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GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH: DOES PUBLIC INVESTMENT MATTER IN THE LONG-TERM?

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Abstract:
Research aims: This study focuses on the correlation between public investment, current expenditure and payment for government debt, and economic growth in short-run and long-run estimations.
Design/Methodology/Approach: Macro data of Vietnam in the period 1991 - 2020, extracted from the World Bank and the Vietnam General Statistics Office. This research employs the Autoregressive Distributed Lag (ARDL) for time series.
Research findings: The results of this study indicate that an improvement in public investment can enhance economic growth; this is also true of the government's current spending. However, it is worth noting that the coefficients of changes in public investment and government current spending reduce the change in economic growth in one and two periods ago. Moreover, debt payment is found to have a negative effect on the economy at all lags with different levels of significance.
Theoretical contribution/ Originality: This study provides empirical evidence on the role of government spending in economic growth, thereby confirming that Keynesian theory still holds true in the case of Vietnam. The study confirms the vital role of government activity in regulating the development of the economy through investment and expenditure.
Practitioner/Policy implication: some important implications for policymakers focusing on government spending: (i) the government needs to have an investment strategy that focuses on the important areas, such as infrastructure and technology foundation. (ii) Government needs to improve accountability and transparency in the management. (iii) Supportive policies on capital, technology, human resources, and the market need to be continued to encourage investment activities in the economy. (iv) The selection, evaluation, and approval of investment portfolios should be made carefully and appropriately.
Research limitation: This study is limited by looking at the overview of government spending with economic growth, which ignores the spending structure due to the lack of necessary data. The following studies need to clarify the spending structure of Vietnam in order to determine which types of expenditures have negative/positive impacts on economic growth, thereby providing incentive solutions and necessary support from the government.

Keywords: Public investment, Public expenditure, Economic growth, Vietnam, ARDL.

Introduction

Governments' interference in worldwide economic activities was scarcely observed before the Great Recession of 1930. However, for the next decades, especially with the widespread of Keynes' theory of total demand, governments have been taking on a larger role in stabilizing the output and employment. In developing countries, the government's involvement in the economy has been enhanced to eradicate poverty and improve economic growth. Public policies in most developing countries are meant to address the market's flaws and assist its normal functioning. Additionally, they are popularly used to increase investment and even production in the public sector.

According to the economic growth theory, the growth rate is determined by capital formation, and thus fiscal policy plays an important role (Peacock and Shaw 1971, Peacock and Wiseman 1979). Economic growth, price stability, the balance of payments, and exchange rate stability are among the most vital macroeconomic goals on which governments are mainly focused (Blanchard, 2009). Fiscal policy refers to the government's modifications of taxes and expenditures to obtain certain macroeconomic goals, especially public investment. Although it is widely accepted that the significance of investment drives the national economic growth, the question on how public investment influences growth is still fragmented. Following Keynes' theory of fiscal policy, the extent to which public expenditures can increase the total demand leading to the output growth depends on the level of the spending multiplier. Keynesian economists are inclined to suggest increasing public spending on activities related to socio-economic issues and infrastructure to promote economic growth. They estimate the value of government through public investment and government expenditure. On this perspective, public investments promote economic dynamism, especially during recessions, when the national self-regulatory mechanisms are unable to retain the economy in equilibrium due to the rigidity of the labor market. This view is also supported by Khan and Kumar (1997), Abdullah (2000), Al-Yusuf (2000), Ramirez and Nazmi (2003), Bukhari et al. (2007), and Haque (2013), who claim that the expansion of public investment and spending contributes to a country's economic growth.

Contrastingly, the classical and neoclassical perspective consider fiscal policies as futile due to direct and indirect repressive effects. Abu and Abdullahi (2010) indicate that the increase of public spending decelerates the advance of 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 a pressure on credit markets, thereby pushing up interest rates. Once interest rates rise, they affect not only the government but also 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 spendings by raising taxes, which can distort market prices, resource allocations, and even attract tax evasion/avoidance behaviors, eventually, negatively impact the economic growth. Thus, the relation between public investment, the government's spendings, and economic growth has been controversial empirically and theoretically.

During the 5-year period of 2015-2020, public investment has been made at 2 million billion VND, which is considered to contribute significantly to the total economic output through the

spillover effect. Due to the impact of the COVID-19 pandemic, public investment has become a key resource for post-pandemic economic recovery. Capital for public investment is concentrated and arranged for strategic infrastructure projects such as roads, airports, ports, irrigation works, electricity, communication, and infrastructure of urban areas, industrial parks, hospitals, schools, national target programs for new rural construction and sustainable poverty reduction (GSO, 2020). In terms of regions, the public investment capital of the central government in the 2016-2020 period will be allocated to the following regions: North Central and Central Coast (27%), Northern Mountains (24%), Dong Nai, and the Mekong River Delta (17%), the Red River Delta (13%), the Southeast (12%) and the Central Highlands (7%) (Figure).

