

The Impact of Government Expenditure in Addressing Human Development Inequality in Lampung Province

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Abstract- Development is an ongoing process of change within a society that involves improvements in quality of life, economic progress, social development, and infrastructure enhancement. The UNDP introduced the concept of the Human Development Index (HDI) to measure the improvement of human quality of life. This concept is known as the IPM in Indonesia. The purpose of this study is to analyze the efficiency of local government spending in the education, health, and economic sectors on IPM in Lampung Province using the Stochastic Frontier Analysis (SFA) method. The results of the panel data regression analysis show that spending in the education, health, and economic sectors has a significantly positive impact on the education, health, and economic indexes. The SFA analysis indicates that the use of spending in the education, health, and economic sectors in the districts of Lampung Province has been efficient.

Index Terms- Human Development Index, SFA, Government Expenditure, Lampung

I. INTRODUCTION

The United Nations Development Program (UNDP) states that development is not only about economic growth and per capita income, but it has a broader scope that includes improving quality of life and increasing the well-being of society through enhancements in the quality of health and education. In 1990, the UNDP introduced the concept of the Human Development Index (HDI) to measure the success of a region in its efforts to develop the quality of human life, which is then published annually in the Human Development Report (HDR).

The HDI concept in was first implemented in 1996. The Central Statistics Agency (BPS) calculates the HDI using three basic dimensions: (1) long and healthy life (measured by life expectancy), (2) knowledge (measured by expected years of schooling and mean years of schooling), and (3) a decent standard of living (measured by adjusted per capita expenditure). For Indonesia, the HDI has become an important and strategic indicator as it serves as a measure of the government's success in improving the quality of life of the people.

Inequality is often reflected in the differences in HDI values among groups in society. Inequality in HDI reflects the uneven distribution of the benefits of development, which can lead to deeper social and economic disparities. Moreover, inequality in HDI can reinforce cycles of poverty and inequality, as marginalized groups have limited access to resources and opportunities to improve their quality of life.

Table I: Human Development Index in Lampung Province

District	Human Development Index (HDI)				
	2018	2019	2020	2021	2022
Lampung Barat	66.7	67.5	67.8	67.9	68.4
Tanggamus	65.7	66.4	66.4	66.7	67.2
Lampung Selatan	67.7	68.2	68.4	68.5	69
Lampung Timur	69	69.3	69.4	69.7	70.6
Lampung Tengah	69.7	70	70.2	70.2	70.8
Lampung Utara	67.2	67.6	67.7	67.9	68.3
Way Kanan	66.6	67.2	67.4	67.6	68
Tulang Bawang	67.7	68.2	68.5	68.7	69.5
Pesawaran	65	65.8	65.8	66.1	66.7
Pringsewu	69.4	70	70.3	70.5	71
Mesuji	62.9	63.5	63.6	64	64.9
Tulang Bawang Barat	65.3	65.9	66	66.2	67.1
Pesisir Barat	63	63.8	63.9	64.3	65.1
Bandar Lampung	76.6	77.3	77.4	77.6	78
Metro	76.2	76.8	77.2	77.5	77.9
Provinsi Lampung	69	69.6	69.7	69.9	70.5

Urban areas tend to have higher HDI values compared to rural areas due to better access to education, healthcare, and economic opportunities. Similarly, groups with higher income levels tend to have higher HDI values compared to those with lower income levels. As seen in Lampung Province, there are two cities with HDI values higher than the provincial and

national averages. Spatially, there is a significant HDI gap between urban and district areas in Lampung Province.

Human development and inequality are two closely related. Human development aims to improve the overall quality of life and well-being of people, focusing on aspects such as education, health, economy, and social conditions. However, inequality arises when there are significant differences in access to and utilization of resources among various groups in society. Addressing inequality in human development requires comprehensive and integrated efforts from various parties, including the government, international organizations, the private sector, and civil society.

The commitment of local governments to provide services to the community can be seen through the allocation of government expenditure. Government expenditure allocation is an indicator that can reflect the local government's commitment to providing public services. Every year, the central and local governments set revenue and expenditure budget.

Fiscal decentralization can give local governments more control over local resources. This can increase the responsibility and accountability of local governments to the local population. By granting fiscal authority to local governments, the central government can reduce the administrative burden associated with managing all financial aspects centrally. According to Alfada (2019), fiscal decentralization is efficient in supporting government spending efficiency in infrastructure, education, and health sectors.

One of the government's efforts to address development inequality is by implementing fiscal policies through government spending and financial management (Nasution, 2020). The allocation of government spending to support equitable human development should focus on providing basic needs services. These basic needs services include health, education, and the fulfillment of the community's basic necessities.

