Government Education Expenditure and Economic Growth Nexus: Empirical Evidence from Vietnam

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Abstract

Government expenditure on education has attracted much attention because it plays an important role in the economic development. The question is whether government expenditure on education has a positive or negative impact on the economic growth and vice versa. This study aims to provide reliable estimates of the relationship between government expenditure on education and economic growth with empirical evidence in Vietnam for the period 2006–2019. The data was taken from the official statistics of the General Statistics Office of Vietnam. The authors have used the VAR model and Granger causal model to determine the relationship between government expenditure on education and the economic growth. Research results show that there is a two-way nexus between the economic growth and government spending on education with a lag of about two years. From the results obtained from this research, the authors have made some policy suggestions for the Vietnamese government as how to increase investment for education. If there is a one-way causal relationship between expenditure on education and the economic growth, the government can use spending as a growth factor. However, if there is a bi-directional relationship between the government expenditure on education and the GDP growth, the government needs to ensure that resources are appropriately managed and allocated effectively to promote growth.

1. Introduction

The relationship between government expenditure and economic growth remains the subject of widespread debate among many scholars worldwide, both in theory and experiment. Several governments around the world have tried to stimulate economic growth by increasing government expenditure. Meanwhile, some countries like the EU countries oppose the way to boost the economy by increasing government expenditure. Experimental and theoretical research on the relationship between government expenditure and economic development can answer questions regarding public financial stability. Moreover, assessing the relationship between economic development and government expenditure can determine the factors that change the growth structure. Government expenditure is an essential component of national income (Chu et al., 2020). But government expenditure has always had two sides, positive and negative. On the one hand, government expenditure can significantly increase economic output and cause disadvantages such as shrinking private investment and impeding overall economic activity. Lee et al. (2013) proved that an increase in government expenditure could increase the net present value of a tax. An increase in the net worth of taxes can reduce permanent income and reduce private consumption and labor supply. There has been a lot of debate about whether government expenditure drives economic growth. But until now, there have been plenty of empirical evidence which suggests both results: an increase in government expenditure may or may not increase economic growth. So there is a fundamental question in the growth theory of whether or not increasing government expenditure

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promotes economic growth. A lot of empirical studies have been unable to reach specific conclusions. Sangkuhl's (2015) macroeconomic theory has shown that increasing government expenditure can lead to high aggregate demand and possibly economic development. Wijeweera and Webb's (2012) empirical evidence has the opposite result: an increase in national income could increase economic development. In Keynes's studies, government expenditure has a causal relationship to economic growth. According to Wagnerian's theory, the share of government expenditure in the gross national product has a positive relationship with the economic development.

In total government expenditure, expenditure on education is aimed at developing high-quality resources which is crucial for the economic development. Economists have also shown a great deal of interest in the role of government expenditure on human capital (Nguyen, 2019). Previous studies have primarily viewed education as a measure of human capital and have attempted to examine the impact of education on the economic growth. Many empirical studies suggest that human capital is the most important for sustainable development in each country. However, some researchers find a weak relationship between human capital and growth. The reason for this fragile relationship is the lack of a close connection between human capital and development. This weak relationship can be attributed to the research methodology as well as the absence or exclusion of control variables that account for the differences in the article estimates. Education and training are indispensable activities for the development of each country. The product of education is human, which is a significant factor in producing and creating material wealth for society. Skilled and qualified workers directly impact productivity in sustainable economic growth (Marimuthu et al., 2021). Therefore, the formation of labor skills should be necessarily created through education and training. Vietnam is one of the developing countries of the world, and the investment budget for education has had significant growth in the period 2006–2020 (Nguyen et al., 2021). Therefore, we rely on a set of findings from different studies to empirically investigate the effects of government expenditure on education and economic growth to more accurately estimate the magnitude of the impact and estimate obtained from the experimental research in Vietnam.

As investments in human capital are essential to become growth engines in endogenous growth theory, our hypothesis suggests a positive correlation between government expenditure on education and growth. Furthermore, based on the Vietnamese data, we hypothesize that the relationship between government expenditure on education and development is positive. Therefore, our research hypothesis is that government expenditure on education (EE) is a share of GDP that drives the GDP growth.

