assets;
- GDP at constant price 2011: the total value of goods and services produced during a year;
- The growth rate of GDP: a percentage change of the total value of goods and services produced in a nation;
- The growth rate of export of goods and services: a percentage change of the value of goods and services sold to the rest of the world;
- The population growth rate: a percentage change of people currently living in a country.

Three primary sources report the data of variables mentioned above.

- The Investment and Capital Stock Dataset of IMF offers data for GDP and government fixed capital formation at a constant price 2011 through the link: https://www.imf.org/external/np/fad/publicinvestment/
- World Bank Database provides data of population growth rate at the link: https://data.worldbank.org/country/cambodia?view=chart
- United Nations Statistics Division's National Accounts Main Aggregates Database The link to get the data of the rest of the variables mentioned above is: https://unstats.un.org/unsd/snaama/dnlList.asp

The transformation made to obtain the independent variables for the regression can be explained as follows.

- Population growth rate can be used to measure the labor force growth rate;
- Government fixed capital formation at a constant price 2011 divided by GDP at a constant price 2011 equals government fixed capital formation (GFCF) as a share of GDP.

STATA 15.1 was the software used to process the data analysis in this study.

6.1.3 Ordinary Least Square

Engle-Granger approach (Engle & Granger, 1987) or Johansen's multivariate maximum likelihood approach (Johansen, 1988; Johansen & Juselius, 1990) for co-integration demands all of the variables (i.e., explained and explanatory variables) to be integrated to order one I(1). Autoregressive distributed lags (ARDL) bound approach (Pesaran & Shin, 1998; Pesaran et al., 2001) requires explained variable as order one of integration I(1), but predictors can be pure order zero I(0), absolute order one I(1), or mixed orders (i.e., I(0) and I(1)) of integration. Therefore, these co-integration approaches can be applied if the dependent variable is integrated to order one I(1). In the case of all variables (dependent and independent variables) to be stationary at the level I(0), Ordinary Least Square (OLS) as the classical method of regression modelling can be applied for the time-series data analysis. The OLS estimate based on minimizing sum square of residuals is so-called BLUE (Best Linear Unbiased Estimate). The good-fit model is subjected to the value of R-squared (R^2). If the value of R^2 is high, it can be regarded as a good model. The error term (residuals) estimated by OLS has to be assumed to be a white-noise (homoscedasticity - constant variance, normal distribution - zero mean, and no autocorrelation).

6.1.4 Calculation of the Optimum Value of Government Spending

The optimum level of government expenditure is calculated by taking the partial derivative of $GGDP$ (equation (5)) with respect to GOV and setting it equal to zero.

$$\frac{\partial GGDP}{\partial GOV} = \beta_3 + 2\beta_4 GOV = 0 \Rightarrow GOV = -\frac{\beta_3}{2\beta_4},\ \beta_3 > 0, \beta_4 < 0, \tag{6}$$

6.2 Results and Discussion

6.2.1 Estimation

According to econometric literature of time series, the estimation with non-stationary variables produces a spurious result of the regression (Granger & Newbold, 1974); due to this, it is necessary to conduct the unit-root test, which is used to check that time-series data include a deterministic or a stochastic trend while those series transform from non-stationarity into stationarity (Kirchgässner et al., 2013). The Augmented Dickey-Fuller (ADF) test (Dickey & Fuller, 1979) as a well-known test of a unit root in time series is used to check differencing order, which leads to stationary data. The Bayesian Information Criterion (BIC) developed by Schwarz (1978) is employed to select an optimal number of lags. The null hypothesis of this test proposes a unit root or non-stationarity. The result of ADF test presented in Table 6 indicates that the dependent variable ($GGDP$) and predictors (LAB , $EXPO$, $GFCF$, $GFCF^2$, $GFCE$, and $GFCE^2$) are stationary at order zero I(0). Thus, the OLS is applied to estimate the connection between explained and explanatory variables.

Table 6: Unit root test

Test	Augmented Dicky-Fuller (ADF) with intercept	
	X_i	ΔX_i
GGDP	-2.521***	
LAB	-2.880***	
EXPO	-4.856***	
GFCF	-1.331*	
$GFCF^2$	-1.642*	
GFCE	-3.155 ***	
$GFCE^2$	-3.683***	

Note: Δ is the first difference. * , **, and *** represent the significance level at 10, 5, and 1 percent, respectively.

Table 7: Results of OLS

GGDP	Model I (GFCF)		Model II (GFCE)	
	Coefficient	SE	Coefficient	SE
β_1	1.233**	0.478	1.134**	0.554
β_2	0.103***	0.027	0.175***	0.040
β_3	9.155***	2.517	2.820**	1.358
β_4	-0.848***	0.281	-0.195**	0.072
β_0	-19.819***	4.850	-9.583*	5.074
R^2	0.6044		0.4985	
Adjusted R^2	0.5648		0.4484	
Root MSE	5.0141		5.6451	

Note: SE denotes standard error. *, ** and *** indicate the significance level at 10, 5, and 1 percent, respectively.

Table 7 displays the results of the OLS analysis. The first model (Model I) for GFCF and the second model (Model II) for GFCF provide an R-squared value (R^2) of 60.44 percent and 49.85 percent, respectively. The coefficients of explanatory variables in both models are statistically significant at 5 percent level. The healthy economic growth responds to the improvement of the growth rate of the labor force ($\beta_1 \rangle 0$) because more labor generates more production in the economy. An increase in the export growth rate significantly and positively influences the growth rate of output ($\beta_2 \rangle 0$). It reflects the more significant gains from international trade, thereby promoting saving, investment, and economic performance in the country. The GFCF and GFCE's hypothesis, an inverted-U-shaped relation with economic growth, is not rejected. The optimal value of GFCF and GFCE was estimated to be approximately 5.40 percent and 7.23 percent, respectively. The influence of government expenditure on economic growth shrinks while steadily increasing the value of government expenditure as a share of GDP. The government expenditure financed by raising taxes and taking out loans might drive down private investment due to creating more disincentives. The growth in public investment (GFCF) above the optimal level becomes unproductive because the allocation of this government investment might finance some inefficient projects. If GFCE passes the optimal level, there might be bureaucracy and centralization, which stifle creativity in the private and public sectors. The entire economy can be harmed by reducing the scope of creativity and creating more inefficiency.

