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Impact of public expenditure on economic growth in South Africa

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Abstract

The relationship between public spending and economic growth is an issue that the Government and economic researchers are very interested in studying. This article analyzes the impact of public expenditure on economic growth in South Africa from 2000-2019. Applying a lagged distributed auto regression model to time series data shows that public spending positively impacts economic growth (represented by GDP per capita) in South Africa.

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1. Introduction

Today, government regulation of the national economy is integral to reproduction. It addresses various issues, such as, for example, stimulating economic growth, regulating employment, promoting progressive shifts in industrial and regional structures, and supporting exports. The directions, form, and scale of economic regulation by the State are determined by the nature and severity of economic and social problems in a country during a particular period. The government can use fiscal policy to intervene in the economy through State budget revenue and expenditure. Government expenditures have the same effect on regulating the economy as revenues (Wu *et al.*, 2010) [4]. The state uses the budget to carry out orders, provide financial subsidies, and ensure stable profits for private individuals. Some other economists also advocate for government spending to provide public goods and services. These goods and services often have low investment capital efficiency, significant capital, and long recovery periods, but they are essential for socio-economic development. Typical public goods and services the State can provide include roads, hospitals, schools, the national grid system, and create socio-economic institutions: laws, law enforcement systems, policies, and target programs. The private sector can only supply these goods for a few subjective and objective reasons (Le & Tran, 2021) [9]. The state collects taxes from all individuals and provides public goods and services as a means of indirect tax reimbursement. However, economists still debate whether large or small budget spending is better for economic development. Budget spending is divided into many different components, each of which has a different impact on economic growth. In the final settlement of budget expenditure, countries are often divided into three main parts: development investment expenditure, recurrent expenditure, and other expenses (debt payment, other expenses). Development investment spending creates more production capacity for the economy, which long-term impacts economic growth. Recurring expenses are expenses to maintain the operation of the administrative apparatus or expenses that appear every year. Recurring expenditures ensure the provision of goods and services in terms of administration, law, etc., creating a macro environment for enterprises' production, investment, and business activities.

For each country, increased domestic health spending is essential to achieve universal healthcare coverage and health-related sustainable development goals. Health spending is not an expense but an investment in poverty reduction, jobs, productivity, inclusive economic growth, and healthier, safer, more equitable societies. In middle-income countries, per capita health spending has doubled since 2000. Governments spend \$60 per person in lower-middle-income countries and nearly 270 per/person in upper-middle-income countries (Arvin *et al.*, 2021) [1]. As countries' public spending on health increases, people will be less likely to fall into poverty when using health services. However, government health spending only reduces inequities in access when allocations are carefully planned to ensure that the entire population can access primary health care.

In 2018, the World Health Organization Western Pacific Region and the OECD published a study evaluating and comparing health spending and drug spending in countries in the region. This includes Vietnam through the topic "How pharmaceutical systems are organized in Asia and the Pacific." Budget allocation in total health expenditure ranges from high (93.8%) in Brunei Darussalam to low (18.9%) in China, while direct out-of-pocket spending accounts for more than half in Cambodia (74.2%), Philippines (53.7%) and Lao People's Democratic Republic (52.6%). People pay out of pocket in a more significant proportion in low-income countries than in high-income countries. Some countries have social health insurance systems that account for a substantial portion of health spending, such as Korea (42.9%), China (37.7%), and Vietnam (24.07%). For example, there are significant differences in drug spending per capita among countries in the Asia-Pacific region, ranging from 27.3 USD in the Lao Democratic Republic to \$683.50 in Australia (Organization, 2018) ^[12].

