

THE IMPACT OF GOVERNMENT SPENDING ON SERVICE SECTOR GROWTH IN INDONESIA: A VECM APPROACH

Maula Fadhilata Rahmatika¹, Dyah Dwi Zubaidah², Setyo Tri Wahyudi²

¹Faculty of Economics and Business, Universitas Negeri Surabaya, Indonesia,

²Faculty of Economics and Business, Brawijaya University, Indonesia

Corresponding author: maularahmatika@unesa.ac.id

ABSTRACT

The service sector is crucial for economic development in developed and developing countries. However, many developing nations, including Indonesia, face challenges in expanding their service sectors, often underestimating their potential. In line with Keynesian theory, government spending is key to stimulating sectoral growth. This research seeks to address the gap in the existing literature by exploring the relationship between specific government expenditures—on subsidies, education, health, and infrastructure—and the growth of Indonesia's service sector between 1990 and 2019. The study aims to answer the following research questions: (1) how does government spending in these four areas influence the growth of the service sector, and (2) which government spending has a significant impact on service sector growth in the short and long term? Using time-series data from the Indonesian Central Bureau of Statistics and the Ministry of Finance, the study employs the Vector Error Correction Model (VECM) to analyse short-term and long-term effects. The results reveal that government spending on education, subsidies, health, and infrastructure significantly contributes to long-term service sector growth, while no significant short-term effects are observed.

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I. INTRODUCTION

Economic growth remains a central objective for countries worldwide, especially in developing economies where rapid development is essential for improving citizens' welfare. For many nations, economic growth is not only about increasing output but also involves substantial structural changes in the economy. As economies evolve, they typically transition from agricultural-based economies to more industrialised ones, with the service sector growing in parallel. The service sector, once considered a secondary or less significant part of the economy, has increasingly become a key driver of economic progress, particularly in labour-intensive economies in developing countries (Myrdal & Sitohang, 1957). However, despite its potential, many developing countries, including Indonesia, continue to face significant challenges in nurturing and expanding the service sector. Often, this is due to the historical undervaluation of the sector, as governments and policymakers prioritise agriculture and manufacturing (Kim & Wood, 2020).

The service sector is still often classified as part of the tertiary sector in many countries. In some traditional economies, it is viewed as a non-tradable sector whose impact is difficult to quantify. For many years, economic growth strategies have largely focused on the agricultural and industrial sectors, with limited attention to the service sector (Francois, 1990). However, contrary to this traditional view, the service sector, especially labour-intensive industries such as healthcare, retail, and tourism, has been shown to contribute substantially to economic growth by enhancing labour productivity and wages (Eichengreen & Gupta, 2009). This shift in economic activity provides a significant opportunity for developing countries to transition their economic growth model from an industrial to a services-driven model.

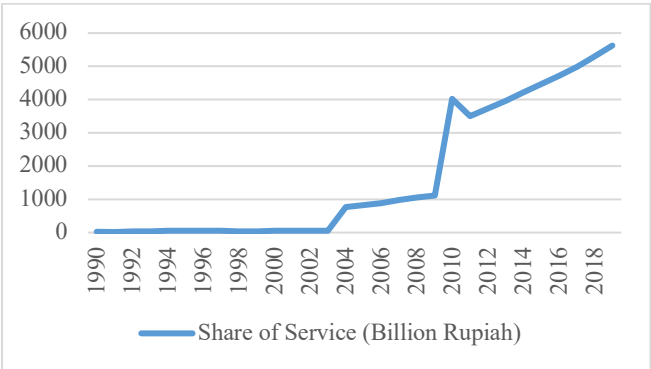


Figure 1. Contribution of the Service Sector in Indonesia, 1990-2019

Source: Central Bureau of Statistics, 2020

In Indonesia, the service sector has become a major contributor to GDP, representing nearly 40% of the nation's total economic output. This surpasses the

contributions of both the agriculture and manufacturing sectors, which were once the backbone of the country's economy. As illustrated in Figure 1, the service sector's contribution to Indonesia's GDP has grown substantially since 2004. However, to fully capitalise on this growth, Indonesia must harness the service sector's potential more effectively, ensuring it becomes a central pillar of the nation's long-term economic development.