6.2.2 Diagnostic Tests

Diagnostic tests are required to check whether the residual (error term) of OLS meets the essential three assumptions. The Breusch-Godfrey test introduced by Breusch (1978) and Godfrey (1978) relies on the Lagrange multiplier (LM) test statistic and checks the autocorrelation (serial correlation) of the residuals. The Breusch-Godfrey test's null hypothesis proposes no autocorrelation. White (1980) introduced a heteroscedasticity-consistent variance estimator of the variance matrix, called White's test, to check the heteroscedasticity of the variance of residual. The null hypothesis of this White's test suggests no heteroscedasticity. The Jarque-Bera test developed by Jarque and Bera (1987) joins between skewness and kurtosis. This test relies on asymptotic standard error without correlation for sample size. The null hypothesis of the Jarque-Bera test suggests a normal distribution (i.e., the built model

explains all trends of data). Table 8 shows that the null hypothesis of Breush-Godfrey LM test, White's test, and Jarque-Bera test is not rejected at 1 percent significance level. There is normality, no serial correlation, and no heteroscedasticity for the residual of OLS.

Table 8: Diagnostic tests for residual of OLS

ε_t	Model I	Model II
	Chi2	Chi2
Breusch-Godfrey LM test	4.805	8.198
White's test	8.84	15.46
Jarque-Bera test	6.93	8.45

Note: *,**, *** denote the significance level at 10, 5, and 1 percent, respectively.

6.2.3 Stability Test

The robustness of the models describes the regression model's parameter stability confirmed by the cumulative sum test. The cumulative sum test subjected to recursive residuals and proposed in Brown et al. (1975) is designed to detect the parameters' instability (Ploberger & Krämer, 1992). No structural breaks (constant regression coefficients over time) are proposed as the null hypothesis of the cumulative sum test. The results are presented in Table 9. For Model I and Model II, the null hypothesis of the test is accepted at 1 percent level of significance. The convergence of estimated long-run parameters to the zero means exists in both models. Model I and Model II, therefore, are stable and consistent models.

Table 9: Cumulative sum test

Model	Model I	Model II
Test statistic	0.343	0.737
Critical value 1%	1.143	1.143
Critical value 5%	0.947	0.947
Critical value 10%	0.850	0.850

Note: *, **, and *** represent the significance level at 10, 5, and 1 percent. If the test statistic is smaller than a critical value, the null hypothesis of the test is not rejected.

6.2.4 Robustness Test

The robustness of regression results of government spending (i.e., government investment and consumption) is presented in this section. The regression model takes into account more specifications (e.g., dummy variables) to shock it and is also analyzed with second-degree polynomial regression.

The ADF test as a basic test of unit root is criticized for not incorporate structural breaks in time-series data, thereby producing a misleading conclusion (Glynn et al., 2007). Cambodia's history is burdened by war, genocide, and occupation, times during which economic conditions are different than in peacetime. Thus, our dependent variable can be tested to find whether structural breaks appear in time-series data of the regressand. The Zivot-Andrews test developed by Zivot and Andrews (1992) incorporates unknown structural breaks in intercept, trend, and both. The null hypothesis of this test suggests that time-series data are non-stationary (unit root). An alternative hypothesis is trend-stationary with a single break. The results presented in Table 10 indicate that the null hypothesis is rejected at all levels of significance, so structural breaks should be included in the regression model.

Table 10: Results of Zivot-Andrews test

Test	Break of intercept		Break of trend		Break of intercept and trend	
	X_i	ΔX_i	X_i	ΔX_i	X_i	ΔX_i
GGDP	-6.008***		-6.175***		-6.546***	

Note: Δ is the first difference. * , **, and *** represent the significance level at 10, 5, and 1 percent, respectively.

Cambodia's history showed that there have been a few shocks which affect economic conditions. Four dummy variables, therefore, are incorporated in regression. In 1973, Cambodia started a civil war between the Khmer Rouge's army led by Pol Pot and the Khmer Republic government's army with the USA's assistance led by Lon Nol. This war negatively influenced Cambodia's economy. The first dummy variable (du1) is introduced in our model. The year 1973 is given value 1, and the rest of the years are zero.

Cambodia also faced political unsettlement in 1989, thereby suddenly worsening Cambodia's economy. Our regression analysis also takes into account the second dummy variable (du2) of this political instability. The year 1989 is given value 1, and all other years are zero.

During 1994-1995, Cambodia faced political uncertainty because the Cambodia People's Party (CPP) leaders refused to accept the election outcome. The disagreement about the 1993 national election result spun out political turmoil and led to a political impasse during 1994-1995. This period is introduced as a structural break as the third dummy variable (du3). The year 1994 or 1995 is given value 1, and the rest of the years are zero.

The started in Thailand and also contributed negatively to Cambodia's economy because they are neighboring countries and trading partners. The fourth dummy variable (du4) denotes a structural break due to the Asian financial crisis in 1997. The value one represents the year 1997, and other years are zero.