The health level of the community affects the level of community well-being because it is closely related to poverty. Meanwhile, the poverty level is related to the level of community well-being. Therefore, health is one of the important factors in achieving community well-being. Health should be a primary focus of the government as the provider of public services. In addition to health, the education sector also influences the poverty level because it is related to community productivity.

Research conducted by Sofilda et al. (2013) states that there is a positive relationship between government spending on economic functions and the improvement of human

development. Several other studies that state the impact of spending on the Human Development Index (HDI) include Nugroho (2016), which states that in high HDI groups, health and infrastructure expenditures have a positive and significant impact on HDI through economic growth, while in low HDI groups, education expenditures have a positive and significant impact on HDI. Fidella (2021) also states that government expenditures in the education, health, economy, education infrastructure, health infrastructure sectors, Gross Regional Domestic Product (GRDP), and BPK opinions have a significant impact on HDI.

Based on the low Human Development Index value of Lampung Province and the inequality between districts/cities, it is necessary to examine the efficiency of local government spending on education, health, and economic functions on the components of the Human Development Index in Lampung Province.

II. METHOD

This study used secondary data in the form of panel data, with time series data ranging from 2014-2022 ($t = 2014-2022$) and cross-section data consisting of 15 regencies/cities ($i = 15$) in Lampung Province. The method used to measure the efficiency of government spending on each component of the Human Development Index is Stochastic Frontier Analysis (SFA).

Stochastic Frontier Analysis (SFA) is a parametric model for calculating efficiency that can differentiate the error term factor from random error and efficiency. The resulting efficiency values are scores ranging from 0 to 1, where a score closer to 1 indicates higher efficiency of the local government. The SFA function in this study describes the maximum production generated from an input. The estimation used in the SFA model is Maximum Likelihood Estimation (MLE). The general equation for Maximum Likelihood Estimation is written as follows:

$$Y_i = \beta_0 + \beta_1 + \alpha_{it} + v_{it} + u_{it}$$

This model assumes that the residuals obtained indicate the efficiency of the model used. Where Y_i represents the maximum level of production achieved, and β_1 is the input variable used. The error term is decomposed into two components: the statistical random disturbance term (v_{it}), which assumes the independent variable is normally distributed with a zero mean and constant variance σ^2/v ; and the second component is a non-negative random variable that reflects technical inefficiency, assuming the independent variable is normally distributed with a zero mean and constant variance (u_{it}). In 1992, Battese and Coelli replaced it with $\sigma^2/u = \sigma^2/v + \sigma^2/v$.

Stochastic Frontier Analysis (SFA) is conducted for each sector to be modeled, by the health sector, the education sector, and the economic sector. The results of the SFA analysis include a panel data regression model, efficiency coefficients for each regency/city.

III. RESULTS

The Impact of Government Education Spending on the Education Index

Table 2: SFA Regression Model in the Education Sector

Variabel	coefficient	Standar Error	P-Value
Intercept	1.32378766	0.29191964	5.767e-06 ***
Education Spending	0.05261852	0.01585768	0.0009061 ***
Population	-0.04251139	0.02147848	0.0477873 *
Economic Groth	0.56195695	0.07624158	1.697e-13 ***
Special Allocation Fund for the education sector	-0.06269910	0.01133536	3.179e-08 ***

The estimation results indicate that education spending significantly influences the education index at a level of $\alpha = 0.1\%$. Education spending has a positively signed coefficient, suggesting that for every one-unit increase in education spending, the education index is predicted to increase by 0.05261852 units, assuming other variables remain constant. Greater expenditure in education allows for various programs such as improving facilities and infrastructure, enhancing teacher quality, and providing adequate resources like textbooks, teaching aids, educational software, and other learning materials. Improved access to these resources helps students learn more efficiently and effectively

Population also significantly affects the education index at a level of $\alpha = 5\%$. Population has a negatively signed coefficient, indicating that for every one-unit increase in population, the education index is predicted to decrease by 0.04251139 units, assuming other variables remain constant. Increasing population can have a negative impact on the education index in a region, as significant population growth may strain educational facilities such as schools and classrooms, leading to less conducive learning conditions such as overcrowded classrooms and reduced individual attention from teachers. Additionally, a large population can strain educational resources, including textbooks, teaching aids, and educational technology.

The estimation results further show that economic growth rate significantly influences the education index at a level of $\alpha = 0.1\%$. The economic growth rate has a positively signed coefficient, indicating that for every one-unit increase in economic growth rate, the education index is predicted to increase by 0.56195695 units, assuming other variables remain constant.