The role of government expenditure in this process is crucial. In the Keynesian economic model, government spending plays an essential role in guiding a country's development by stimulating demand and addressing structural gaps in key sectors. Government spending can help foster the conditions for growth by targeting sectors with the highest development potential. In Indonesia, government expenditures are allocated across five key categories: education, subsidies, health, infrastructure, and social protection. These allocations play a pivotal role in determining the service sector's capacity to grow and thrive.

Despite the significant role of government spending in economic growth, a notable gap in the literature persists: a lack of focused research on the specific relationship between government expenditure and service-sector growth. While many studies have explored the broader causal relationship between government spending and overall economic growth (Alshahrani, Alsadiq, Alshahrani, & Alsadiq, 2014; Aregbeyen & Kolawole, 2015; Gukat & Ogboru, 2016; Nworji & Oluwalaiye, 2012; Rasaki .O et al., 2014), few have dissected the impact of specific types of government expenditure—such as education, subsidies, health, and infrastructure—on the service sector's growth. Moreover, the limited research has not clearly distinguished between the short-term and long-term effects of these expenditures. One notable study by Nwosa and Tijani (2020) examines the relationship between government spending and service sector growth but does not differentiate the specific impacts of different types of government spending or their varying effects over time.

This research aims to fill this gap by examining the effects of government spending on service-sector growth in Indonesia. Specifically, the study addresses two key research questions: (1) What is the relationship between government spending on education, subsidies, health, and infrastructure financing and the growth of Indonesia's service sector? and (2) Which type of government spending has the most significant positive impact on the service sector's growth in both the short and long term?

By addressing these questions, this research will provide valuable insights into the role of government expenditure in promoting service sector growth, offering a more nuanced understanding of how specific types of public spending contribute to economic development. The findings will also inform policy recommendations aimed at optimising government spending to further enhance the service sector's contribution to Indonesia's economic development. The study will use time-series data from 1990 to 2019 and employ the Vector Error Correction Model (VECM) to

analyze both short-term and long-term relationships, providing robust evidence for policymakers.

II. LITERATURE REVIEW

The relationship between government spending and economic development is grounded in Keynesian theory, which holds that increased government spending can stimulate aggregate demand, thereby accelerating economic growth. According to Keynes (1936), government expenditure plays a crucial role in boosting economic activity, particularly during economic downturns. However, the practical application of Keynesian theory has been the subject of ongoing debate, as empirical evidence supporting a direct relationship between government spending and sustained economic growth remains inconclusive. Several studies conducted in both developing and developed countries, using various time periods and methods, have produced mixed results.

One such study by Alshahrani and Alsadiq (2014) investigated whether increasing government spending leads to higher economic output. Their results indicate that, while government expenditure can stimulate economic growth in the short term, the effect diminishes over time in countries facing certain challenges, such as slower development, ageing populations, low debt levels, and weak regulatory frameworks for managing public spending. This suggests that the effectiveness of government spending in stimulating long-term economic growth may be constrained by broader structural issues.

Further, Alexiou (2009) examined the relationship between government spending and economic growth in South-Eastern Europe and found a positive, statistically significant association. Similarly, research by Nworji & Oluwalaiye (2012) in Nigeria, using the Ordinary Least Squares (OLS) method, showed that government spending on infrastructure significantly contributed to economic growth. This was reinforced by Chude & Chude (2013), whose study of Norway found that government spending on education had a positive long-term impact on economic growth, suggesting that investments in human capital can play a central role in sustaining growth.