2. Literature Review

There have been many empirical studies focusing on the relationship between government expenditure and economic growth in the developed and the developing countries. However, there is a massive difference in the research results due to the fact that each country's level of economic development and political institutions are different. In addition, the differences between studies are due to the various research methods applied and analysis stages. Landau (1983) has shown that the increase in government expenditure reduces economic growth over a relatively long study period. Each inverse relationship between government expenditure and real GDP per capita in the short term is weaker. This study also found that the relationship between government expenditure and real GDP per capita does not demonstrate an increase in the economic well-being. Barro (1991) again demonstrates a positive relationship between government expenditure on non-productive services and per capita economic growth. He also expanded his research to more than 100 different countries between 1960 and 1990. Barro's research has shown that among the decisive factors which leads to an increase in the GDP are: controlling inflation and reducing government expenditure.

Meanwhile, government expenditure, which does not include spending on education and military, shows its negative impact on the economic growth. Thus, in Barro's studies, if government expenditure is higher, economic growth decreases (possibly due to higher taxation). Devarajan et al. (1996) offered mixed results while asserting that the impact of government expenditure on GDP growth may depend on the composition of expenditure or the share of expenditure for each component. Research shows that the percentage of government expenditure has a positive effect on growth for developing countries, but the relationship between public expenditure and GDP per capita remains inversions.

The Musgrave-Rostow theory states that public spending should be encouraged in the early stages of economic growth (Adewara et al., 2012). The main reason is that it is necessary to have the participation of the government when the market is going through problems. On the other hand, Peacock's hypothesis of the shifting effect shows that government expenditure tends to vary with social upheaval, especially during wartime. These theories have been supported by several experimental studies such as Ebiringa and Charles-Anyaogu (2012), Ifarajimi and Ola (2017), and Onuka and Odinakachukwu (2020).

Abu-Bader and Abu-Qarn (2003) conducted a study on the relationship between government expenditure and economic growth in three countries, Egypt, Israel, and Syria. Research has demonstrated a causal relationship between government expenditure and the economic growth. However, in the long run, this relationship is negative between the two variables.

Furthermore, military expenditures also had a negative effect on the economic growth in all the three countries.

Jiranyakul (2013) conducted an empirical study of government expenditure on economic growth in Thailand in the period 1993–2006. Research results show a one-way causal relationship between government expenditure and the economic growth. The least-squares estimation method has shown the positive effect of government expenditure on economic growth over the studied period. Similarly, some other scholars have also assessed the causal relationship between government expenditure and economic development in Greece, UK, and Ireland. The results show that the size of government expenditure generates economic growth in all the three countries. Dilrukshini (2009) used the Johansen test to evaluate the impact of government expenditure on the economic growth in Sri Lanka between 1932 and 2002. The results also showed that the extent of public spending growth determined Sri Lanka's economic growth.

Murphy's study (2015) has demonstrated that shocks in government expenditure would cause an increase in total consumption. Surveys have suggested that, in some cases, lower levels of government expenditure drives the economic growth. However, government expenditure often increases the government debt. Bose et al. (2007) offered strong evidence that deficits in government expenditure in developing countries (our sample of 30 countries) can lead to adverse effects on growth. In the case of Greece, the causal relationship Granger shows a positive relationship between economic growth and government debt over the long run. Spilioti and Vamvoukas (2015) researched over 40 years and demonstrated that government debt was positively related to GDP growth over a given total debt ratio (in Greece, it is about 110%).

Bose et al. (2007) found that a high deficit in government expenditure can lead to a disadvantage in promoting growth when he analyzed the relationship between the government expenditure and the economic development. In Greece, Dritsaki (2013) also found a causal relationship between economic growth and government debt but in the long run. An increase in government expenditure likely causes higher levels of corruption in a country. Corruption also has an indirect effect on the GDP growth. Government expenditure helps the economy grow, but government expenditure on the military is significant, and corruption indirectly reduces GDP (Alptekin & Levine, 2012). Meanwhile, the negative relationship between government expenditure and the economic growth is often found in countries which have inefficient governments. A study of the relationship between government expenditure and financial performance in EU countries also saw a long-run elasticity of the variables. However, the long-term resilience is not sustainable over time and tends to decrease significantly in countries with rapid aging, countries with low debt, and countries with poor spending controls. Countries with a short elasticity are due to the rate at which government expenditure is adjusted to potential output (Arpaia & Turrini, 2012).