The ICOR coefficient of public investment is on the decline in the period 2015 - 2020; specifically, the ICOR in the 2016-2019 period is 6.1, lower than the nearly 6.3 level in the 2011-2015 period (citation). However, considering the whole year of the 2020 pandemic, the ICOR of the 2016-2020 period is about 8.5, resulting in a sharp decrease in GDP in 2020 compared to previous years. Although public investment is considered an essential factor of the economy, the proportion of state investment in total social investment has gradually decreased, from an average of 39.11% in the period 2011-2015 to an average of 34% between 2016 and 2020. This raises the question of whether increasing the size of public investment will increase the size of the economy in Vietnam.

To the best of the author's knowledge, studies on the impact of public investment are still limited in Vietnam. Several studies have shown that public investment has a positive role in economic growth, but the findings are very different in both the short and long term (To, 2011; Tran and Le, 2014; Diep et al., 2015). The limitations of this study lie in the different approaches and the use of different data sets. Therefore, this study fills the gap left by the research by using the Autoregressive Distributed Lag (ARDL) method to find the short-term and long-term effects of public investment, applied to the data set from 1991 to 2020 of the Vietnam General Statistics Office and World Bank. This approach provides a more comprehensive view than other approaches such as VAR and VECM because it does not require a vast number of samples and only estimates a single equation instead of a system of equations (Pesaran & Pesaran (1997)). This makes the ARDL approach the best model in the Vietnamese context.

In summary, the Keynesian, classical and neoclassical views offer two different positions regarding the relationship in general and causality between public investment and the economy's growth. While Keynes's view holds that the causality runs from government spending to economic growth, classical and neoclassical schools argue an opposite direction of causality. However, both can be true, depending on the characteristics of each economy. According to the World Bank, developing countries have recently achieved middle-income status through development restructuring. After examining the regional output growth and fiscal trends, this study empirically analyzes the effects of public investment on economic growth in Vietnam. The models' development is based on the consideration of the properties of observed 30-year macroeconomic data and a broad review of the previous literature.

This study develops a model that focuses on public investment and economic growth to clarify these relationships. The study is structured as follows: Part 1 focuses on the research's

essential targets, while part 2 presents a literature review and model development. Part 3 shows data and methodology. Part 4 discusses the main results, and finally, part 5 offers conclusions and some implications.

Literature Review and Model Development

According to Perotti (2008), there are two conflicting mechanisms of the transmission of public investment into production. On the one hand, the neoclassical view on the transmission mechanism of fiscal policy predicts that the increase on public spendings after a deficit will decline the private consumption and real wages. Specifically, when government expenditure increases, the representative households suffer an increase in cost of taxes that negatively affects their wealth. The expectation of future tax hikes lessens current consumption and leisure while increasing labor supply and output (Perotti 2008). On the other hand, modern Keynesian models indicate that the government's spending can enhance the total demand of labor. Labor demand growth may be strong enough to effectively offset the loss in real wage caused by surge of labor supply, consequently, raises the real wage. With the assumption that most families have credit constraints and cannot modify their long-term consumption (Gali, Lopez-Salido, and Valles 2007), a rise in the real wage leads to greater amount of consumption (Perotti 2008; Petrovic, Arsic, and Nojkovic 2020). Moreover, because infrastructure services are highly complementary, neo-Keynesians also support that increased investment in public infrastructure can boost short-term total demand by providing fiscal stimulus and gathering private investment. Thus, the increase of public capital in infrastructure possibly boosts the productivity of other inputs such as labor market and the engagement of private capital, reducing per-unit costs of the output (Cohen and Paul 2004; Teruel and Kuroda 2005). By enhancing the marginal productivity of private capital, public infrastructure may increase the capital' return rate and promote economic growth (Agénor, 2004).

Thus, empirical studies on the relationship between public investment and growth are developed in different directions, considering both the short- and long-term effects. Aschauer (1989) find that government investment in 'core infrastructure', e.g., streets, highways, airports, and other public capital, can stimulate output expansion in the United States from 1949 to 1985, showing that public investment is the critical determinant of productive capacity. Then, Barro (1990) demonstrates that public investment positively affects economic growth through endogenous models of growth. Similarly, Easterly and Rebelo (1993) discover that public investment into transportation and telecommunications in emerging nations results in stronger economic growth. In the 2000s, Ramirez and Nazmi (2003) show that either public or private expenditure can support economic growth, using the cross-country data from Latin American countries between 1983 and 1993. Angelopoulos et al. (2007) find that economic growth depends not only on the typical components of public investment but also on the government's proportion of spending. Bukhari et al. (2007) demonstrate that the dynamics of public investment have a favorable impact on growth rates using ARDL analysis in East Asian countries between 1971 and 2000. Caldéron (2010) analyzes the impact of the infrastructure advance on the economic growth in 39 African nations. He concludes that both the expansion of infrastructure supply and the improvement of infrastructure-related services positively contribute to economic growth. Using a VAR model for Portugal, Pereira

and Andraz (2013) also demonstrate that the investment in road transportation is a potent lever for encouraging private investment, employment, and economic growth in the long term.