While some studies highlight the positive effects of government spending on short-term economic growth, Jhingan (2009) found that these effects may not be sustained in the long term. For example, Arpaia and Turrini (2008) analysed government spending in several European Union countries and observed that the positive impact of increased government spending on output was stronger in the short run but decreased in the long run. This phenomenon suggests that short-term fiscal stimulus might not translate into long-term growth unless accompanied by structural reforms. Other scholars, such as Butkiewicz and Yanikkaya (2011), argue that the effectiveness of government spending in driving growth is contingent on the

quality of governance. Their study found that in countries with ineffective governments, the relationship between government spending and economic growth is negative, as inefficient allocation and management of public funds can undermine growth prospects. Wu et al. (2010) reinforced the idea that government spending, while important, should not exceed 25% of a country's GDP to avoid diminishing returns. However, their research faced criticism for not adequately accounting for the quality of government in the countries under study, which may skew the results.

While much research has explored the general relationship between government spending and economic growth, there has been limited attention to the specific impact of government expenditures on the service sector's growth. Studies examining the service sector's role in economic development often focus on broader economic measures, neglecting how particular categories of government spending—such as education, health, subsidies, and infrastructure—affect service sector performance. A notable exception is the study by Nwosa and Tijani (2020), which investigated the relationship between government spending and service sector growth in Nigeria. They found that government spending had a negative impact on the service sector, highlighting the need for better planning and more targeted expenditure to boost the sector's contribution to the economy.

In the case of Indonesia, there has been limited research on the specific effects of government spending on the service sector. While Indonesia has experienced significant growth in the service sector, particularly since 2004, no comprehensive studies have examined in detail how various categories of government expenditure—such as spending on education, health, subsidies, and infrastructure—have contributed to the sector's growth between 1990 and 2019. This gap in the literature presents a valuable opportunity to explore the relationship between government spending and service sector growth in Indonesia, providing insights that could inform future policy decisions.

III. METHODOLOGY

This study adopts a descriptive quantitative research approach, which aims to test hypotheses using empirical data. Specifically, the study seeks to measure the effects of changes in economic variables and their relationship with other economic indicators. The goal is to assess the correlation between government spending and the growth of the service sector in Indonesia. The findings will be based on measured data, with an analysis of the underlying economic assumptions to provide a comprehensive conclusion.

The study uses a time-series data methodology and applies two key econometric techniques: Granger Causality and the Vector Autoregressive (VAR) or Vector Error Correction Model (VECM). These methods are well-established for analyzing the short-term and long-term relationships between variables, as demonstrated by Copelman (2000) and Rousseau and Xiao (2007). Time-series data from the Indonesian Central Bureau of Statistics and the Indonesian Ministry of

Finance spanning from 1990 to 2019 will be used to analyze the effects of government spending on service sector growth.

The Vector Autoregressive (VAR) approach is employed when the data is stationary but not cointegrated, while the VECM (Vector Error Correction Model) approach is used when the data is stationary and there is evidence of cointegration between the variables. Both techniques are suitable for examining the effectiveness and impact of policy decisions, especially when assessing long-term relationships between government spending and economic variables.

In this study, the focus is on understanding the impact of government spending across four key areas: education financing, subsidized financing, health financing, and infrastructure financing. The analysis aims to measure how these expenditures influence the growth of the service sector in Indonesia. To achieve this, the study employs the following modified model based on Keynesian theory, which suggests that government expenditure drives economic growth:

$$SSG = f(GE) \quad (1)$$

Where:

SSG_t represents economic growth in the service sector, measured by the total output of the service sector.

GE_t represents total government expenditure.

To further break down the components of government spending, the model is expanded as follows:

$$SSG_t = \alpha_0 + \alpha_1 GE_t + \varepsilon_t \quad (2)$$

$$SSG_t = \alpha_0 + \alpha_1 Sub_t + \alpha_2 Edu_t + \alpha_3 Heal_t + \alpha_4 Inf_t + \varepsilon_t \quad (3)$$

Where:

Sub_t denotes subsidized financing

Edu_t denotes education financing

$Heal_t$ denotes health financing

Inf_t denotes infrastructure financing

α_0 is the intercept

$\alpha_1, \alpha_2, \alpha_3, \alpha_4$ are the coefficients of the respective variables

ε_t is the error term

By applying these models, this study will quantify the impact and magnitude of government expenditure on the service sector's growth in Indonesia. The findings will provide valuable insights into how different forms of government spending contribute to the development of this critical sector.