These dummy variables are defined as follows:

$$du1=\begin{cases}1 \;\; if \qquad t=1973\\ 0 \;\; if \;\; t=other\ years\end{cases}, \qquad du2=\begin{cases}1 \;\; if \qquad t=1989\\ 0 \;\; if \;\; t=other\ years\end{cases}, \tag{7}$$

$$du3=\begin{cases}1 \;\; if \;\; t=1994,1995\\ 0 \;\; if \;\; t=other\ years\end{cases}, \qquad du4=\begin{cases}1 \;\; if \qquad t=1997\\ 0 \;\; if \;\; t=other\ years\end{cases}.$$

There is a substantial correlation between a government's spending (i.e., government investment and consumption) and its power. Theoretical literature about the linkage between government expenditure and economic growth suggests that their relationship is a quadratic function. The second-degree polynomials of independent variables (i.e., public investment and government purchasing) are proposed in this analysis. The orthogonal polynomial terms generated by the Christoffel-Darboux recurrence formula (Abramovitz & Stegun, 1972) meets the property (i.e., quadratic trend without the constant). The equation (5) can be rewritten with the orthogonal polynomial terms of regressors (i.e., government investment and consumption) as follows:

$$GGDP_t = \beta_0 + \beta_1 LAB_t + \beta_2 EXPO_t + \alpha_1 PGFCF1_t + \alpha_2 PGFCF2_t$$
$$+\alpha_3 PGFCE1_t + \alpha_4 PGFCE2_t + \alpha_5 du1 + \alpha_6 du2 + \alpha_7 du3 + \alpha_8 du4 + \varepsilon_t, \quad (8)$$

where $t = 1971, 1972 \ldots 2015$;

$GGDP_t$: GDP growth rate of Cambodia at time t;

LAB_t: labor force growth rate of Cambodia at time t;

$EXPO_t$: growth rate of export of goods and services of Cambodia at time t;

$PGFCF1_t$: first degree of an orthogonal polynomial of government investment as a share of GDP of Cambodia at time t;

$PGFCF2_t$: second degree of an orthogonal polynomial of government investment as a share of GDP of Cambodia at time t;

$PGFCE1_t$: first degree of an orthogonal polynomial of government consumption as a share of GDP of Cambodia at time t;

$PGFCE2_t$: second degree of an orthogonal polynomial of government consumption as a share of GDP of Cambodia at time t;

$du1$: dummy variable of Cambodia's civil war in 1973;

$du2$: dummy variable of Cambodia's political instability in 1989;

$du3$: dummy variable of Cambodia's political instability during 1994-1995;

$du4$: dummy variable of the Asian financial crisis 1997;

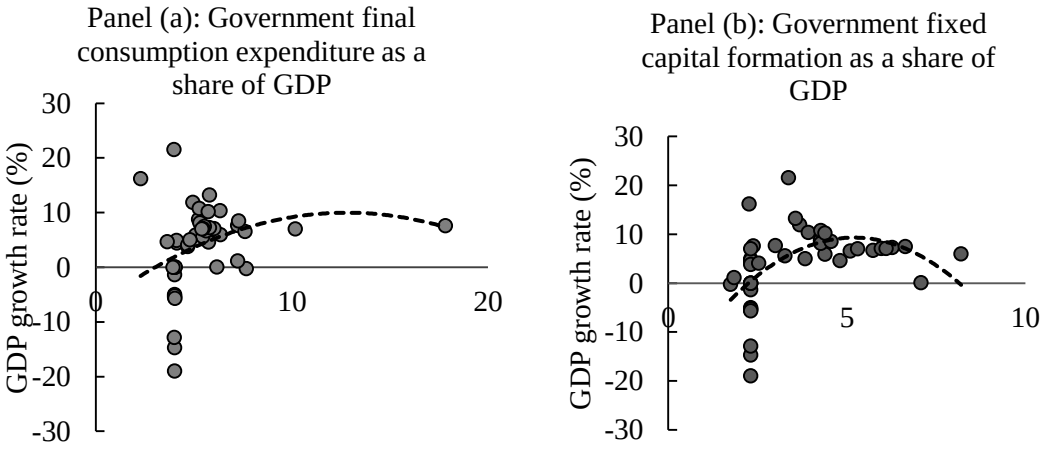
ε_t: error term at the time t.

Table 11: Results of second-degree orthogonal polynomial regression

GGDP	Coefficient	Standard Error
LAB	1.390***	0.353
EXPO	0.195***	0.031
*PGFCF*1	1.427**	0.682
*PGFCF*2	-1.657***	0.581
*PGFCE*1	-2.486***	0.703
*PGFCE*2	-2.264**	0.837
*du*1	-15.653***	3.745
*du*2	-11.456**	4.565
*du*3	-10.871***	3.010
*du*4	-6.662*	3.714
Constant	-0.588	0.819
R^2	0.8330	
Adjusted R^2	0.7838	
Root MSE	3.5337	

Note: *, ** and *** indicate the significance level at 10, 5, and 1 percent, respectively.

The results presented in Table 11 show that the second-degree orthogonal polynomial regression provides R-squared (83.30 percent) and Root Mean Square Error (3.5337). All of the explanatory variables are statistically significant. The improvement of the labor force or growth rate of exports stimulates Cambodia's economic growth. Some shocks (i.e., a civil war in 1973, political deadlock in 1989, political instability during 1994-1995, and the Asian financial crisis in 1997) in Cambodia's history slowed down its economic growth because these shocks negatively affect household behavior regarding expenditure and investment in Cambodia. The quadratic response to government investment has an optimal value at *PGFCF* (orthogonal polynomial of *GFCF*)= $-\alpha_1/(2\alpha_2)$=0.43, which was approximately 5.20 percent on the original government investment (GFCF) scale. The inverted-U shaped relationship between government consumption and economic growth exists. The optimal level of *PGFCE* (orthogonal polynomial of GFCE) was $-\alpha_3/(2\alpha_4)$= -0.55, which was approximately 6.45 percent on the original government consumption (GFCE) scale. This optimal level of GFCF and GFCE is slightly lower than the optimal value from Model I and Model II.



Note: each dot and dashed line represent each year and estimated line, respectively. Cambodian annual data are from 1971 to 2015. Government final consumption expenditure as a share of GDP (GFCE) and GDP growth rate are plotted in Panel (a). Panel (b) represents plotting government fixed capital formation as a share of GDP (GFCF) and GDP growth rate.

Figure 4: Scatter (government spending, GDP growth rate) plot
Source: National Accounts Main Aggregates Database and IMF Database

Figure 4 also indicates that the linkage between government spending (i.e., GFCF and GFCE) and economic growth is an inverted-U shape.