However, recent studies, such as Keefer and Knack (2007) and Dabla-Norris et al. (2012), indicate that public investment may have limited benefits on economic development, contingent on the strength of institutions. Swaby (2007) finds that public investment positively influences GDP, but this effect is not statistically significant, using the vector error correction model (VECM) for Jamaica. Okafor et al. (2012) reiterate in the recent empirical literature that separating government expenditure into public investment and current spending. Then, they estimate their relationships with economic growth from 1987 to 2010 in Nigeria. Research results show that current spending has a positive and insignificant impact on economic growth, while public investment has a negative and negligible impact on economic growth. In addition, Adu and Ackah (2015) investigate the government's investment and spending in the short- and long-term in Ghana, using an ARDL model with annual data ranging from 1970 to 2010. Their study concludes that public expenditure significantly and negatively impacts economic growth, but current spending positively affects economic growth both in the long run and short run. It further suggests a fiscal regulation and efficiency in disbursing public investment to generate positive future benefits.

There are several studies on the impacts of public investment in Vietnam; however, they are inconsistent and rather primitive. To (2011) demonstrates that both private and state investment had a statistically significant beneficial influence on yield, using VECM to estimate impulse response. However, state spending crowds out a private investment with minor effects in the first few years and high effects after 5th year. Tran and Le (2014) examine the influence of public investment on economic advance from 1988 to 2012 in Vietnam, applying the ARDL model. According to the study's findings, the influence of public investment on economic growth is not statistically significant in the short term, but it has a crowding-in effect over the long run. Diep et al. (2015) also employ the ARDL model in combination with the co-integration of variables using the boundary method of Pesaran et al. (2001). Although the long-term correlations between public investment and economic growth is found, there is little evidence to support the usefulness of public investment in total amount of investment in the short term, as indicated by the findings.

In summary, previous studies only analyzed each factor individually and did not provide consistent empirical evidence on the role of these factors in the relationship between public expenditure and growth, therefore needs to be further explored in individual country contexts. Previous empirical studies in Vietnam are limited because these studies lie in the different approaches and the use of different data sets. This study addresses the gap left by previous research by applying the ARDL approach to the data set from 1991 to 2020 to determine public investment's short- and long-term consequences. Accordingly, this study analyzes and tests the role of public investment in Vietnam's economic growth from 1991 to 2020 in Vietnam. The hypotheses of this study are the following:

Hypothesis H1: Public investment spending positively affects economic growth in the short run.

Hypothesis H2: Public investment spending positively affects economic growth in the long run.

Model, Data, and Methodology

Model

According to Pesaran & Pesaran (1997), the ARDL method has more advantages than the other time-series analysis methods: (1) in case the sample size is small, the ARDL model is a more statistically significant approach for testing co-integration; (2) in contrast to conventional methods for finding long-run relationships, the ARDL method does not estimate a system of equations; instead, it only estimates a single equation; (3) other co-integration techniques require all regressors included in the association to be at the same level of delay; meanwhile, the regressors can have different optimal lags in the ARDL approach; (4) the ARDL method allows the least squares (OLS) technique to estimate the co-integration when the delay of the model is determined. This makes the ARDL method the best model in this case. The general ARDL equation is expressed as:

$$\Delta Y_t = c + \sum_{k=1}^{n} \alpha_i \, \Delta Y_{t-k} + \sum_{i=0}^{m} \beta_i \Delta X_{t-i} + \varphi_1 Y_{t-1} + \varphi_2 X_{t-1} + \mu_t \quad (1)$$

where:

- ΔY_{t-k} and ΔX_{t-i} are stationary variables that can be used with I(0) or I(1), and c, α_i, β_i are usually estimated by OLS, thus μ_t is the white noise and m, n are lag orders. In this paper, the set of X variables are public investment (GOVINV), government payment for external debts (GOVPAY), and current expenditure of government (GOVEXP), respectively. Y is gross domestic production (GDP). All variables are transformed to nature logarithm values.
- Y_{t-1} and X_{t-1} are variables at t - 1 lag, showing the long-term effects.

Then, this study specifies to long-run model from Equation (1) as follows:

$$GDP_t = \beta_0 + \sum_{k=1}^{n} \beta_{1i} GDP_{t-k} + \sum_{i=0}^{m1} \beta_{2i} GOVINV_{t-i} + \sum_{i=0}^{m2} \beta_{3i} GOVPAY_{t-i} + \sum_{i=0}^{m3} \beta_{4i} GOVEXP_{t-i} + \mu_t \quad (2)$$

The short-run dynamic parameters is obtained by estimating an Error Correction Model (ECM) associated with the long-run estimates

$$\Delta GDP_t = \theta_0 + \sum_{k=1}^{n} \theta_{1i} \Delta GDP_{t-k} + \sum_{i=0}^{m1} \theta_{2i} \Delta GOVINV_{t-i} + \sum_{i=0}^{m2} \theta_{3i} \Delta GOVPAY_{t-i} + \sum_{i=0}^{m3} \theta_{4i} \Delta GOVEXP_{t-i} + \varphi' ecm_{t-1} + \mu_t \quad (3)$$

Where θ_{ki}, β_{ki} are long-run and short-run dynamic coefficients of the model's convergence to equilibrium, and φ' is the speed of adjustment to long-run equilibrium following a shock of the system.