Additionally, the estimation results indicate that the Special Allocation Fund (DAK) for the education sector significantly influences the education index at a level of $\alpha = 0.1\%$. DAK for education has a negatively signed coefficient, suggesting that for every one-unit increase in DAK education funding, the education index is predicted to decrease by 0.06269910 units, assuming other variables remain constant. Some factors that may contribute to DAK funds having a negative impact include lack of transparency and accountability in DAK management. Moreover, regions heavily reliant on DAK funds may not develop internal capacity to finance and manage their own education systems. Uneven distribution of DAK funds, where some regions receive more than they need while others lack sufficient funding, can exacerbate inequalities in educational quality across regions

Table 3: SFA Efficiency in the Education Sector

Efficiency (%)	Technical Efficiency	
	Total District	Percentage (%)
<0.5	0	100%
0.51-0.60	0	
0.61-0.70	0	
0.71-0.80	0	
0.81-0.90	0	
0.91- 1.00	135	
Total	135	
Average	0.9997391	
Min	0.9997378	
Max	0.9997412	

The analysis results show that the achieved level of technical efficiency ranges from 0.9997378 (minimum value) to 0.9997412 (maximum value) with an average of 0.9997391. Out of 135 regencies/cities, all have achieved efficiency levels above 90%. Despite the efficient use of expenditure, there are still several factors of concern indicated as reasons for the low quality of education in Lampung Province, including household economic incapacity, accessibility to educational facilities, parental education, teacher quality, and others.

The Impact of Government Health Spending on the Health Index

The estimation results indicate that health expenditure significantly affects the health index at $\alpha = 0.1\%$. Health

expenditure has a positively signed coefficient, suggesting that for every one-unit increase in health expenditure, the health index is predicted to increase by 0.013289 units, assuming other variables remain constant. Greater expenditure allows for the development and improvement of health facilities such as hospitals, clinics, and health centers. Better facilities can enhance community access to quality healthcare services.

Table 4: SFA Regression Model in the Health Sector

Variabel	coefficient	Standar Error	p-value
Intercept	-1.8500e+00	1.7030e-01	< 2.2e-16***
Health Spending	1.3289e-02	2.2059e-03	1.698e-09***
Population	9.2023e-02	1.5181e-02	1.346e-09***
Economic Growth	-1.9257e-02	6.5332e-03	0.003203**
Special Allocation Fund for the Health sector	7.7875e-04	9.0491e-04	0.389468
Inflation	-2.3788e-03	1.4278e-03	0.095691

Population also significantly influences the health index at $\alpha = 0.1\%$, with a positively signed coefficient indicating that for every one-unit increase in population, the health index is predicted to increase by 0.092023 units, assuming other variables remain constant. A larger population can positively impact the health index by creating economies of scale, attracting investments, increasing the availability of healthcare personnel, and enabling large-scale health programs.

Rapid economic growth does not always have a positive impact on the health index. If not managed properly, economic growth can lead to issues such as environmental problems, social inequalities, and lifestyle changes that may adversely affect public health. The estimation results show that the economic growth rate significantly influences the health index at $\alpha = 1\%$. The economic growth rate has a negatively signed coefficient, indicating that for every one-unit increase in the economic growth rate, the health index is predicted to decrease by 0.019257 units, assuming other variables remain constant.

Furthermore, the estimation results indicate that the Special Allocation Fund (DAK) for the health sector significantly influences the health index at $\alpha = 0.1\%$. DAK for the health sector has a positively signed coefficient, suggesting that for every one-unit increase in DAK funding for health, the health index is predicted to increase by 0.00077875 units, assuming other variables remain constant.

Based on the estimation results, inflation significantly affects the health index at $\alpha = 0.1\%$. Inflation has a negatively signed coefficient, indicating that for every one-unit increase in

inflation, the health index is predicted to decrease by 0.0023788 units, assuming other variables remain constant. Inflation can have a negative impact on the health index by reducing purchasing power and increasing healthcare costs, thus lowering nutritional quality.

Table 5: SFA Efficiency in the Education Sector

Efficiency (%)	Technical Efficiency	
	Total District	Percentage (%)
<0.5	0	100%
0.51-0.60	0	
0.61-0.70	0	
0.71-0.80	0	
0.81-0.90	0	
0.91- 1.00	135	
Total	135	
Average	0.9999313	
Min	0.99993	
Max	0.9999328	

The analysis results show that the achieved level of technical efficiency ranges from 0.9999439 (minimum value) to 0.9999457 (maximum value) with an average of 0.9999447. Out of 135 regencies/cities, all have achieved efficiency levels above 90%. Several external factors influencing life expectancy and indicated as causes of low human development in the health dimension include health complaints and morbidity rates, frequency of early marriages, and access to health facilities such as hospitals and community health centers.