6.2.5 Discussion

The finding of this study agrees with the explanations of Barro (1990), Armey (1995), and Mourmouras and Lee (1999) about the existence of an inverted-U-shaped connection between government spending and economic growth. The level of government expenditure determines whether there is a positive or negative impact, as illustrated by Keynesian theory and neo-classical theory, respectively. A rise in government spending below the optimal level improves the investment environment, employment, consumption, and therefore the economy as a whole. If it is over the threshold level, there is harm to economic performance because government spending financed by raising taxes and borrowing leads to less incentive to household consumption and investment. This finding is in line with the studies of Vedder and Gallaway

(1998), Chobanov and Mladenova (2009), and Hok et al. (2014); however, they use total government expenditure as a share of GDP and various estimation methods. This result is also consistent with the outcomes of Chen and Lee (2005), Asimakopoulos and Karavias (2016) and Hajamini and Falahi (2018), who also investigated the influence of government spending's two types (e.g., government fixed capital formation and government final consumption expenditure) on output growth, although these studies provide the various threshold level (optimal value).

The optimal level of GFCE calculated in this study was approximately 7.23 percent, which is lower than the 18.04 percent, 16 percent and 15 percent yielded in the studies conducted by Asimakopoulos and Karavias (2016), Chiou-Wei et al. (2010) in the case of Taiwan, and Chen and Lee (2005), respectively. The threshold level of GFCE calculated by Chiou-Wei et al. (2010) in the case of South Korea and Thailand is also higher (11 percent) than the optimal value in this study.

The optimal value of GFCF calculated in this study equalled approximately 5.40 percent. This optimum value is higher than the threshold value (2.31 percent) reported by Hajamini and Falahi (2018), but lower than 7.3 percent estimated by Chen and Lee (2005) and the 13 percent by Davies (2009). The optimal level of GFCE and GFCF is different from other findings owing to Cambodia's historical data, economic situation, distinctive methods, and economic and social factors included in the model. The optimal value of government spending may be heterogeneous across countries. A large government finances its expenditures through taxation and allocates more spending into unproductive projects than a small government, thereby leading to the optimal level in developed countries being lower than in developing countries (Asimakopoulos & Karavias, 2016; Gray et al., 2007).

Thesis II

The effect of government expenditure (i.e., public investment and consumption) on economic growth depends on the magnitude of fiscal adjustment (the adjustment of government expenditure). There is an inverted-U-shaped relationship between government expenditure and economic growth. That is, larger increases in government spending do not lead to more growth.

7 Government Spending and Competitiveness

7.1 An Alternative Measurement of Competitiveness

Most countries in the world are open economies. Globalization (i.e., the interdependence between countries or the openness of the economy to the world market) leads to the integration of national economies through culture, information technology, investment, and international trade. In a globalized economy, the extension of market size through international trade can be a potential indicator of trade competitiveness. The expansion of the market for produced goods and services encourages the trade competitiveness of a country. That is, lower prices on those goods and services and a higher level of aggregate productivity react to a larger market size due to higher elasticity of demand in the market. Remarkably, the market size is a critical pillar for determining global competitiveness, according to the Global Competitiveness Report 2017-2018 (Schwab, 2017). With ceteris paribus, a change in foreign market size depends on a price level in foreign currency. If the foreign prices (prices in trading partners' currency) of goods and services produced in the home country are low relative to trading partners, the foreign market for these goods and services increases. The domestic price of products can represent the lowest cost of production at that place because producers can use economies of scale (i.e., a reduction in cost per unit as a response to an increase in the total output of production) to implement a low-price strategy in a competitive market (Samuelson, 1984). The domestic price

measured in home currency can be expressed in a foreign currency with the help of the nominal exchange rate used to compute the real exchange rate in order to compare price levels between countries. An elastic real exchange rate creates an elastic market size and thus trade competitiveness because a change in the real exchange rate can change the prices in foreign markets relative to those of the trading partners. The real exchange rate, therefore, can also be an alternative measurement of trade competitiveness. The clear connection between prices and cost competitiveness is measured with the help of the real exchange rate (Lipschitz & McDonald, 1992). An improvement in the cost competitiveness of international airlines is the result of the depreciation of the real exchange rate in the home country (Forsyth & Dwyer, 2010). Makin and Ratnasiri (2015) and Nagayasu (2017) use the real exchange rate to measure the trade competitiveness of a country. An appreciation of the real exchange rate weakens the trade competitiveness of the economy while the devaluation of the real exchange boosts it. For example, the global competitiveness of companies from the USA improved in response to the devaluation of the US dollar between 2002 and 2008, thereby opening up education (skill development), employment, and investment opportunities (Baily & Slaughter, 2008).

The real effective exchange rate refers to the weighted average of the home currency against a basket of primary trading partners' foreign currencies. The Asian Development Bank (ADB) reports in own database that Cambodia regularly exports to ten trading partners (i.e., Belgium, Canada, Hong Kong, Germany, Japan, the People's Republic of China, Spain, Thailand, the United Kingdom, and the United States of America (USA)). The export value of these ten trading partners in 2010 was approximately 78 percent of Cambodia's total export. The bilateral real exchange rate can be computed by the formula below (Catão, 2007):

$$RER_{it} = \frac{E_{it} \times P_{it}^{*}}{P_t}, \tag{9}$$

where $t = 1970, 1971, ..., 2015$;

$i = 1, 2, ..., 10$ stands for trading partners;

RER_{it} denotes the bilateral real exchange rate of Riel (Cambodia's currency) against a foreign currency i at time t;

E_{it} represents the nominal exchange rate measured by the AMA exchange rate (Riel/foreign currency i) at time t;

P_{it}^{*} stands for the price level in a foreign country i at time t;

P_t refers to the price level in Cambodia (home country) at time t.

There are only data for the nominal exchange rate of the foreign currency of the country i against the US dollar; data of the nominal exchange rate of Cambodia currency against the foreign currency of the other countries is unavailable. The transformation can be made with this formula:

$$E_{it} = \frac{E_{USA,t}}{e_{it}}, \tag{10}$$

where $E_{USA,t}$ denotes the nominal exchange rate of Riel against the US dollar at time t;

e_{it} stands for the nominal exchange rate of the foreign currency i against the US dollar at time t.