Data

The research data is Vietnam's macro data, collected from the General Statistics Office and Worldbank in the period 1991 - 2020 to ensure the reliability of the data. Research data are organized into time-series data and logarithmic to reduce magnitude differences between

data types while retaining information. This study chooses Vietnam as a model for the study on the effects of public spending because (1) Vietnam is one of the countries with impressive economic growth rates in ASEAN. (2) The increase in public investment and government spending has increased over 30 years. (3) Despite this fact, many scholars still assess that the effectiveness of public investment in Vietnam is not impressive (To, 2011; Tran and Le, 2014; Diep et al., 2015). Therefore, it is very meaningful to consider the issues of public spending and economic growth in the context of Vietnam in the context that developing countries are under the pressure of political-economic crises - society. Therefore, it is necessary to determine the right development direction to overcome difficulties and maintain economic growth.

Methodology

The ARDL method is processed in three steps:

- Unit root test: this step is performed on the variables to check whether the variables are stationary at the unit root I(0) or stationary at the first difference I(1) to avoid spurious regression results (Gujarati, 2004). This study uses both the Augmented Dickey-Fuller (ADF) test of Dickey and Fuller (1979) and the Phillips Perron (PP) test of the Phillips and Perron (1988).
- ADRL bound test: this test is performed according to two main procedures: The first procedure is to estimate the ARDL equation using OLS to check for the existence of a long-term correlation between the variables. Then, the F-statistic is taken for the combined significance level for these variables' coefficients in their lagged states. When the critical value of the F-statistic is greater than the upper limit, it can be concluded that there is a co-integration between the variables. On the contrary, it is not possible to reject the null hypothesis of no co-integration.
- ADRL estimation: the study determines the lag of the variables in the ARDL model using the SBC or AIC criteria. Then, ARDL estimation with defined lags is then applied to test the long-run relationship and short-run impacts of variables by error correction model (ECM), based on the ARDL approach for co-integration.

Results and Discussion

Data and Descriptive Statistics

Table 1 below presents the statistical results of the variables in this study (number of observations, mean, standard deviation, minimum and maximum values). It can be observed that the mean of economic growth (lnGDP) is 6.8895 and its standard deviation is 1.3252, respectively; Its minimum and maximum values are recorded from 4.3400 to 8.7472. It shows a positive trend of economic growth in Vietnam from 1991 to 2020. In addition, the mean of public investment (GOVINV) and government spending (GOVEXP) are 4.2716 and 5,0575, respectively, while their standard deviations are 1.4125 and 1.4305, respectively. The minimum and maximum values of public investment are 0.9988 and 6.1540, while the minimum and maximum values of government spending are 2.0909 and 7.0193. Finally, government debt servicing (GOVPAY) has a mean of 3.4870, a standard deviation of 1.3057, and minimum and maximum values of 0.3097 and 5.1693. They show the government spending priorities for the period 1991 - 2020, with the majority going to current expenditure and public investment, respectively.

Table 1. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
lnGDP	30	6.8895	1.3252	4.3400	8.7472
lnGOVINV	30	4.2716	1.4125	0.9988	6.1540
lnGOVPAY	30	3.4870	1.3057	0.3097	5.1693
lnGOVEXP	30	5.0575	1.4305	2.0909	7.0193

Source: World Bank, 2021

During the period 1991 - 2020, we can observe that the growth of the economy (GDP) has the same trend as the increase in public investment (GOVINV) and government spending (GOVEXP). Meanwhile, debt payments (GOVPAY) tend to decrease, and there seems to be no association with economic growth, as shown in Figure 1 below.