In particular, the COVID-19 pandemic has created pressure on health systems in countries worldwide, testing the health system's capacity to care for patients and protect staff healthcare at times of greatest crisis. Many countries have had to deploy testing on a large scale, reserve space for hospital patients, and ensure the availability of necessary medical equipment such as ventilators and masks. However, the role of public spending on economic growth is a topic that has many inconsistent results and needs more research (Savvides, 1995) ^[13] (Loizides & Vamvoukas, 2005) ^[11]. In this study, the author collects time series data from World Bank data on South Africa, using a lagged distributed auto regression (VAR) model, to evaluate the short-term and long-term impacts of public spending on economic growth.

2. Overview of the studies

Many studies have analyzed the impact of public spending on the economic growth of a country or a group of countries. Beraldo *et al.* (2009) ^[3] provides evidence of the effects of public and private expenditures on health and education on economic growth through their impact on people's health, skills, and knowledge. The authors study whether countries that devote more resources to investment in health and education achieve higher growth rates. The authors also examine whether the impact on economic growth of public spending on health and education differs from that of private expenditure. The authors' empirical analysis is based on a panel of 19 OECD countries observed from 1971 to 1998. The results are consistent with the hypothesis that spending on health and education positively affects growth. The estimated impact is more vital for health than for education. In addition, the authors also find some evidence that public spending affects GDP growth more than private spending. Le and Tran's research shows the impact of the expenditure on education on economic growth.

Liu *et al.* (2020) ^[10] provides empirical evidence on the incentive role of official promotion from the perspective of managing economic growth goals. Using a dataset of economic growth targets in 230 Chinese cities from 2003-2016, the authors find that governments' economic growth targets constrain public service spending for education, science, and technology. This misalignment leads to stagnation of human capital and technological progress, limiting long-term economic growth. When the size of cities' growth targets is at most the size of higher-level governments

or if governments overachieve their growth target mandates, public service spending will remain the same. The authors interpret the empirical findings as evidence that evaluating promotions based on economic performance distorts the structure of public spending, hinders sustainable economic development, and even accelerates the onset of economic recession. The authors' study adds necessary evidence to the theoretical literature, emphasizing that formal evaluation systems and public services can influence business cycles. Recently, Chen Xu (2022) ^[5] studied how the government stabilizes economic growth from the perspective of government spending. The authors contribute a method to identify government spending to stabilize growth and test it empirically using a data set of economic growth targets. The authors find that when the economy experiences adverse shocks, government spending increases significantly by an average of 1.1% for every 1% increase in the growth target. The authors note the following growth stabilization patterns: (1) Government spending increases on economic issues rather than on other functions; (2) Current revenues finance government spending; and (3) it is a temporary act to stabilize growth. This paper also suggests stabilizing growth by increasing government spending is a global phenomenon.

Dhrifi (2019) ^[7] analyzes the impact of public spending on economic growth in Southeast Asian countries from 1995-2012. The regression analysis of panel data shows that total public expenditure, public spending on health, and national security positively impact economic growth, and public expenditure on education has the opposite effect. In addition, during the analysis, the research results also show that the labor force, private investment, and foreign direct investment positively impact economic growth and inflation, and the openness of the economy-opposite effect. Besides, A'yun (2022) ^[2] studies the relationship between the size of public expenditure and the economic growth rate during the global financial crisis, using the regression analysis method using the model. It has a fixed effect, with panel data for 65 countries from 2008-2012. The results show that the economic growth rate is inversely proportional to the size of public spending. In addition, the article also finds evidence of the influence of other factors on economic growth, specifically including the impact of the economic cycle through one-period lagged GDP variables, investment, education, life expectancy, savings, birth rate, labor force, trade, taxes, and integration index.