Tang (2009) examined the relationship between growth and the government expenditure in Malaysia during the period 1960–2007. This study found that government expenditure on education and military is positively correlated with the national income. In contrast, government expenditure on health found no evidence which could suggest that it has a positive effect on the national income. The author conducted a causality test which showed a one-way relationship between national income and the government expenditure on health. Another study tested 182 countries between 1950 and 2004 and confirmed a positive relationship between government expenditure on health and national income and economic growth (Wu et al., 2010). Wahab's (2004) study also re-examined government expenditure during recession and found that government expenditure decreased during economic growth and expansion. As a result, GDP growth is equal to or higher than the trend of development. This same rule applies to some OECD countries, even in the developing countries.

For economies in developed countries like the EU, the above elasticity is negligible. For example, in Malaysia, a relatively high middle-income developing country, the test has shown that an increase in overall government expenditure has a negative relationship with the economic growth. However, there is no relationship between government expenditure on social services and the economic development. In addition, the results of this study also show a link between government expenditure on social services and the economic growth. However, several sectors, such as health care, transportation, and public utilities, are positively associated with the economic growth.

Another study examined the relationship between government expenditure in different sectors and the economic growth in Nigeria between 1980 and 2008. Key sectors include security, health, education, transport, communication, and agriculture, interwoven with positive and negative relationships with the economic growth. In the short term, spending on military, transportation, and communications is positively correlated with the economic growth, while agricultural spending negatively affects the economic growth. On the other hand, the impact of the expenditure on education has a negative but negligible effect on the economic growth.

Bosma et al., (2018) also carried out a test of general government expenditure on the economic growth in 23 OECD countries. The test results show a positive relationship between the government expenditure and the economic development. In the long run, the more

considerable elasticity shows that the government expenditure is proportionate to the economic performance of a country. The author also finds that the correlation between variables in countries with per capita GDP is generally lower than in countries with high per capita GDP. This study shows that the relationship between the government expenditure and GDP can be characterized by intense government action in the developed world. Bateman and Jones's (2003) study on the relationship between government public expenditure and GDP in Jordan in the period 1990–2010 also showed a positive effect of the government expenditure on GDP growth.

Several studies on the relationship between the economic growth and the government expenditure in developing countries also show mixed results. Chude and Chude (2013) estimated the impact of education spending on economic growth in Nigeria. The test results show that spending on education positively impacted the economic growth in Nigeria for a long time, from 1977 to 2012. The study results also have important policy implications for education spending in Nigeria.

Easterly and Rebelo (1993) also conducted a study evaluating the relationship between fiscal policy and the economic growth. The author has examined the effects of the budget structure on the economic growth in 9 countries in 1990–2010. The author has concluded that public spending significantly reduces growth—economics in countries in the CFA region. Olulu et al. (2014) showed that the government expenditure in Nigeria, when broken down into total spending on health, education, and public debt, shows an inverse relationship between government expenditure on health and the economic growth. The Nigerian government's spending on education is not enough to cater to the country's expanding education sector. Afonso and Jalles (2014) assessed the relationship between public expenditure and the economic growth in 14 European countries and showed that the government expenditure function for some countries such as Austria, France, Netherlands, and Portugal and found that the national income increased when the government expenditure of these countries increased.

The research of Churchill and Yew (2017) showed that the government expenditure is negatively related to the economic growth in developed economies and vice versa in countries with less developed economies because government expenditures have had an apparent effect on GDP growth. The above studies have shown that the relationship between government expenditure and economic growth is very diverse (either negative, positive or unclear, etc.). Studies had not demonstrated the unity or monotony between relationships because each country's economic development is different. Different stages of analysis and research methods also show different results.

However, the above research gap lacks studies about government expenditure in education in relation to economic growth in a rapidly growing country like Vietnam. Most of the research has focused on some specific countries such as Tang (2009); Hamzah (2011); Taiwo and Abayomi (2011); Chude and Chude, (2013); Ndjokou (2013); Gisore et al. (2014); Olulu et al. (2014). But there are no specific studies on Vietnam, especially on the relationship between government expenditure on education and on economic growth. Therefore, this study will focus on the relationship between government expenditure and economic development in Vietnam for the period 2006–2019.

