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ANALYSIS OF REGIONAL SHOPPING EFFICIENCY OF BENGKULU PROVINCE IN THE EDUCATION AND HEALTH BUDGET 2019-2021

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Abstrak

Penelitian ini menganalisis efisiensi pengeluaran daerah di 10 kabupaten/kota di Provinsi Bengkulu, terutama pengeluaran di sektor pendidikan dan kesehatan. Penelitian ini menggunakan data dari tahun 2019-2021 dan diolah menggunakan alat analisis Data Envelopment Analysis (DEA). Variabel yang digunakan untuk mengukur efisiensi di sektor pendidikan adalah anggaran belanja pendidikan sebagai variabel input. Jumlah sekolah, jumlah guru, dan jumlah siswa adalah variabel output. Sementara itu, variabel yang digunakan untuk melihat efisiensi di sektor kesehatan adalah anggaran belanja kesehatan sebagai variabel input. Jumlah tenaga kesehatan, jumlah fasilitas kesehatan, dan jumlah orang yang memiliki asuransi kesehatan adalah variabel output. Berdasarkan perhitungan DEA, menunjukkan bahwa skor efisiensi rata-rata dalam tiga tahun penelitian belum efisien. Kabupaten Bengkulu Tengah mampu mencapai efisiensi keseluruhan dalam semua tahun penelitian baik di sektor pendidikan maupun kesehatan. Ketidakefisienan yang terjadi di daerah lain menunjukkan bahwa ada alokasi sumber daya yang buruk akibat sistem manajemen pemerintahan yang lemah.

Kata Kunci: Analisa Data Envelopment, Pendidikan, Kata Kunci Keempat, Kesehatan, Belanja Daerah

Abstract

This research analyzes the efficiency of regional spending in 10 regencies/cities in Bengkulu Province, especially spending in the education and health sectors. This research uses data from 2019-2021 and is processed using the Data Envelopment Analysis (DEA) analysis tool. The variable used to measure efficiency in the education sector is the education expenditure budget as an input variable. The number of schools, the number of teachers, and the number of students are output variables. Meanwhile, the variable used to see efficiency in the health sector is the health expenditure budget as an input va riable. The number of health workers, the number of health facilities, and the number of people with health insurance are output variables. Based on DEA calculations, it shows that the average efficiency score in the three years of research has not been efficient. Central Bengkulu Regency was able to achieve overall efficiency in all years of research in both the education and health sectors. The inefficiencies that occur in other areas show that there is poor allocation of resources due to weak government management systems.

Keywords: Data Envelopment Analysis, Education, Fourth keyword, Health, Regional Expenditures

INTRODUCTION

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Decentralization and regional autonomy within the framework of the unitary state of the Republic of Indonesia are part of a series of policies for the independence of a region in managing and regulating its household. To realize the implementation of regional economic and community development, the government always programs all activities based on a priority scale.

The policies governing regional autonomy and fiscal decentralisation, as stipulated in Law No. 32 of 2004 on Regional Government and Law No. 33 of 2004 on Central and Regional Financial Balancing, prioritise expenditure decentralisation in the context of fiscal decentralisation in Indonesia. Regional autonomy accompanied by fiscal decentralization has given regional governments the authority to carry out tasks and functions that have been assigned by the central government. (Arief Widodo Moh Khusaini, n.d.)

Fiscal decentralization revolves around the distribution of resources in a decentralized manner, recognizing that resources are finite commodities. Given the inherent limitations of resources, a critical factor in this context is the principle of efficient allocation. Efficiency, as a guiding principle in fiscal decentralization, underscores the need for reasonable resource management. It emphasizes the importance of allocating resources in a manner that maximizes their impact on development initiatives and economic growth. (Kasus et al., 2014)