The consumer price index (CPI) at 2010=100 is used as a proxy for the price level. In the case of states without available data of CPI (i.e., Cambodia, Hong Kong, and the People's Republic of China), a GDP deflator acts as a proxy for the price level.

To transform the real exchange rate into the index primarily relies on setting up the base year. Basing on the base year 2010, we get 100 as an index value of the bilateral real exchange rate in 2010. The bilateral real exchange rate index can be calculated as follows:

$$RER_{it}\ Index = \left(\frac{RER_{it}}{RER_{i,2010}} \right) \times 100, \tag{11}$$

where $RER_{i,2010}$ is the real exchange rate of Riel against the foreign currency i in 2010.

These bilateral real exchange rate indices can be converted into a real effective (multilateral) exchange rate index as follows:

$$R_t = \prod_{i=1}^{10} \left(RER_{it}\ Index \right)^{w_i} = \left(RER_{it}\ Index \right)^{w_1} \times \left(RER_{it}\ Index \right)^{w_2} \times ... \times \left(RER_{it}\ Index \right)^{w_{10}}, \tag{12}$$

where R_t stands for the real effective exchange rate index at time t;

w_i denotes the export-weighted index for the country i.

These weights based on bilateral exports as a share of total exports in 2010 are calculated to estimate Cambodia's real effective exchange rate index. The export-weighted index can be computed as follows:

$$w_i = \frac{BE_i}{TE}, \tag{13}$$

where BE_i represents bilateral export between Cambodia and the country i in 2010;

TE denotes Cambodia's total export in 2010.

Cambodia's exchange rate is written as a home currency against a foreign currency. A higher real effective exchange rate index can be interpreted as the depreciation of the real exchange rate, thereby improving trade competitiveness. The nominal exchange rate and GDP deflator at 2010=100 are taken from the National Accounts Main Aggregates Database, United Nations. CPI at 2010=100 and export data in 2010 are retrieved from the World Bank Indicators and the ADB database, respectively.

7.2 Methodology

7.2.1 Specific Model

Household consumption and private investment play a crucial role in the fluctuation of the real exchange rate, as explained in the two-country models of Obstfeld and Rogoff (1995) and Di Giorgio et al. (2018). The recent research conducted by Makin and Ratnasiri (2015) also takes into account both the aggregate private spending and government spending in their model. Therefore, the international competitiveness function in this study can be written as follows:

$$R_t = f\left(E_t, G_t\right), \tag{14}$$

where R_t stands for the real effective exchange rate index at time t;

E_t refers to aggregate private spending (i.e., the sum of household consumption and private investment) at time t;

G_t represents government spending at time t.

Total government expenditure can be disaggregated into government consumption and public investment. Notably, public investment significantly affects the supply side (production) for international competitiveness. The regression for this study, therefore, can be rewritten as follows:

$$R_t = \beta_0 + \beta_1 E_t + \beta_2 GFCF_t + \beta_3 GFCE_t + \varepsilon_t, \quad (15)$$

where $t = 1970, 1972 \ldots 2015$;

R_t represents the real effective exchange rate index of Cambodia at time t;

E_t denotes aggregate private spending as a share of GDP of Cambodia at time t;

$GFCF_t$ refers to government fixed capital formation as a share of GDP of Cambodia at time t;

$GFCE_t$ stands for government final consumption expenditure as a share of GDP of Cambodia at time t.

7.2.2 Data Collection

Cambodia annual data obtained from1970 to 2015 create 46 observations. Variables used for this analysis are:

- Real effective exchange rate index: assessing cost competitiveness of the home country relative to the critical trading competitors;
- GDP at a constant price in 2011: the total value of goods and services produced per annum;
- Private investment at a constant price at 2011: the private sector's investment spending in infrastructure services according to Investment and Capital Stock Dataset of IMF;
- Household final consumption expenditure as a share of GDP: the consumption of goods and services made by households and enterprises in the nation;
- Government fixed capital formation at a price at 2011: acquisitions (i.e., purchase of new or second-hand assets) plus specific expenditure on services providing extra value to non-produced assets and then minus disposals of produced fixed assets;
- Government final consumption expenditure as a share of GDP: goods and services consumed by and collective consumption services offered by the general government.

The data for these variables are derived from two primary sources: the Investment and Capital Stock Dataset of the IMF and the National Accounts Main Aggregate Database of the United Nations. The link to obtain the data of GDP, government fixed capital formation, and private investment at a constant price at 2011 is:

https://www.imf.org/external/np/fad/publicinvestment/

For the rest of the variables mentioned above, data are accessed through the link below:

https://unstats.un.org/unsd/snaama/dnlList.asp

The conversions to receive explanatory variables for the regression are:

- Private investment and government fixed capital formation at a constant price 2011 divided by GDP at a constant price 2011 is equal to private investment as a share of GDP and government fixed capital formation as a share of GDP, respectively.
- Aggregate private spending as a share of GDP is the sum of household final consumption expenditure as a share of GDP and private investment as a share of GDP.

The data analysis is conducted in STATA 15.1 software.

7.2.3 Autoregressive Distributed Lags Approach

The Engle–Granger approach (Engle & Granger, 1987) or Johansen's multivariate maximum likelihood approach for co-integration (Johansen, 1988; Johansen & Juselius, 1990) requires all of the variables (i.e., dependent and independent variables) integrated to be order one I(1). The autoregressive distributed lags (ARDL) bound approach introduced by Pesaran and Shin (1998) and Pesaran et al. (2001) has several advantages over other traditional co-integration approaches. First, the ARDL model credibly deals with regressors with the existence of mutually integrated orders (zero I(0) and first I(1)) while the regressand is integrated of order one I(1) (Nkoro & Uko, 2016). Next, the ARDL model tests the existence of co-integration based on the standard F-test and estimates short-run and long-run relationships among explained and explanatory variables. Last, the ARDL approach also copes with the endogeneity problem by adding lags of explained and/or explanatory variables. Optimal lag lengths for ARDL bound test are selected under the minimum value of the Akaike Information Criterion (AIC) developed by Akaike (1977). The bound testing approach, based on the standard F-test with two sets of critical value (i.e., lower bound I(0) and upper bound I(1)), justifies the existence of long-run co-integration. If the F-statistic estimated from the ARDL bound model is higher than the upper bound I(1), the null hypothesis, no co-integration, is rejected. In the case of an F-statistic between the lower and upper bound, no conclusion can be confirmed. An F-statistic lower than lower bound leads to the conclusion that long-run co-integration does not exist. If there is a long-run co-integration relationship among dependent and independent variables, a causal relationship exists, at least in one direction. We assumed unrestricted intercept and no trend in the equation of the ARDL bound test. The ARDL bound model of this study can be written as follows:

$$\Delta R_t = \beta_0 + \beta_1 E_t + \beta_2 GFCF_t + \beta_3 GFCE_t + \lambda_R ECT_{t-1} + \sum_{j=1}^{p} \theta_j \Delta R_{t-j} + \sum_{j=1}^{k} \alpha_j \Delta E_{t-j} + \sum_{j=1}^{l} \varphi_j \Delta GFCF_{t-j} + \sum_{j=1}^{k} \rho_j \Delta GFCE_{t-j} + \varepsilon_t, \quad (16)$$

where Δ represents the first difference, λ_R stands for the speed of adjustment, and ECT_{t-1} (error correction term) denotes disequilibrium. The coefficient of the error correction term indicates the speed to adjust disequilibrium due to short-run shocks to long-run equilibrium (Shahbaz et al., 2013). If this coefficient is statistically significant and negative, it depicts the existence of this adjustment. p, k, l, and m refer to lags of ΔR, ΔE, $\Delta GFCF$, and $\Delta GFCE$, respectively. The selected value of p, k, l, and m is based on AIC. ε_t represents the error term. This study deals only with the long-run relationship between explained and explanatory variables and the effects of E_t, $GFCF_t$, and $GFCE_t$ on R_t.

7.3 Results and Discussion

7.3.1 Estimation

analysis (e.g., OLS and ARDL approach) with the variables, non-stationarity after first differencing or without co-integration, generates a spurious result, thus demanding that a unit root test (stationary test) and co-integration test be conducted before running a regression (Granger & Newbold, 1974). The unit root test can be performed to reveal whether the time series has a deterministic trend (i.e., constant covariance, mean, and variance over time) or a stochastic trend (i.e., containing random walk) (Kirchgässner et al., 2013). If the unit-root exists, the variables have a stochastic trend. This study employs two well-known unit root tests (i.e., Augmented-Dicky–Fuller suggested by Dickey and Fuller (1979) and Philips-Perron developed by Philips and Perron (1988)). The null hypothesis of both tests is unit-root (non-stationarity). The Augmented-Dicky–Fuller (ADF) test relies heavily on the length of lags, therefore selecting the optimal lags based on the Bayesian Information Criterion (BIC) proposed by Schwarz (1978). The result of unit-root tests (ADF and Philips–Perron) seen in Table 12 reveals that the explained variable (R_t) is integrated of order one I(1). The explanatory variable ($GFCF_t$) has integration of order one I(1), but the other explanatory variables (E_t and $GFCE_t$) are stationary at level I(0).

Table 12: Unit root tests

Test	Augmented-Dicky-Fuller (ADF) with intercept		Philips-Perron (PP) with tercept	
	X_i	ΔX_i	X_i	ΔX_i
R_t	-0.794	-3.161***	-0.699	-4.520***
E_t	-2.820***		-3.202**	
$GFCF_t$	-1.325*	-5.297***	-1.233	-6.604***
$GFCE_t$	-3.168***		-3.944***	

Note: Δ donotes the first difference. * , **, and *** represent the significance level at 10, 5, and 1 percent, respectively. If both tests express stationarity, the variable is concluded as stationarity.

The optimal lags chosen by AIC are 6 for the ARDL bound test. AIC also indicates 6, 5, 4, and 6 as the value of p , k , l , and m , respectively. The F-statistics shown in Table 13 are above the critical value of the upper bound at a significance level of 1 percent. The null hypothesis of no co-integration, therefore, is rejected at these levels. There is co-integration among these variables, so a causal relationship occurs in at least one direction.

Table 13: ARDL (6, 5, 4, 6) bound test for co-integration

	Dependent variable (R_t)	
F Statistics	30.1126	
Test critical value	I(0)	I(1)
1 percent level	4.29	5.61
5 percent level	3.23	4.35
10 percent level	2.72	3.77

Note: If F statistics is greater than the critical value of upper bound I(1), the null hypothesis is rejected.

Table 14: Regression results from ARDL approach

ΔR_t	ARDL (6, 5, 4, 6)	
	Coefficient	Standard Error
Long-run		
E_t	7.546***	0.450
$GFCF_t$	17.208***	0.682
$GFCE_t$	17.483***	0.860
Short-run		
ECT_{t-1}	-0.334***	0.031
ΔR_{t-1}	-0.726***	0.128
ΔR_{t-2}	-0.411***	0.090
ΔR_{t-3}	-0.182**	0.081
ΔR_{t-4}	-0.286***	0.065
ΔR_{t-5}	-0.267**	0.095
ΔE_t	-2.506***	0.275
ΔE_{t-1}	-2.751***	0.260
ΔE_{t-2}	-2.546***	0.283
ΔE_{t-3}	-1.630***	0.209
ΔE_{t-4}	-0.558***	0.126
$\Delta GFCF_t$	-4.988***	0.560
$\Delta GFCF_{t-1}$	-3.729***	0.436
$\Delta GFCF_{t-2}$	-2.515***	0.314
$\Delta GFCF_{t-3}$	-0.876**	0.301
$\Delta GFCE_t$	-5.755***	0.565
$\Delta GFCE_{t-1}$	-5.738***	0.540
$\Delta GFCE_{t-2}$	-4.342***	0.565
$\Delta GFCE_{t-3}$	-1.741***	0.367
$\Delta GFCE_{t-4}$	0.345	0.216
$\Delta GFCE_{t-5}$	0.540***	0.138
Constant	-285.156***	30.615

Note: Δ denotes the first differences. *, ** and *** indicate the significance level at 10, 5, and 1 percent, respectively.