Some other scholars argue that government spending has a negative impact, reducing economic growth for reasons such as crowding out private investment and displacing the financial sector's activities, distorting resource allocation, or inhibiting innovation in many sectors of the economy. When the government spends, it needs money from other sources or other uses such as taxes or debt. Taxes reduce productive behavior because taxes are levied on income from labor, savings, investment, or other forms of payment. Personal income tax reduces workers' disposable income, discourages them from working as much, and even discourages job search (Danziger *et al.*, 1981) ^[6]. A decrease in labor leads to a reduction in aggregate supply, while a decrease in income leads to a decrease in aggregate demand. Corporate income tax increases production costs, reduces after-tax profits of enterprises, and decreases aggregate supply. Taxes on saving lessen the incentive to keep, creating less capital for investment by productive firms (Gordon & Li, 2009) ^[8]. Besides, forms of borrowing to finance government spending

also bring adverse effects. Domestic borrowing will lead to government spending crowding out private investment as government borrowing reduces the capital that would otherwise be used for private investment. Borrowing from abroad will increase foreign debt, increasing the risk of foreign dependence.

The third school of thought holds that the impact of government spending on economic growth depends on the size of government spending (as a proportion of government spending to total economic output). When government spending is small, the positive effect outweighs the negative impact. When government spending becomes large, the negative effect will outweigh the positive impact on economic growth. There are two main reasons to explain this. First, as argued by Armey (1995) or Chao & Grubel, (1998)^[4], there exists a law of diminishing returns for extra government spending. Accordingly, the output-boosting features of government spending will prevail when government spending is minimal, and then an increase in government spending will increase output. At some point, however, the growth-promoting feature of government spending will fade, and continued increases will no longer lead to increased production. Second, taxes must increase to get more revenue to finance government spending, reducing the private sector's incentives to work, save, invest, and produce. Furthermore, as government spending increases, more and more resources are withdrawn from the private sector from highly profitable projects. These effects change the behavior of individuals, reduce the efficient supply of resources, and thus reduce economic growth.

In practice, studies are carried out in various ways, from aggregated countries to groups of developed or developing countries to individual countries, giving different, even contradictory results. Empirical studies by Ram (198), Kelly (1997), Loizides and Vamvoukas (2005)^[11], Alexiou (2007), Ranjan and Sharma (2008), and Cooray (2009) show that government spending has a positive impact, promoting economic growth^[5, 6]. However, research by Laudau (1983), Barro (1991), Engen and Skinner (1992), Ghura (1995), Guseh (1997), Fölster and Henrekson (2001) and Peter (2003) shows that spending by the government has a negative effect, hindering economic growth^[6, 7, 8]. In a different direction, Scully (1994), Vedder and Gallaway (1998), Chao and Gruber (1998)^[4], and Afonso, Schuknecht, and Tanzi (2003) seek estimates for the optimal size of government spending to increase growth in the economy.

The overview shows that research on the relationship between public spending and economic growth in Vietnam in the new period is still an empirical gap, so this article seeks more empirical evidence.

Table 3: Criteria for selecting VAR lag order

| Lag | LogL | LR | df | P | FPE | AIC | HQIC | SBIC |
|-----|---------|---------|----|-------|----------|-----------|-----------|-----------|
| 0 | -49.3 | | | | .007397 | 3.6069 | 3.6512 | 3.74834 |
| 1 | 220.663 | 539.93 | 9 | 0.000 | 1.1e-10 | -14.3906 | -14.2134 | -13.8248 |
| 2 | 399.95 | 358.57* | 9 | 0.000 | 9.2e-16* | -26.1345* | -25.8244* | -25.1444* |
| 3 | 395.96 | -7.9813 | 9 | . | 1.9e-15 | -25.4455 | -25.0468 | -24.1725 |
| 4 | 396.38 | .84109 | 9 | 1.000 | 3.0e-15 | -25.0607 | -24.5734 | -23.5048 |

Table 4 represents the VAR system result of our interest equation, where GRR is the dependent variable. From the results, one- and four-period lags positively impact the growth of the South African economy. This implies that a one

3. Research methods

This study uses the VAR research method. VAR (Vector Autoregression) research method is a statistical method used to study the relationship between many time variables. This method assumes that time variables have an autoregressive relationship with each other; that is, the value of a time variable in one period depends on its value in previous periods and the values of other variables during that period. To conduct VAR research, collecting data on the time variables must be studied is necessary. This data needs to be time series data, i.e., each variable has values for multiple periods.