The efficacy of governmental intervention in an economy is demonstrated through the Regional Revenue and Expenditure Budget (APBD). An annual regional financial strategy, the Regional Revenue and Expenditure Budget is established in accordance with regional regulations. Through the implementation of regional spending, the government can influence economic growth directly or indirectly by improving the quality of education and public health status. So through the budget, the government functions as a provider of public goods and services. According to Todaro and Smith (2006), education is widely acknowledged to play a crucial and pivotal role in shaping not only the capabilities of individuals but also the collective capacity of a nation to assimilate and generate modern technology. Beyond individual development, education stands as a linchpin for fostering sustainable economic growth and overall national progress. The health sector is also an important aspect of human resource development. In part because an extended life expectancy contributes to an increased return on investment in education, good health capital can enhance the return on investment in education. In addition, healthy individuals are better able to use education productively at all times in their lives. Therefore, education and health spending is considered an important effort to improve community welfare so that it can increase economic development. (Kesebelas Jilid & Todaro I Stephen C Smith, n.d.)

A. Government Expenditures

Government expenditure reflects government policy as a user of a country's money and resources to finance government activities to realize its function in achieving prosperity (Ferry Prasetya, n.d.). Public expenditure is the budget issued by the government or regional government which is allocated to the public sector such as education and health. In the Minister of Home Affairs Regulation (Permendagri) no. 59 of 2007, education and health affairs are mandatory regional government affairs.

Macro theories regarding government spending were put forward by economists and can be classified into 3 groups, namely Development Models regarding the Development of Government Expenditures, Adolf Wagner's Theory, and Peacock and Wiseman's Theory. In contrast, the micro theory pertaining to the evolution of government spending entails an examination of the determinants that generate the need for public goods. The quantity of public products that will be financially supported by the expenditure budget is determined by the interplay between supply and demand.

B. Regional Spending

According to Minister of Home Affairs Regulation No. 59 of 2007, regional expenditures play a pivotal role in financing the execution of governmental matters falling under the jurisdiction of provinces or districts/cities. These matters encompass mandatory affairs, optional affairs, and affairs managed within specific sections or fields, which may be collaboratively undertaken by both the central government and regions as stipulated by statutory provisions. The primary objective of regional expenditures is to safeguard and uplift the well-being of the community. This commitment is translated into tangible actions, including the improvement of essential services, advancements in education, healthcare provisions, the establishment of social facilities, and the development of adequate public amenities.

Investing in education and healthcare reflects the government's dedication to fostering the development of human capital. By allocating resources to these critical areas, the government aims to enhance the quality of its workforce. This strategic investment is driven by the recognition that a well-educated and healthy population contributes significantly to a nation's efficiency and productivity. (H.D. Atmanti, 2005)

Enhancing the education sector involves addressing various dimensions such as accessibility, quality, relevance, and competitiveness. The allocation of budgetary resources to the education function serves as a tangible manifestation of the government's dedication to providing essential services in the realm of education. This financial commitment underscores the prioritization of education in the overall national agenda. Moreover, it is a proactive step in fulfilling the constitutional mandate that stipulates a minimum allocation of 20% of state expenditure to the education budget. (*Portal Data APBN*, n.d.)

To achieve the desired public health outcomes, the government must prioritize health as a paramount element of its public service responsibilities. The government's

focal point should be ensuring and safeguarding the fundamental right to health for all citizens. This entails the provision of health services that are not only of high quality but also characterized by fairness, accessibility, affordability, and adequacy. (A. Widodo et al., 2012).

C. Efficiency

The concept of efficiency, which was first introduced by Farrel (1957) in Coelli et al. (2005), consists of three types, namely technical efficiency, allocative efficiency and economic efficiency. Farrel (1957) dalam Coelli et al.(2005) also includes allocation aspects in measuring efficiency. According to him, efficiency is not only determined by technical factors, but also by allocation factors. Allocative efficiency measures how well inputs are allocated to produce output according to prices and existing technology.The effectiveness of government expenditures can be construed as the endeavors of local governments to streamline costs as part of their overarching mission to enhance economic conditions and communal well-being. This pursuit of efficiency is typically categorized into two dimensions: input efficiency and output efficiency. Input efficiency refers to an organization's ability to generate a specific output utilizing the least possible input, while output efficiency involves the capacity to produce the maximum output with a given input. (Rambe, n.d.)