IV. RESULTS AND ANALYSIS

Since 1990, the service sector's contribution to GDP in developing Asian countries has shown a noticeable shift compared to developing countries in Europe and Latin America, with the service sector increasingly becoming the dominant contributor to economic output. By 2016, the gap between the service sector's contribution and that of the agricultural and industrial sectors widened, with a sharp

increase in service sector output. This trend has been observed across nearly all developing Asian countries, including Indonesia. In Indonesia, the service sector began experiencing significant growth from 2004 onward, with a marked acceleration in 2010. While the sector saw a brief decline in 2011, its growth continued consistently thereafter, reaching new heights each year until 2019.

The first step in the analysis involved testing the stationarity of each variable using the Augmented Dickey-Fuller (ADF) test. This test determines whether the data series are stationary or non-stationary. If all variables were stationary at the level, the Vector Autoregressive (VAR) model would be appropriate. However, since some variables were non-stationary at the level, they were re-tested at the first difference, where they became stationary, allowing the use of the Vector Error Correction Model (VECM).

Stationarity Test Results

As shown in Table 1, all variables were found to be stationary after first-differencing. This necessitated the use of the VECM approach, as the variables exhibited cointegration. The optimal lag length was determined to be 3, ensuring that the model adequately captured the dynamic relationships among the variables.

Table 1. Stationarity Test Results

Augmented dickey-fuller (ADF) test			
Variable	Level	1 st Difference	Status
SSG	0,378	-6.496	Stationary
Sub	-2.252	-9.943	Stationary
Edu	-3.377	-6.425	Stationary
Heal	-2.299	-6.714	Stationary
Inf	-3.385	-9.184	Stationary

Source: Data processed, 2020

Cointegration Test Results

The next step was to conduct the Johansen Cointegration Test, which confirmed the existence of a long-term equilibrium relationship between the variables. As indicated in Table 2, cointegration was found for all variables, meaning that the service sector's growth is significantly linked to government spending across all sectors in the long term.

Table 2. Johansen's Cointegration Test

Trace test				Max-eigen test			
Hypothesize d no. of EC(s)	Hypothesized no. of EC(s)	Stat. values	Critical values	Hypothesized no. of EC(s)	Stat. values	Critical values	Prob.
None *	None *	166.8942	33.87687	None *	166.8942	33.87687	0.0001
At most 1 *	At most 1 *	68.79699	27.58434	At most 1 *	68.79699	27.58434	0.0000
At most 2 *	At most 2 *	51.60439	21.13162	At most 2 *	51.60439	21.13162	0.0000
At most 3 *	At most 3	13.48409	14.26460	At most 3	13.48409	14.26460	0.0661

At most 4 *	At most 4 *	3.861755	3.841466	At most 4 *	3.861755	3.841466	0.494
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Source: Data processed, 2020

Long-Term VECM Results

The long-term VECM results, as shown in Table 3, indicate that government spending on subsidies, education, health, and infrastructure has a significant positive impact on service sector growth. Among these variables, education and infrastructure financing have the strongest influence on service sector growth, supporting the Keynesian theory, which emphasises the importance of public investment in human capital and infrastructure to drive long-term economic growth. This finding is consistent with previous studies by Alexiou (2009), Nworji & Oluwalaiye (2012), Chude & Chude (2013), and Alshahrani & Alsadiq (2014), who have similarly identified education and infrastructure as key drivers of growth.