3. Data and Methodology

This article evaluates the relationship between government spending and economic growth in Vietnam based on data from 2006–2019.

After synthesizing relevant studies and analysing data on government expenditure and government expenditure on education in Vietnam, the author used the following model:

$$\text{GDP}_t = \alpha + \sum_{i=1}^{k} \beta_i \text{EE}_{t-1} + \sum_{j=1}^{n} \beta_j \text{GE}_{t-j} + \varepsilon_{it}$$

In which,

GDP : Vietnam's economic growth in the period 2006–2019

EE　 : Total government expenditure on education in 2006–2019

EG　 : Total government expenditure in 2006–2019

The study uses the data set by the General Statistics Office of Vietnam from 2006 to 2019. The research analysis method used is VAR regression and Granger causality test, which examines the interaction between GDP growth rate and government spending on education in Vietnam.

The Vector Autoregression (VAR) model, proposed by Princeton University professor Christopher Sims in 1980, has become one of the most successful methods in macro-empirical analysis, especially in the field of the macro-empirical monetary economy. The model that considers many time series simultaneously is called the VAR(*p*) model (*p* is the maximum delay): this is a system of equations. Moreover, the VAR model allows considering variables that interact with each other (all of which can be endogenous variables). The model has the form:

$$Y_t = \delta + \phi_1 y_{t-1} + \ldots + \phi_p y_{t-p} + u_t$$

In which $Y_t = \begin{bmatrix} Y_{1t} \\ \vdots \\ Y_{mt} \end{bmatrix}$

VAR model will allow considering the dynamic effect of a shock on other variables. In addition, the VAR model also provides the basis for performing the Granger causality test and considering the interrelationship between variables. The VAR model has (p) being the optimal lag of any variable. In the VAR model without the above constraint, each variable appears with each lag in all equations. In VAR(p) model with m variables, there will be m_2 coefficients at each lag; the VAR model has many coefficients. The random errors (disturbances) of the VAR are white noise vectors. Any dynamic relationship will be expressed through the coefficients of VAR. Each random error cannot be predicted from the past – either from its past or from another error. This model increases the ability to estimate the parameters in the VAR system. The lag of p must be chosen so that there is no autocorrelation between the estimation errors.

However, the condition of VAR is that the time series must be stationary. In practice, the original data series are usually non-stationary. Therefore, we should switch to considering the first-order difference series, the data series taken the natural logarithm, or the data series's difference has taken the natural logarithm. In this case, the time series is called cointegration. This model helps us to consider the long-run relationship of variables (time series). The model results are read through the Granger causality test, Impulse Response Function Graph, Variance Decomposition, and Cointegration.

4. Empirical Results and Discussion

To ensure the conditions for the model implementation, the study conducted the Augmented Dickey-Fuller unit root test to determine the stationary of the data used in the model. The test results show that EE and GE's variables are significant at the 1% level, which proves that both variables have unit roots or stationary data. GDP has a unit root test in the 1st, and GE and EE have a unit root test and have 2nd stationery (Table 1).

Because the GE variable is not stationary at the first difference, the study continues to conduct the ADF unit root test to test the stationary of the second differences of the GE variable in the research model. The unit root test results show that the variable is stationary at the second difference, at the significance levels. In addition, the graph depicting

Table 1: Augmented Dickey-Fuller (ADF) Unit Root Test Results

Variables	*t*-statistic	Prob.*
D (GDP)	−7.003311	0.0003
D (EE,2)	−3.388977	0.0384
D (GE,2)	−5.367126	0.0018

the 1, 2th difference of the variables in the research model shows that there is a correlation between the variables. However, the graphical analysis did not establish a clear quantitative relationship for the causal relationships in the research model.

To perform the next testing steps, this study conducts some basic condition tests of the model. Firstly, we do the testing for stability of the model.

The characteristic root AR test results show that all the solutions of the polynomial lie in the unit circle reflect the VAR model (Figure 1), ensuring stability and sustainability. Therefore, the study continues to test the cointegration relationship to prove the long-term relationship between the variables in the model. The cointegration test is done through the Trace test and Max-Eigen test (Table 2).