The focus point of this study lies in the long-run relationship between government spending (i.e., public investment and consumption) and trade competitiveness. The long-run elasticity of the explained variable with respect to explanatory variables is reported in Table 14. E_t, $GFCF_t$, and $GFCE_t$ are positive and statistically significant at these levels. The extension of aggregate private spending, public investment, or government consumption depreciates the real effective

exchange rate, thereby gaining more trade competitiveness. The coefficient of error correction term (ECT_{t-1}) is negative and significant at these levels. The error-correction coefficient ($\lambda_R = -0.334$) indicates that the speed of adjustment– the period needed to return to the long-run equilibrium after disequilibrium in the short run – is approximately 33.4 percent.

The estimated result of the short-run implication is also presented in Table 14. R_t also reacts to its lags at a 1 percent significance level. A negative response of R_t to an increase of aggregate private spending, public investment, or government consumption is found in the short run, and these three variables are highly significant at these levels.

7.3.2 Diagnostic Tests

The key ARDL assumptions about the error term (residual) checked with diagnostic tests are no serial correlation, homoscedasticity, and normal distribution. A residual has a serial correlation (i.e., the residual at time t correlates to the residual at the previous time), thus impacting the volume of t-statistics, standard error, and confident interval. Heteroscedasticity (i.e., the residual's variance is not constant) implies that this built model does not explain the explained variable. If the residual is not a normal distribution, this model does not describe all trends of data. The Durbin–Watson test suggested by Durbin and Watson (1950) is carried out to check the residual. The null hypothesis is no serial correlation. The Breusch–Pagan test is used to confirm the residual with no heteroscedasticity as the test's null hypothesis (Breusch & Pagan, 1979). The Jarque–Bera test introduced by Jarque and Bera (1987) joins between Skewness and Kurtosis. This test relies on asymptotic standard error without correlation for sample size. The normal distribution is proposed as the null hypothesis of the Jarque–Bera test. The three tests presented in Table 15 indicate that the null hypothesis of each test cannot be rejected at these levels. The residual of ARDL (6, 5, 4, 6) has no serial correlation, no heteroscedasticity, and normal distribution.

Table 15: Diagnostic tests of ARDL (6, 5, 4, 6)

ε_t	Chi2
Durbin-Watson test	0.446
Breusch-Pagan test	2.21
Jarque-Bera test	4.45

Note: *, **, and *** denotes the significance level at 10, 5, and 1 percent, respectively.

7.3.3 Stability Test

The robustness of models can be checked with the cumulative sum test to confirm the parameter stability for the regression model. The cumulative sum test propounded in Brown et al. (1975) and based on recursive residuals is potentially designed to detect instability of parameters (Ploberger & Krämer, 1992). The null hypothesis of the cumulative sum test is no structural breaks (no change of regression coefficients over time). The result shown in Table 16 reveals the null hypothesis is not rejected at these levels of significance. The estimated long-run parameters converge to the zero means, thereby leading to the existence of a stable and consistent model.

Table 16: Cumulative sum test

Model	ARDL (6, 5, 4, 6)
Test statistic	0.230
Critical value 1 percent	1.143
Critical value 5 percent	0.947
Critical value 10 percent	0.850

Note: *, **, and *** represent the significance level at 10, 5, and 1 percent, respectively.

7.3.4 Causality Test

The ARDL bound estimation does not disclose causality (i.e., cause and effect) among the considered variables. The Modified Wald test (MWALD) proposed by Toda and Yamamoto (1995) is carried out in this study to understand the directional causality relationship between government spending (i.e., public investment and consumption) and trade competitiveness. The MWALD, the so-called Toda–Yamamoto causality test, can manage problems (i.e., any possible non-stationarity or co-integration among variables) which the original Granger causality ignores (Wolde-Rufael, 2005). For the Toda and Yamamoto (1995) approach, a standard vector autoregressive (VAR) model is applied to the level of variables rather than the first differences in the traditional Granger causality test, thus lessening the risks of wrongly identifying the integrated order of series (Mavrotas & Kelly, 2001). The null hypothesis of the Toda–Yamamoto causality test is no effect of a variable on another variable. The kaleidoscopic result of Toda–Yamamoto causality test is presented in Table 17. The bi-directional causality relationship between three explanatory variables (i.e., aggregate private spending, public investment, and government consumption) and trade competitiveness is observed in this analysis.

Table 17: Toda-Yamamoto causality test result

Cause	→	Effect	Wald Statistics	P-value
E_t	→	R_t	5824.80***	0.000
R_t	→	E_t	163.58***	0.000
$GFCF_t$	→	R_t	2401***	0.000
R_t	→	$GFCF_t$	97.983***	0.000
$GFCE_t$	→	R_t	8502.6***	0.000
R_t	→	$GFCE_t$	131.89***	0.000

Note: * , ** and *** indicate the significance level at 10, 5 and 1 percent, respectively.

7.3.5 Discussion

The results of public investment and government consumption in this study coincide precisely with the explanations of Obstfeld and Rogoff (1995) and Di Giorgio et al. (2018) based on the two-country model, that is to say, an increase in government spending improves trade competitiveness through depreciation of the real exchange rate as a measurement of trade competitiveness. This finding also agrees with the result of Bouakez and Eyquem (2015), who indicated that the response to the extension of public spending is the depreciation of the real exchange rate, which intensified international competitiveness in four developed countries. The result of this study is consonant with the result of Kim (2015), who suggested that the extension of government consumption in 18 industrialized countries enhanced trade competitiveness

owing to the improvement of the market size in response to the depreciation of the real exchange rate. Thus, the extension of the market size in the time of globalization can be an effective channel for the improvement of trade competitiveness for developed and also developing countries (e.g., Cambodia). The extension of government spending can encourage a level of productivity that generates low production costs and high relative money demand in the home country, so it is a benefit in expanding the market size and therefore increasing trade competitiveness.