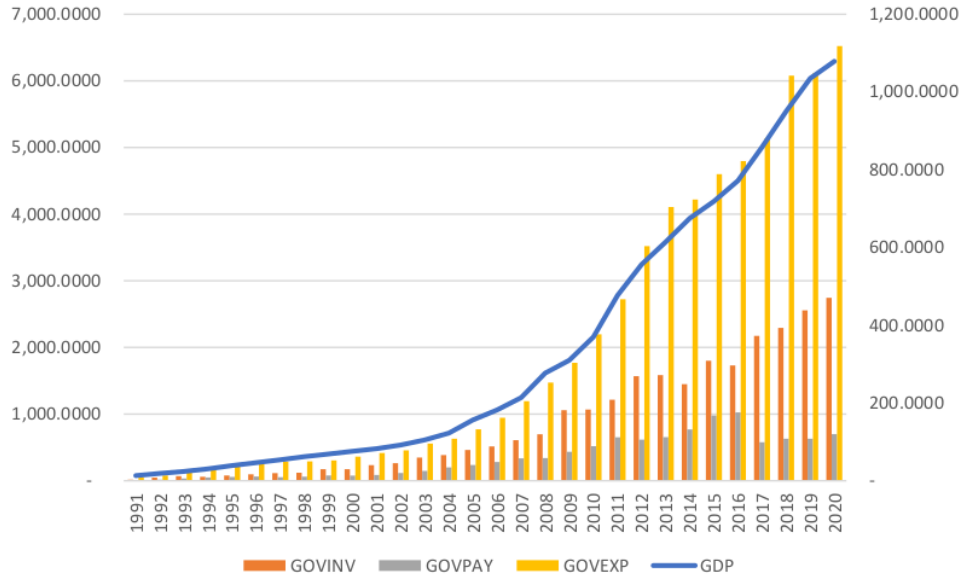

Figure 1. The linear relationship between public investment, government spending, and gross domestic production

Source: World Bank, 2021

Empirical findings

Table 2. Unit root tests

Variables	Lag	t-statistic value of ADF unit root test	Critical value at 5%	t-statistic value of PP unit root test	Critical value at 5%	Results
lnGDP	I(0)	-1.5013	-2.9719	-2.7095	-2.9678	Non-stationary
lnGDP	I(1)	-3.4195**	-2.9719	-3.4160**	-2.9678	Stationary
lnGOVINV	I(0)	-1.703749	-2.9719	-3.2682**	-2.9678	Stationary

lnGOVINV	I(1)	-8.5497***	-2.9719	-8.5496***	-2.9678	Stationary
lnGOVPAY	I(0)	-3.8225***	-2.9719	-3.8225***	-2.9678	Stationary
lnGOVPAY	I(1)	-3.6686**	-2.9719	-3.6286**	-2.9678	Stationary
lnGOVEXP	I(0)	-0.9316	-2.9719	-2.4837	-2.9678	Non-stationary
lnGOVEXP	I(1)	-3.2850**	-2.9719	-3.2849**	-2.9678	Stationary

Note: *, **, *** respectively show the results at the significance level of 10%, 5%, and 1%

Source: obtained by Eview's estimation.

In both ADF and PP unit root tests in Table 2, the absolute value of the statistic is less than its critical values at I(0), so this study cannot reject the null hypothesis, excluding the variables GOVINV and lnGOVPAY. Meanwhile, the absolute value of the statistic is smaller than its critical values at I(1). Therefore, we can conclude that variables are stationary at the root level I(0) at 5% significance level, excluding the lnGOVINV and lnGOVPAY. Therefore, these results in the unit root test give important evidence to use the ARDL co-integration approach proposed by Pesaran et al. (2001), which is suitable for checking the long-run relationship among the variables.

Table 3 shows the tests of the existence of the long-run co-integration relationship among the variables (Pesaran, 1997). In this step, if the obtained value of the F-statistic is greater than the upper critical bound, the long-run relationship between the variables exists. Otherwise, if the obtained value of the F-statistic is less than the lower critical bound, the long-run relationship does not exist. However, if the obtained F-statistic value falls between the lower and upper critical bounds, the long-run relationship is inconclusive (Mintz, 1991; Hassan & Kalim, 2012).

Table 3. ADRL Bound test for co-integration

K	Value of F-statistic	The critical value bounds, according to Pesaran (1997) (Restricted constant và no trend)							
		90%		95%		97,5%		99%	
		I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
3	7.3181	2.37	3.20	2.79	3.67	3.15	4.08	3.65	4.66

Note: *, **, *** respectively show the results at the significance level of 10%, 5%, and 1%

Source*: obtained by Eview's estimation.*

Due to the many variables and the small sample size in this model, the number of lags incorporated in the ARDL dynamic equations is limited in a period. The results of the ARDL bound test in Table 3 show that the F-statistic 7.3181 is higher than the upper critical bound test both in I(0) and I(1) (Pesaran et al. (2001) and Narayan (2004)), corresponding to the significance level of 1%. Thus, the hypothesis H_0 is rejected, and the hypothesis H1 is accepted: There is a co-integration relationship among variables, or in other words, there is a long-run relationship among these variables in the model. Also, the optimal lag order (4, 5, 3, 4) is chosen based on Akaike Information Criterion (ACI), shown below figure.