The Trace test and the Max - Eigen test results show two cointegration relationships between the variables in the model at the 5% significance level. This result reflects that the variables in the model satisfy the conditions of the VAR model when there is a long-term correlation. The model's optimal lag test results are 2, the model is significant (Table 3).

After determining the optimal lag of the model, the study performed the Granger causality test to determine the model's causal relationship (Table 4).

The results of the causality test in Table 4 and Table 5 show the causal relationship between GDP and EE, and GDP and GE. When the P values are 0, there is a basis to reject the H0 hypothesis and accept the H1 hypothesis. Only the hypothesis that GE does not affect GDP has Prob of 0, so this hypothesis is accepted.
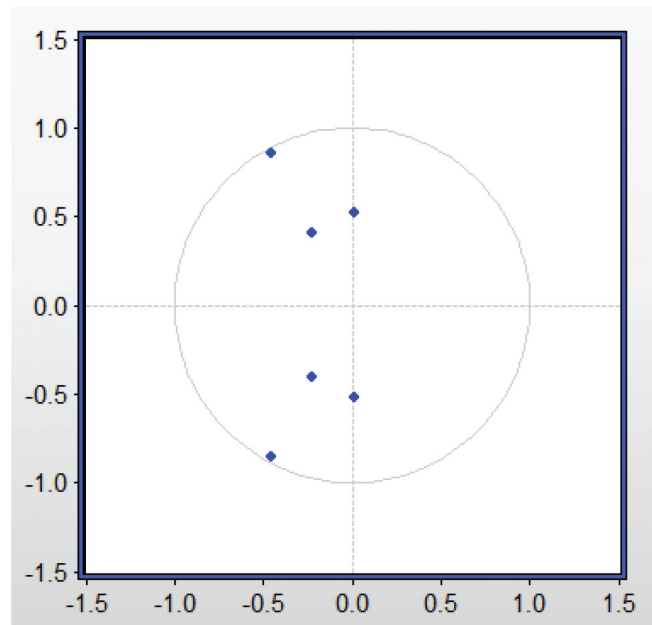

Figure 1: Inverse Roots of AR Characteristic Polynomial

Table 2: Cointegration Test

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
Hypothesized		Trace	0.05	
None*	0.886466	48.25307	29.79707	0.0001
At most 1*	0.763910	19.96960	15.49471	0.0099
At most 2	0.088424	1.203538	3.841466	0.2726

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level; *denotes rejection of the hypothesis at the 0.05 level.

Hypothesized		Max-Eigen	0.05	
None*	0.886466	28.28347	21.13162	0.0042
At most 1*	0.763910	18.76607	14.26460	0.0091
At most 2	0.088424	1.203538	3.841466	0.2726

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level; *denotes rejection of the hypothesis at the 0.05 level; **MacKinnon-Haug-Michelis (1999) *p*-values.

Table 3: Optimal Lag of the Model

Lag	LogL	LR	FPE	AIC	SC	HQ
0	–493.1265	NA	2.83e+29	76.32716	76.45753	76.30036
1	–453.5347	54.81943*	2.72e+27	71.62073	72.14222	71.51354
2	–436.1326	16.06351	1.03e+27*	70.32809*	71.24070*	70.14051*

*indicates lag order selected by the criterion; LR: sequential modified LR test statistic (eac`h test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hannan-Quinn information criterion.

Table 4: VAR Granger Causality/Block Exogeneity Wald Tests

Dependent Variable: EE			
Excluded	Chi-sq	df	Prob.
GDP	8.488716	2	0.0143
GE	8.873504	2	0.0118
All	55.07805	4	0.0000
Dependent Variable: GDP			
EE	1.983274	2	0.3710
GE	0.381829	2	0.8262
All	2.178786	4	0.7029
Dependent Variable: GE			
EE	0.451191	2	0.7980
GDP	27.49596	2	0.0000
All	36.04558	4	0.0000

The model also shows a positive effect between EE and GDP. An increase in government spending on education has a positive impact on GDP growth. The variance decomposition of EE in 10 years shows the change in EE explained by a GDP growth of 63.7% and GE of 1.3%.