The results of this study are inconsistent with the outcome of Makin and Ratnasiri (2015) due to the different baseline for reflecting the real exchange rate as the measurement of trade competitiveness. In their study, they find that the real exchange rate is the proportion of the domestic currency price of non-traded to traded goods. The improvement of the real exchange rate index appreciates Australia's currency and thus reduces the international competitiveness owing to Australia's exchange rate written as a foreign currency against the home currency. In the case of expansionary public policy (i.e., public investment and government purchase) on non-traded goods, real exchange rate appreciation responds to the growth in the relative price of non-traded goods (i.e., an increase in opportunity cost of tapping production resources in tradable goods sector) due to faster productivity growth in non-traded than traded goods sector. As a result, the extension of government expenditure on non-tradable goods sector decreases Australian international competitiveness. The findings of this study are also not in line with Chen and Liu (2018), who pointed out that the enhancement of public investment or government consumption worsens the trade competitiveness due to the existence of the government's twin deficit. While there is an increase in government expenditure and a decrease in national savings, the real interest rates grow. More capital in the domestic capital market reacts to higher real interest rates, thus reducing the net capital outflow. A decline in net capital outflow decreases trade competitiveness via the appreciation of the real exchange rate and disrupts the trade account balance as well.

Thesis III

This study advances a new alternative measurement of international competitiveness based on the expansion of market size. Fiscal policy, mainly government spending, plays a direct role in contributing to an international macroeconomic model through the real exchange rate as the alternative measure of international (trade) competitiveness. The expansionary government spending (i.e., government investment and consumption) improves international competitiveness due to the depreciation of the real exchange rate.

8 General Conclusions

This study provides potential evidence that the role of government spending is integral to the economy (i.e., national and international macroeconomic activities). For domestic macro activities, the contribution of government expenditure, mainly public investment, to private consumption is non-linear because a rise in the present value of taxes creates a negative wealth effect via a decline in disposable income and an increase in price levels. Another important reason is that political instability produces an unhealthy influence on household behavior, thus reducing the effectiveness of government spending on private consumption.

Moreover, the healthy level of economic growth diminishes in response to a higher level of government expenditure. The optimal magnitude in Cambodia's economy was found to be 5.40 percent for public investment (GFCF) and 7.23 percent for public consumption (GFCE). The actual GFCF as a share of GDP in 2015 equals 5.30 percent, smaller than the 5.40 percent estimated in this paper as the optimum value of GFCF. A slight increase in GFCF, productive

investment, drives economic growth in Cambodia. The GFCE of 5.40 percent in 2015 has not yet exceeded the calculated optimal level (7.23 percent). Thus, the Cambodian government can apply an expansionary public policy to encourage the economy.

In the case of international macro activities, an expansionary fiscal policy (i.e., government investment and purchases) is instrumental in the enhancement of Cambodia's trade competitiveness via the depreciation of the real exchange rate as its alternative measurement. The expansion of government spending creates more incentive to invest in Cambodia and also enhances productivity via the improvement of labor productivity in the private sector. It can bring down the marginal cost of production and encourage private consumption in Cambodia. As a result, a high relative demand for money emerges in Cambodia, thus leading to a depreciation of the real exchange rate and improving trade competitiveness. According to the results of this study, the Cambodian government can improve trade competitiveness through an expansionary fiscal policy (i.e., public investment and government purchases).The possibility for designing expansionary fiscal policy can be seen if there are high values of consolidated fiscal balance and low national debt. Cambodia's consolidated fiscal balance as a share of GDP based on the CEIC database declined from -7.65 percent in 2011 to -2.66 percent in 2015. As reported by IMF's database, Cambodia's national debt as a share of GDP in the same period slightly increased from 30.30 percent to 32.54 percent.

However, this study suggests that high interest rates also contribute negatively to private consumption as the essential function of households in economic activity. The principal reason is that an increase in interest rates encourages households to save rather than spend because saving and spending are substitution products. Alternatively, households reduce their expenditures if they usually use the financial market to smooth their future consumption – that is, they have difficulties in repaying their loans in response to high interest rates. The household consumption is also one of the key components to calculate GDP based on demand-side. That is, a drop in household expenditure slows down economic growth. This study also points to trade competitiveness loss in response to a reduction in aggregate private spending as the sum of private consumption and investment. Thus, a decrease in household spending leads to worsening trade competitiveness. This is conclusive evidence that the government should use the integration of fiscal and monetary policy, thereby being able to achieve sustainable economic growth, improvement of international competitiveness, and development for Cambodia.

The result of the optimal level of government spending based on this time series analysis can be robust for three years from the analyzed period from 1971 to 2015. For a period of more than three years, the optimal value may change because the economic environment – especially the activities of the private sector in Cambodia's economy – has been undergoing significant changes. Thus, he threshold levels in this analysis might not be robust after the COVID-19 period, because it is farther away from this studied period.

The three thesis statements of this study can be made based on hypothesis testing and the results of data analysis as follows:

No.	Thesis statements
Thesis I	Government expenditure contributes significantly to private consumption. An increase in the present value of taxes and political instability can prevent the efficacy of government expenditure and cause the non-linear effect (i.e., the occurrence of not only Keynesian but also non-Keynesian impact in a certain period) of government spending (mainly public investment) on private consumption.
Thesis II	The effect of government expenditure (i.e., public investment and consumption) on economic growth depends on the magnitude of fiscal adjustment (the adjustment of government expenditure). There is an inverted-U-shaped relationship between government expenditure and economic growth. That is, larger increases in government spending do not lead to more growth.
Thesis III	This study advances a new alternative measurement of international competitiveness based on the expansion of market size. Fiscal policy, mainly government spending, plays a direct role in contributing to an international macroeconomic model through the real exchange rate as the alternative measure of international (trade) competitiveness. The expansionary government spending (i.e., government investment and consumption) improves international competitiveness due to the depreciation of the real exchange rate.

Source: Author's work

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