The Impact of Government Economic Spending on the Economic Index

Table 6: SFA Regression Model in the Economic Sector

Variabel	Coefficient	Standar Error	P-Value
Intercept	-5.0341	1.0000e+00	4.8e-07***
Economic Spending	31.4700	1.0000e+00	< 2e-16***
Population	0.36886	1.0000e+00	0.7122
Inflation	-0.019132	1.0000e+00	0.9847
Special Allocation Fund for the Economic sector	-31.468	1.0000e+00	< 2e-16***

Estimation results show that economic expenditure significantly influences the economic field index at $\alpha = 0.1\%$. Economic expenditure has a positive coefficient indicating that for every one-unit increase in economic expenditure, the economic field index is predicted to increase by 31.47 units, assuming all other variables remain constant. Economic

expenditure has a positive impact on the economic index through the enhancement, maintenance, and development of supporting infrastructure such as roads, bridges, ports, and telecommunications networks. Furthermore, when the government or private sector allocates funds for development projects or industrial expansion, they create job opportunities for the populace, which can ultimately lead to increased income and consumption among the population.

Estimation results indicate that population does not significantly influence the economic field index at the 0.1% significance level. There is no strong evidence to suggest that population significantly affects the economic field index. The positive coefficient (0.53885790) indicates that population does not have a statistically significant impact on economic efficiency in this model. Factors such as large population size with low productivity may not significantly contribute to economic growth. Economic policies and government management play a crucial role. Other factors contributing to the lack of significant impact from population include corruption, complex bureaucracy, and ineffective policies that may hinder the population's contribution to the economy.

Meanwhile, there is not enough statistical evidence to claim that the inflation variable significantly affects the economic field index. With a P-value of -0.019132, which is much larger than the significance level, it can be concluded that the effect of inflation rate on the economic field index is not significant. At the 0.1% significance level, there is sufficient evidence to state that Special Allocation Fund (DAK) for the economic field significantly affects the economic field index.

Table 7: SFA Efficiency in the Economic Sector

Efficiency (%)	Technical Efficiency	
	Total District	Percentage (%)
<0.5	0	
0.51-0.60	0	
0.61-0.70	0	
0.71-0.80	0	
0.81-0.90	0	
0.91- 1.00	135	100%
Total	135	
Average	0.9997391	
Min	0.9997378	
Max	0.9997412	

The negative coefficient -31.468 indicates that an increase in DAK for the economic field is associated with a decrease in the economic field index. This suggests that increased allocation of funds specifically for the economic field may be linked to a decline in economic performance in that area. Current issues in DAK implementation are largely due to inadequate mechanisms for determining priority areas and

recipient regions for DAK. Additionally, the use of DAK often involves complex and bureaucratic administrative processes. If local governments struggle to meet these administrative requirements, the use of funds may be delayed or underutilized, thus not providing maximum benefit.

The analysis results indicate that the achieved level of technical efficiency ranges from 0.94683 (minimum value) to 0.99744 (maximum value), with an average of 0.98396. Out of 135 districts/cities, all have achieved efficiency levels above 90%.

As one of the determinants of the Human Development Index (HDI), purchasing power plays a crucial role in economic development by reflecting the community's ability to acquire necessary goods and services.

Purchasing power in a region can serve as a primary indicator of economic development success, as lower purchasing power is associated with higher rates of poverty and unemployment. Two factors influence purchasing power: income and inflation. Income reflects individual earning capabilities, while inflation relates to macroeconomic performance and price stability.

IV. CONCLUSION

In the panel regression equation, the results show that: (1) education expenditure has a significant positive effect on the education index; health expenditure has a significant positive effect on the health index; and (3) economic expenditure has a significant positive effect on the economic index. Additionally, DAK (Special Allocation Fund) for health also has a significant positive effect on the health index. Conversely, DAK for Education and Economic DAK have a significant negative effect on their respective indices due to issues in the current implementation of DAK, primarily caused by inadequate prioritization mechanisms and selection of recipient regions.

Based on the efficiency analysis using the SFA method, districts/cities in Lampung Province have efficiently utilized these expenditure functions. However, there are external factors (random noise) contributing to the still low Human Development Index in Lampung Province.

These factors include household economic incapacity, accessibility to educational facilities, parental education, and teacher quality in the education sector. In the health sector, factors include morbidity rates, frequency of early marriages, and access to health facilities such as hospitals and community health centers. For the economic sector, factors relate to income generation capability and macroeconomic performance including price stability aspects.

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