Table 3. Long-term VECM Results

Variable	Coefisien	t-statistik Parsial
D(SUBSIDIZED (-1))	0.00028	3.63141
D(EDUCATION(-1))	0.00037	-7.90196
D(HEALTH(-1))	0.00033	-4.30283
D(INFRASTRUCTURE(-1))	0.00037	8.64488

Source: Data processed, 2020

Short-Term VECM Results

The short-term VECM results, shown in Table 4, reveal that not all variables significantly impact the growth of the service sector's GDP in the short term. Additionally, service sector GDP growth does not significantly affect government spending variables in the short term. This finding contrasts with earlier research by Jhingan (2009) and Arpaia & Turrini (2008), which suggested that government spending should have a more immediate effect on economic output. The lack of short-term significance in this study may be due to the fact that long-term investments in sectors such as education and infrastructure take time to yield visible results, as confirmed by the VECM's long-term estimates. This is consistent with the view that long-term policy measures have cumulative effects that may not be immediately reflected in short-term data.

Table 4. Short-Term VECM Results

Variable	Coefisien	t-statistik Parsial
D(SHAREOFSERVICE(-1))	0.26587	-0.96126
D(SHAREOFSERVICE(-2))	0.25674	-0.13094
D(SUBSIDIZED (-1))	458.489	0.70415
D(EDUCATION(-1))	722.320	0.05733
D(HEALTH(-1))	414.920	0.63134
D(INFRASTRUCTURE(-1))	789.432	0.80521
D(SUBSIDIZED (-2))	442.757	0.08236

D(EDUCATION(-2))	697.535	0.38342
D(HEALTH(-2))	400.683	0.60629
D(INFRASTRUCTURE(-2))	762.344	0.70210

Source: Data processed, 2020

Discussion

The results from the Vector Error Correction Model (VECM) analysis highlight the crucial role that government spending on education, health, infrastructure, and subsidies plays in shaping the long-term growth of Indonesia's service sector. The findings confirm the theoretical foundation of Keynesian economics, which advocates that public investment, particularly in human capital and physical infrastructure, is central to fostering sustainable economic growth.

In particular, education and infrastructure financing were found to have the most pronounced impact on the growth of the service sector. This result aligns with previous studies, such as those by Alexiou (2009) and Nworji & Oluwalaiye (2012), who have also emphasised that investments in education and infrastructure create the necessary conditions for long-term economic development. Education spending enhances labour productivity by improving the skills and capabilities of the workforce, which is essential for sectors like finance, information technology, and healthcare that rely heavily on skilled labour. Infrastructure, on the other hand, provides the backbone for efficient service delivery in key sectors such as transportation, logistics, and telecommunications, thereby increasing overall productivity and reducing transaction costs.

The positive effects of these investments, however, are not immediate. As Keynesian theory suggests, the benefits of government spending in these areas accrue over time. The long-term nature of these effects can be attributed to several factors, including the time required to fully implement education reforms, the gradual improvement in workforce skills, and the long gestation period of infrastructure projects. For example, an increase in educational spending today may not result in an immediate increase in service sector output, as the full benefits of a more skilled labour force are realised gradually over the years. Similarly, infrastructure projects often take several years to complete and only show tangible impacts once they are operational and integrated into the economy.

Interestingly, the study found that, in the short term, government spending does not appear to affect the service sector's GDP. This is consistent with the time lag hypothesis often discussed in economic literature, which suggests that the effects of certain types of government expenditure—particularly those that involve long-term investments like education and infrastructure—are not fully realised in the short term. While government spending can increase aggregate demand and stimulate economic activity in the short run, it takes time for the productive capacities built through these investments to translate into higher productivity and sectoral growth.

This lack of short-term impact may also reflect the broader macroeconomic environment in Indonesia. For instance, short-term economic fluctuations may be influenced by factors such as global economic conditions, domestic political stability, and external shocks (e.g., natural disasters or pandemics), which can overshadow the immediate effects of government spending. Furthermore, the delay between the allocation of funds and the tangible effects of these investments suggests that policymakers must focus on the long-term nature of these projects, recognising that the benefits may not be immediately visible but will emerge more clearly over time.

The implications of these findings are significant for policymakers in Indonesia. The results clearly suggest that long-term investment in education and infrastructure is essential to unlocking the full potential of the service sector. As the service sector becomes increasingly important to Indonesia's economic growth, targeting these two areas of public expenditure should be prioritised in the government's fiscal policies.