5. Conclusion and Recommendation

The results of statistical data analysis show that the level of expenditure between education expenditure and GDP growth in Vietnam has a positive relationship and influences each other. The results of the cointegration analysis for the period 2006–2019 show a long-term relationship between economic growth and government spending on education. The variance decomposition table also indicates that the increase in total GDP explains the change in the education expenditure (Table 5). The first response function analysis results imply that when the growth rate of education expenditure increases by 1%, the GDP increases by 63.7% at the end of the 10th year (Table 5). This result shows that a dynamic reciprocal

Table 5: Variance Decomposition of Variables

Period	S.E.	EE	GDP	GE
Variance Decomposition of EE				
1	4457.241	100.0000	0.000000	0.000000
2	6305.180	51.68218	48.29950	0.018315
3	13920.02	50.16587	43.83466	5.999474
4	21139.45	41.32589	55.81280	2.861311
5	24844.62	36.42321	61.09933	2.477463
6	27198.25	37.01955	60.87128	2.109175
7	29961.13	36.72872	61.39196	1.879325
8	32524.48	34.92026	63.46585	1.613893
9	34869.61	34.71619	63.86940	1.414401
10	37738.86	34.97506	63.71186	1.313083
Variance Decomposition of GDP				
1	139592.1	14.14580	85.85420	0.000000
2	229695.3	23.68838	75.83895	0.472672
3	346909.1	31.33667	67.76260	0.900730
4	451088.1	31.77509	67.65365	0.571261
5	528698.0	31.61870	67.96459	0.416708
6	595503.0	32.21192	67.42691	0.361175
7	661214.6	32.21582	67.46654	0.317637
8	724074.6	31.95640	67.77473	0.268871
9	787007.6	32.11971	67.63151	0.248785
10	853298.9	32.25777	67.50409	0.238139
Variance Decomposition of GE				
1	35697.73	22.29118	11.17331	66.53552
2	77857.15	11.90395	73.34996	14.74610
3	103404.6	23.62480	67.98158	8.393618
4	138842.6	34.48589	59.28414	6.229969
5	165074.4	31.36733	64.13444	4.498230
6	178667.0	30.39667	65.59521	4.008124
7	194063.2	32.31262	63.98334	3.704041
8	213426.4	31.98719	64.91049	3.102318
9	229885.3	31.15356	66.14458	2.701859
10	246316.0	31.93642	65.65090	2.412677
Cholesky Ordering: EE GDP GE				

First and foremost, the Vietnamese government should further increase expenditure for education at all levels of education. Second, the management of the state budget for education is also a matter to concern. There are still many weaknesses in the management of expenditure on education in Vietnam. The results achieved in maintaining education activities step by step to overcome the weaknesses in quality and effectiveness in the minimal condition of finance and facilities are remarkable. However, the limitations of socio-economic conditions, the capacity of teachers and facilities of the education sector, the income and quality of life of all classes of people have a substantial impact, creating the gap and quality of education between regions, between types, between education modes.

The quality and effectiveness of education in Vietnam is still somewhat unsatisfactory in terms of the requirements of industrialization and modernization of the country and with the education and training level of developed countries in the region and in the world. Improving the quality and efficiency is still an urgent requirement, the main challenge that the education sector must overcome. With the view that education is the top national policy, the Ministry of Planning and Investment and the Ministry of Finance have helped the Government increase the budget for education, ensuring the norm set by the Resolution. In 1996, the state budget spent on education accounted for 11%, and in 2000 it was 15%. The state budget for education in 2000 was 1.6 times higher than in 1996. However, the state budget only meets about 70% of the minimum needs of education. Most of the budget is used to pay salaries and salary-based allowances (up to 90% in some places). With limited funding for education and training, Vietnam has to innovate budget management to take the crucial step to use it more effectively. Innovation in education budget management needs to be implemented synchronously to renovate the budget planning process for education. It is necessary to analyze new bases for formulating budget expenditure estimates for education, reforming, verifying, and approving expenditure estimates. The influence of the education budget on GDP growth shows that it is necessary to clearly define responsibilities and coordinate among ministries in budgeting education expenditures.

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between EE and GDP is two-way and has an indispensable relationship. Based on the results of data analysis, some solutions can be proposed in terms of budget expenditure for education in Vietnam.

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