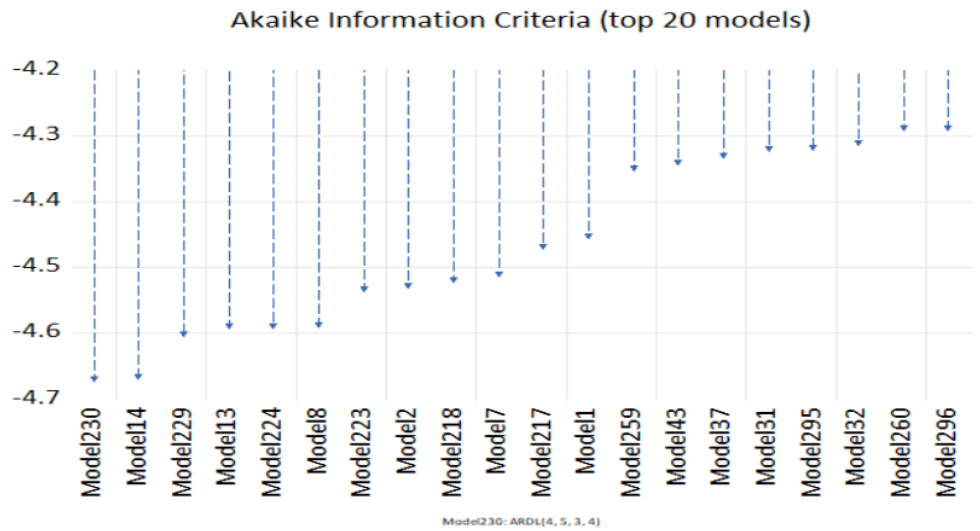

Figure 2. ARDL lag selection based on Akaike Information Criteria

Source: obtained by Eview's estimation.

In the next steps, Figure 3 and Figure 4 below show the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Square of Residuals (CUSUMSQ) plots. Both figures of CUSUM and CUSUMSQ stay within the critical boundaries at 5% significance. These provide evidence that the model parameters have not exhibited any structural instability. Thus, the long-run estimation is stable and has no structural break. Thus, these ARDL estimates are reliable and valid, paving the way for interpreting estimates in an ARDL approach.

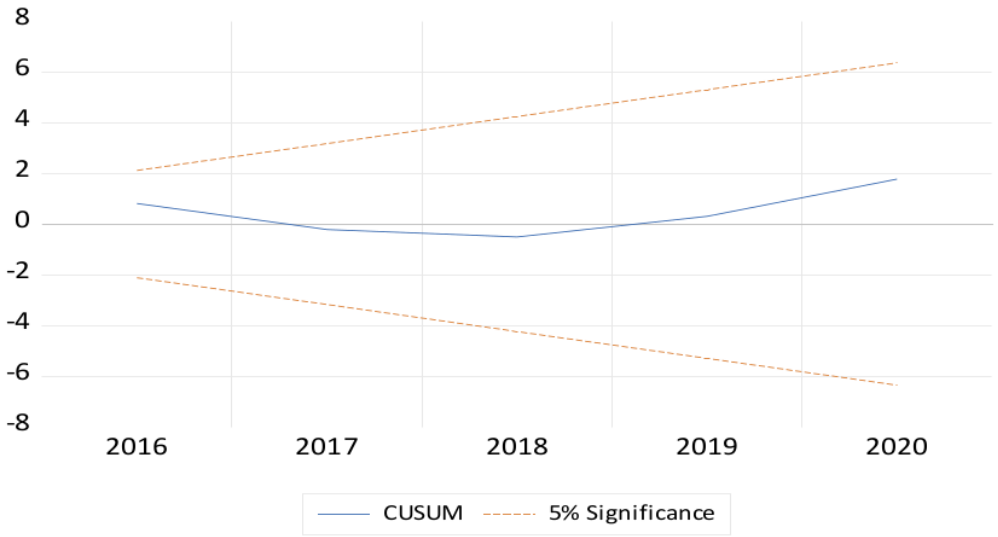

Figure 3. CUSUM: Cumulative Sum of Recursive Residuals

Source: obtained by Eview's estimation.

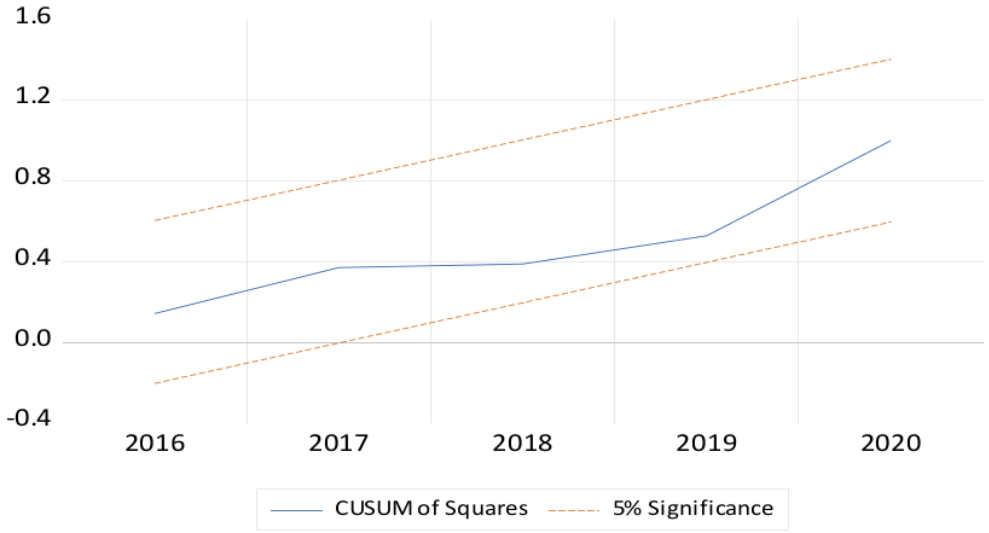

Figure 4. CUSUMSQ: Cumulative Sum of Square of Residuals

Source: obtained by Eview's estimation.