If efficiency is defined in terms of input and output functions, then a formula can be derived to represent it.

$$\boldsymbol{E = \frac{O}{I}}$$

In the evaluation of government budget utilization to enhance the Human Development Index (HDI), a systematic efficiency measurement is employed, utilizing the variables O (output) and I (input). The primary goal of this efficiency assessment is to discern both proficient and deficient areas within the government's budgetary allocations. By identifying areas of efficiency, there is a strategic opportunity to optimize resource utilization and consequently improve the overall HDI. (I. Kurniawan et al., 2021)

D. Data Envelopment Analysis (DEA)

The relative effectiveness of a group of decision-making units (DMU) in managing resources (input) to produce outcomes (output) when the relationship between the functional forms from input to output is uncertain is assessed using the DEA mathematical programming technique. DEA is typically used to assess the effectiveness of services rendered by state-owned businesses, nonprofits, and the government.

DEA, or Data Envelopment Analysis, provides the means to compute technical efficiency measures, and these measures can be categorized as either input-oriented or output-oriented. The distinction between the two lies in their focus on either

minimizing input usage for a given level of output or maximizing output given a set level of inputs. It's important to note that when conditions of constant returns to scale are present, both input-oriented and output-oriented models yield identical results. However, in scenarios with variable returns to scale, the models diverge in their outcomes. Despite this, both models maintain their ability to identify the efficiency or inefficiency of economic units within the same dataset. (Afonso & Aubyn, 2005).

Several studies, such as those conducted by (Titl et al., 2021); Lucio & Ayala-García (2021); Campoli et al. (2020); Dutu & Sicari (2020); Lewis (2018); Ouertani et al. (2018), has revealed that low efficiency in regions is caused by excessive spending that is disproportionate to the output produced. Therefore, to increase efficiency, regions need to reduce unproductive expenditure and maintain optimal output to avoid wasting resources (Lucio & Ayala-García, 2021; Campoli et al., 2020; Dutu & Sicari, 2020 ; Ouertani et al., 2018).

RESEARCH METHOD

The study's focus is on regional spending in the fields of health and education throughout ten Bengkulu Province districts and cities. Secondary data from BPS Bengkulu Province and the DJPK Data Portal of the Indonesian Ministry of Finance were used in this study. The input data used is regional expenditure in the education sector and district/city health sector in Bengkulu Province in 2019-2021. The output variable data for the education sector is the number of school facilities, the number of teachers, and the number of students per district/city in Bengkulu Province, while the output variable data for the health sector is the number of health workers, the number of health facilities, and the number of residents with health insurance per district/ City in Bengkulu Province. (*BPS Bengkulu*, n.d.; Dinas Jenderal Perimbangan Keuangan, n.d.)

Data Envelopment Analysis (DEA), an output-oriented analytical technique based on the Variable Return to Scale (VRS) assumption, was employed in this study. DEAP software version 2.1 was utilised for the analysis. The VRS DEA efficiency model is used in this study from (Banker,1984)

The efficiency models in this research are:

Objective function

$\text{Max } E = \mu 1Y1 + \mu 2Y2 + \mu 3Y3 + \mu 0$

Subject to

$\upsilon\ 1X1 = 1$

$\mu 1Y1 + \mu 2Y2 - (\upsilon\ 1X1) + \mu 0 \leq 0$

$\mu 1,2,3\ \upsilon 1 \geq 0$

Where

$\mu 1, .2$ = weights for output

$\upsilon 1,2$ = weights for input

RESULT AND DISCUSSION

This part provides a thorough discussion along with an explanation of the research findings. Results can be shown in ways that help the reader understand, such as tables, graphs, and figures.

1. Efficiency of Capital Expenditures in the Education Sector

The efficiency value of education capital expenditure for Bengkulu Regency/City was obtained using variable input in the form of the amount of education capital expenditure issued for each Regency/City. The number of instructors, pupils, and school facilities are the output variables that are employed. An output orientation model and variable return to scale (VRS) assumptions are used in this technical cost efficiency assessment.