Expanding investments in education, particularly in higher education and vocational training, will be crucial to preparing Indonesia's workforce for the growing demand in the service sector. Education improves the overall quality of labour and boosts productivity, making the country more competitive in sectors such as technology, finance, and healthcare. Policymakers should therefore allocate more resources to enhancing the quality of education and ensuring equitable access for all regions, with a particular focus on underserved areas.

Meanwhile, investing in infrastructure is equally important, as it directly influences the efficiency and accessibility of service industries. Efficient transportation networks, reliable energy supply, and modern digital infrastructure are essential for supporting the service sector. Infrastructure development should be strategically planned, particularly in regions outside major urban centres, to foster balanced growth and enable regional services to thrive.

Additionally, health financing and subsidies are important but appear to have a more indirect effect on the service sector's long-term growth. While health spending contributes to improved public health and a more productive workforce, its effect on the service sector is mediated by improvements in labour force participation and human capital. Similarly, subsidies, particularly in essential sectors such as energy, can lower operational costs for service industries, but their effectiveness in promoting growth depends on efficient distribution and management.

Policy Recommendations

Based on the findings of this study, several key policy recommendations are proposed to support the continued growth of Indonesia's service sector. First, the

government should prioritise investments in education, particularly in vocational training and technical education, to develop a skilled workforce that can meet the evolving demands of the service sector. Such investments will enhance labour productivity and help sustain long-term growth in sectors like technology, finance, and healthcare. Second, there should be a concerted effort to strengthen infrastructure development, with a focus on transportation, logistics, and digital connectivity. Accelerating infrastructure projects will improve the service sector's productivity and accessibility, while ensuring that development extends beyond major urban centres to promote more equitable growth across regions.

In addition, policymakers must also adopt a long-term vision when planning and implementing these investments. The benefits of education and infrastructure spending, while substantial, take time to materialise, and short-term performance indicators should not overshadow the broader, long-term goals. Finally, the government should focus on optimising health and subsidy spending. Although health and subsidies may not have an immediate impact on service sector growth, improving public health outcomes and efficiently targeting subsidies will contribute to a healthier, more productive workforce in the future, indirectly supporting service sector expansion. By prioritising these areas, Indonesia can create a more robust and sustainable foundation for the service sector to thrive as a key driver of economic development.

V. CONCLUSION AND RECOMMENDATION

The findings of this study reveal that government spending in education, subsidies, health, and infrastructure has a significant positive impact on the long-term growth of the service sector in Indonesia. While the short-term effects of these expenditures on the service sector are not significant, the long-term results clearly indicate that such investments can play a critical role in fostering economic growth. The most influential factors driving service-sector growth are government expenditures on education and infrastructure, which align with Keynesian economic theory. This theory suggests that strategic government spending, particularly in human capital and physical infrastructure, can drive sustained economic development.

The results emphasise that while government spending may have an immediate impact on aggregate demand, its full effects on the service sector are realised over time. Specifically, investments in education help build a more skilled and productive workforce, while infrastructure improvements facilitate efficient service delivery and increase overall productivity. The study confirms that a long-term focus on these areas will be crucial for Indonesia's service sector to continue its expansion and become a leading engine of economic development.

Based on these findings, several policy recommendations are made to the Indonesian government. To maximise the potential of the service sector, the

government must prioritise spending on education and infrastructure. These areas have proven to have the most substantial and lasting effects on economic growth. Moreover, careful planning and efficient resource allocation in these sectors will help ensure that government spending achieves the desired outcomes, contributing to the broader goal of sustainable and inclusive development.

In conclusion, the study underscores the importance of long-term investments in key sectors, such as education and infrastructure, as vital drivers of growth in Indonesia's service sector. By continuing to focus on these strategic areas, Indonesia can position itself for continued economic development, with the service sector as a pivotal contributor to national prosperity.

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