Similarly, Table 4 presents the results of the error diagnostic tests for the ARDL approach. These tests are performed because the validity of the ARDL results is based on the satisfaction of OLS assumptions. The statistical values are all greater than 0.100, confirming that the model does not violate the estimation errors and, therefore, the ARDL estimation is reliable.

Table 4. Error diagnostic tests for the ARDL approach

Diagnostic error	Test	F-statistic	P - value
Heteroskedasticity	Breusch-Pagan-Godfrey (H0: Homoskedasticity)	0.6120	0.8008
Serial correlation	Breusch-Godfrey Serial Correlation LM Test (H0: No serial correlation at up to 2 lags)	0.7576	0.1210
Functional Form	Ramsey's RESET test using the square of the fitted values (H0: Functional form is correct specification)	0.6891	0.2874

Note: *, **, *** respectively show the results at the significance level of 10%, 5%, and 1%

Source: obtained by Eview's estimation.

Then, the next step is estimating the appropriate ARDL model to find out the long-run coefficients, which are presented in Table 5 below.

Table 5. ADRL estimation for long-run coefficients

The dependent variable is lnGDP	ARDL estimation			
	Coefficient	Standard error	t-statistic	p-value
lnGOVINV	0.4356***	0.0695	6.2714	0.0015
lnGOVPAY	-0.0302	0.0357	-0.8467	0.4358
lnGOVCEX	0.5411***	0.0654	8.2765	0.0004
C	2.4086***	0.0647	37.2196	0.0000

Note: *, **, *** respectively show the results at the significance level of 10%, 5%, and 1%
Source: obtained by Eview's estimation.

Based on Table 5, public investment and the government's current expenditure have positive effects in a long-term relationship at 1% statistically significant. As the table results, an one percent increase in public investment will cause 0.4356 percent in GDP. Meanwhile, one percent growth in the government's current spending will increase economic growth by 0.5411 percent at 1%, statistically significant in the long-run time. These findings confirm Keynes's view that government expenditure plays an important role in the development of the economy. The findings of this study in Vietnam are consistent with the view of Aschauer (1989), who finds that government spending on production can stimulate output expansion. The study also supports the findings of Devarajan et al. (1996) supporting that government spending has a relationship with economic growth, each of its components having different effects on growth. In this study, the government's current spending is associated with higher growth than a public investment with a greater coefficient. Thus, it could be concluded that the role of government current spending is very important for economic growth in Vietnam due to the significant boost in aggressive demand. It is noteworthy that debt servicing expenditures have no impact on economic growth at statistical significance, implying that these activities are not the drivers of economic growth in the long run. Moreover, its negative coefficient requires further studies on the role of debt payment on economic growth in future studies as a premise for consideration of the government's foreign debt. Next, Table 6 presents the error correction estimation for short-run coefficients.

Table 6. ADRL error correction estimation for short-run coefficients

Dependent variable ΔlnGDP	Error correction estimation for selected ARDL			
	Coefficient	Standard error	t-statistic	p-value
ΔlnGDP (-1)	0.8691	0.1643	5.2894	0.0032
ΔlnGDP (-2)	0.2269	0.1418	1.6007	0.1703
ΔlnGDP (-3)	1.3399	0.1620	8.2737	0.0004
ΔlnGDP	0.3301	0.0643	5.1366	0.0037
ΔlnGOVINV (-1)	-0.2303	0.0605	-3.8054	0.0126

ΔlnGOVINV (-2)	-0.2438	0.0704	-3.4614	0.0180
ΔlnGOVINV (-1)	0.0818	0.0440	1.8581	0.1223
ΔlnGOVINV (-2)	0.1123	0.0277	4.0560	0.0098
ΔlnGOVPAY	-0.1387	0.0270	-5.1322	0.0037
ΔlnGOVPAY (-1)	-0.0191	0.0242	-0.7908	0.4649
ΔlnGOVPAY (-2)	-0.1009	0.0269	-3.7425	0.0134
ΔlnGOVEXP	0.3407	0.0720	4.7288	0.0052
ΔlnGOVEXP (-1)	-0.7303	0.1289	-5.6639	0.0024
ΔlnGOVEXP (-2)	-0.7179	0.1256	-5.7144	0.0023
ΔlnGOVEXP (-3)	-0.4917	0.0985	-4.9898	0.0041
ECT (-1)*	-1.8711	0.2306	-8.1156	0.0005
R-squared	0.9643	Akaike info criterion		-4.9887
Adjusted R-squared	0.9048	Schwarz criterion		-4.2086
Durbin-Watson stat	2.4849	Hannan-Quinn criterion		-4.7723
EC = lnGDP - (0.4356* lnGOVINV - 0.0302* lnGOVPAY + 0.5411* lnGOVEXP + 2.4086)				

Note: *, **, *** respectively show the results at the significance level of 10%, 5%, and 1%
( ) is t-test results.
Source: obtained by Eview's estimation.