After collecting data, it is necessary to determine the number of degrees of freedom (lag length) of the VAR model. The number of degrees of freedom is the maximum number of lag periods that must be considered when estimating the VAR model. Determining the number of degrees of space needs to be based on statistical criteria, such as the Akaike Information Criterion (AIC) and the Bayesian Information Criterion (BIC).

Once the number of degrees of freedom has been determined, the VAR model can be estimated. The VAR model is calculated using the least squares method.

4. Research results

The study begins its analysis by evaluating the statistical properties of the data set. Table 1 presents the results of descriptive statistics.

Table 1: Descriptive Statistics

| Variable | Obs | Mean | Std. dev. | Min | Max |
|----------|-----|----------|-----------|------|------|
| GPE | 33 | 36.34242 | 6.417117 | 26.9 | 47.3 |
| GRR | 33 | 2.124242 | 2.134395 | -6.1 | 5.1 |
| Gini | 33 | .8 | .0966954 | .64 | .96 |

Table 2 shows that GRR and Gini have unit roots at all levels and are stationary at first difference, and GPE is stationary at zero difference. The VAR method is applied to create estimates because the series is integrated into I (1).

Table 2: Augmented Dickey-Fuller Root Test (ADF)

| Biến | Kiểm định ADF | | Bậc sai phân |
|------|---------------|--------|--------------|
| | Bậc 0 | Bậc 1 | |
| GRR | -4.813 | | I(0) |
| GPE | | -3.709 | I(1) |
| Gini | -105.326 | | I(0) |

Table 3 shows that the Akaike Information Criterion (AIC) and all other information criteria are significant at lag two (2), so the study will choose lag 2.

percent increase in the lags of the first and fourth periods leads to a 21.39 and 2.52 percent increase in the growth of the South African economy over the current period, respectively. However, the lag of the second and third periods has a

negative impact on the development of the South African economy. This implies that a one percent increase in the

second and third-period GRR lags resulted in a 33.24% and 18.05% decrease in GPE in the current period, respectively.

Table 4: Var Estimates

| | | | | | | | |
|--------------|---------------|-----------|----------|----------|----------|-----------|-----------|
| GPE | GPE | | | | | | |
| | L1. | .7294722 | .1728759 | 4.22 | 0.000 | .3906416 | 1.068303 |
| | L2. | -.0739368 | .1731366 | -0.43 | 0.669 | -.4132783 | .2654046 |
| | GRR | | | | | | |
| | L1. | -.011218 | .0174544 | -0.64 | 0.520 | -.045428 | .022992 |
| | L2. | -.0079379 | .0195233 | -0.41 | 0.684 | -.0462028 | .030327 |
| | lngini | | | | | | |
| | L1. | 1815.023 | 1334.071 | 1.36 | 0.174 | -799.7094 | 4429.755 |
| | L2. | -1773.417 | 1311.001 | -1.35 | 0.176 | -4342.932 | 796.0972 |
| _cons | | | | | | | |
| GRR | GPE | | | | | | |
| | L1. | -.3504139 | 1.682232 | -0.21 | 0.835 | -3.647527 | 2.946699 |
| | L2. | .0095923 | 1.684768 | 0.01 | 0.995 | -3.292492 | 3.311677 |
| | GRR | .0876512 | 7.856827 | 0.01 | 0.991 | -15.31145 | 15.48675 |
| | L1. | -.2443362 | .1698466 | -1.44 | 0.150 | -.5772294 | .088557 |
| | L2. | -.4638065 | .1899782 | -2.44 | 0.015 | -.8361568 | -.0914561 |
| | lngini | | | | | | |
| | L1. | -16708.7 | 12981.66 | -1.29 | 0.198 | -42152.29 | 8734.898 |
| | L2. | 16503.13 | 12757.17 | 1.29 | 0.196 | -8500.463 | 41506.72 |
| _cons | 179.1798 | 76.4537 | 2.34 | 0.019 | 29.33335 | 329.0263 | |
| Gini | GPE | | | | | | |
| | L1. | -2.40e | 07 | 7.42e | 08 | -3.23 | 0.001 |
| | L2. | -1.58e | 07 | 7.44e | 08 | -2.12 | 0.034 |
| | GRR | | | | | | |
| | L1. | 5.56e-09 | 7.50e-09 | 0.74 | 0.459 | -9.14e-09 | 2.03e-08 |
| | L2. | -1.16e | 08 | 8.39e | 09 | -1.39 | 0.166 |
| | lngini | | | | | | |
| | L1. | 1.953084 | .000573 | 3408.63 | 0.000 | 1.951961 | 1.954207 |
| | L2. | -.9533387 | .0005631 | -1693.10 | 0.000 | -.9544423 | -.9522351 |
| _cons | .0003882 | 3.37e | 06 | 115.03 | 0.000 | .0003816 | |

It can be seen that South Africa's public spending and income inequality have an inverse correlation. When public spending increases, income inequality decreases. This may be because public spending is used to support low-income people, helping to close the income gap between different income groups. Economic growth is also correlated with public spending and income inequality. When public spending and income inequality decrease, economic growth tends to increase. Public expenditure and income inequality can impede economic growth by reducing market efficiency and reducing

private investment. Furthermore, the first, second, and fourth periods of lagged government capital expenditure have a positive impact on the growth of the South African economy in the current period. One percent increases in the first lagged second and fourth periods of government capital spending led to 0.29 percent, 33.35 percent, and 0.95 percent increases in the economy's growth. South African economy. However, a one percent increase in the third phase lagged behind government capital expenditure, resulting in a 57.46 percent decline in the growth of the South African economy.

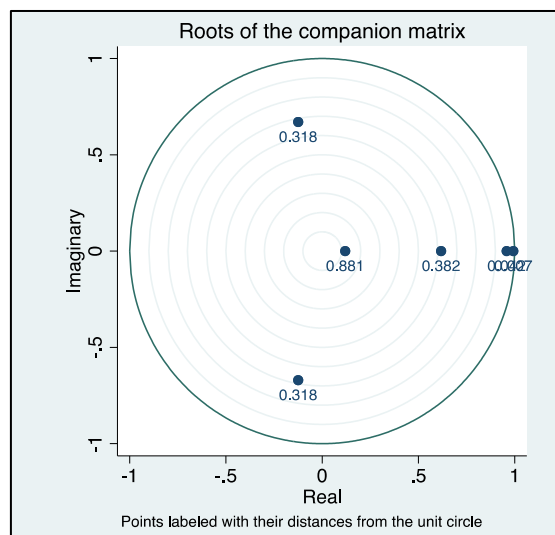


Fig 1

The values of the model are all within the unit circle, so it can be concluded that the model is stable and qualified to implement the VAR model.

5 Conclusion

This article tests the stationarity of two variables, estimating the impact of public investment (represented by public investment in health) on economic growth (measured by GDP per capita). The results of this article confirm the positive impact of public spending on short-term economic growth and verify the existence of a long-term balanced relationship between public expenditure and economic development. In other words, improved public spending will increase economic growth. Public expenditure must be strictly controlled, not exceeding the threshold causing a negative impact on economic growth, and off-balance sheet expenditures must be avoided. To do this, shifting public spending based on input factors to spending based on goals and outputs is necessary. Also, with this topic, the research can be expanded in further research directions, such as selecting other variables to represent public investment (such as spending on education, spending on national defense and security) or Selecting other variables representing economic growth (such as total GDP, GDP growth rate, etc.), or use other appropriate econometric models to compare and contrast results with this study.

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