The error correction term (ECT) is obtained from the corresponding model for the long run, whose coefficients are estimated by normalizing the Equation. The ECT indicates how the dynamic model is adjusted to restore equilibrium; thus, it must be statistically significant and have a negative coefficient. Bannerjee et al. (1998) state that the highly significant ECT confirms the existence of a stable long-run relationship. The results in Table 5 show that the estimated negative coefficient of ECT is very significant, confirming the existence of a long-run relationship between the variables with their significantly different lags. Indeed, the ECM coefficient -1.8711 implies that the deviation from long-run growth in GDP will be adjusted to equilibrium next year. The high coefficient of R-squared explains that about 96.43% of GDP changes are due to changes in public investment, debt servicing, and current government spending. Additionally, the DW statistic does not suggest autocorrelation, and the F statistic shows unbiased results.

The short-term results show a significantly positive relation between the change in GDP and the change in public investment at the base year, which is consistent with the long-term results. As is the case, in the long run, this result suggests that Wagner's law applies to Vietnam, as the economic growth is influenced by the amount of public investment and government expenditure in the economy. However, it is worth noting that the coefficients of changes in public investment 1 and 2 periods ago reduce the change in current GDP. This effect was similarly found in current government expenditure. This indicates that public

investment and current spending appear to be the crowding-out effect of non-state investments, as has been shown in previous studies (Ahmed, H., and S. M. Miller. 2000, Farla, K., D. De Crombrugghe, and B. Verspagen. 2016, Nguyen Thi Canh 2018). Therefore, this finding reinforces the view that public investment and current expenditure must be implemented properly, although playing an important role in the economy. Then, debt payment is found to have a negative effect on the economy at all lags with different levels of significance, confirming that debt repayment carries a burden on the national economy.

Conclusion

The purpose of the study focuses on the relationship between government expenditure activities, such as public investment, debt repayment, recurrent expenditure, and economic growth in Vietnam. This study uses Vietnam macro data for the period 1991 - 2020, extracted from the databases of the World Bank and the General Statistics Office of Vietnam. To fit the time series data, this study uses the ADRL approach to investigate both the short- and long-term effects of expenditure variables on economic growth. Theoretically, this study provides empirical evidence on the role of government spending in economic growth, thereby confirming that Keynesian theory still holds true in the case of Vietnam.

The results of the study indicate that an improvement in investment can boost economic growth; the same is true of current government spending. According to the Keynesian school, an increase in public investment and recurrent government spending boosts the demand for labor, leading to an increase in real wages, which leads to an increase in consumer demand. Thus, aggregate demand in the economy is driven by an increase in spending under the expansionary fiscal policy (Gali, Lopez-Salido, and Valles 2007). Furthermore, an increase in public investment brings in infrastructure as well as technology, boosting the productivity of other inputs, such as labor and private capital. As a result, it reduces unit output costs, increases return on capital, and promotes economic growth (Cohen and Paul, 2004; Agénor, 2004; Teruel and Kuroda, 2005). However, this study also uncovers the crowding out of public investment and government spending through its negative effect on economic growth at later lags. According to previous studies by Ahmed, H., and S. M. Miller. 2000, Farla, K., D. De Crombrugghe, and B. Verspagen. 2016, Nguyen Thi Canh 2018, public investment can crowd out other forms of capital investment in the economy, so controlling government investment spending becomes essential.

Other contributions of this study are providing some key implications for policymakers focusing on government spending. First, to promote economic growth, the government needs to have an investment strategy that focuses on the areas that create the infrastructure and technology foundation of the economy, as mentioned by Wagner's law. We believe that the government needs to improve accountability and transparency in the management and use of public investment capital and in current expenditure activities at all levels of management. This requires the government to continue to reform the public financial system as a top priority. Moreover, supportive policies on capital, technology, human resources, and the market need to be continued to encourage investment activities in the economy. Besides, the selection, evaluation, and approval of investment portfolios should be made carefully and appropriately.

This study is limited by looking at the overview of government spending with economic growth, which ignores the spending structure due to the lack of necessary data. The following studies need to clarify the spending structure of Vietnam to determine which types of expenditures have negative/positive impacts on economic growth, thereby providing incentive solutions and necessary support from the government.

Reference

Public investment_ARDL_R

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