Table 1. Education Sector Efficiency Score for the Regency/City of Bengkulu Province 2019-2021

Kabupaten/Kota	2019	2020	2021	Mean
Kab. Bengkulu Selatan	0.616	0.640	0.613	0.623
Kab. Bengkulu Utara	0.874	0.858	0.871	0.868
Kab. Rejang Lebong	1.000	1.000	1.000	1.000
Kota Bengkulu	0.662	0.662	0.662	0.662
Kab. Kaur	0.829	0.836	0.836	0.834
Kab. Seluma	0.746	0.756	1.000	0.834
Kab. Mukomuko	0.425	0.425	0.425	0.425
Kab. Lebong	0.488	0.492	0.492	0.491
Kab. Kepahiang	0.548	0.559	0.559	0.555
Kab. Bengkulu Tengah	1.000	1.000	1.000	1.000

Source: processed data, 2023

The research results in Table 1 show that of the 10 regency/city in Bengkulu Province, only 2 regency/city are efficient in capital expenditure in the education sector, namely Central Bengkulu Regency and Lebong Regency. These two districts/cities have an average efficiency score of 1.00. This means that these two regency/city have achieved maximum output with the input provided. Meanwhile, these 8 districts/cities have not achieved maximum output with the input provided. The district/city that has the lowest average efficiency score is Mukomuko District with an average efficiency score of 0.425. This means that Mukomuko Regency is only able to produce an output of 42.5% of the maximum output that should be achieved with the input provided.

Next, a peer analysis was carried out and the number of benchmark provinces for each district/city that was inefficient was carried out. Peers are efficient districts/cities

that have input and output characteristics similar to inefficient districts/cities. The number of inefficient regency/city for benchmarking is the number of regency/city that are inefficient for benchmarking (reference). This analysis aims to provide suggestions to inefficient districts/cities to improve their performance by imitating best practices from peers or benchmark districts/cities.

Tabel 2. Peer and Amount kab/kota Benchmark

Tahun	Peer	Inefficient number of cities for benchmark
2019	Kab. Rejang Lebong	8
	Kab. Bengkulu Tengah	2
2020	Kab. Rejang Lebong	8
	Kab. Bengkulu Tengah	2
2021	Kab. Rejang Lebong	7
	Kab. Bengkulu Tengah	2

Source: processed data, 2023

From Table 2, it can be seen that Rejang Lebong Regency is the district with the most peer participation in the 2019-2021 period. This shows that Rejang Lebong Regency has very good performance in terms of efficiency in capital expenditure in the education sector.

2. Efficiency of Capital Expenditures in the Health Sector

The amount of health capital expenditure issued for each Regency/City served as a variable input used to calculate the efficiency value of district/city health capital expenditure in Bengkulu Province. The number of healthcare providers, the number of hospitals, and the number of citizens with health insurance are the output variables that are utilised. An output orientation model and variable return to scale (VRS) assumptions are used in this technical cost efficiency assessment.

Table 3. Bengkulu Province District/City Health Sector Efficiency Score 2019-2021

Kabupaten/Kota	2019	2020	2021	Mean
Kab. Bengkulu Selatan	0.943	0.999	1.000	0.981
Kab. Bengkulu Utara	0.889	0.821	0.821	0.844
Kab. Rejang Lebong	0.926	0.964	0.929	0.940
Kota Bengkulu	0.839	0.848	0.831	0.839
Kab. Kaur	0.906	0.898	1.000	0.935
Kab. Seluma	0.694	0.857	0.806	0.786
Kab. Mukomuko	0.694	0.678	0.827	0.733
Kab. Lebong	0.689	0.677	0.693	0.686
Kab. Kepahiang	0.867	0.820	0.930	0.872
Kab. Bengkulu Tengah	1.000	1.000	1.000	1.000

Source: processed data, 2023

The research results in Table 3 show that of the 10 regency/city in Bengkulu Province, only 1 regency/city was efficient from 2019-2021 in capital expenditure in the health sector, namely Central Bengkulu Regency with an average efficiency score of 1.00. This

means that in the period 2019-2921, Central Bengkulu Regency has achieved maximum output with the input provided. Meanwhile, there are 2 regency/cities that have only achieved efficiency in 2021, namely South Bengkulu Regency and Kaur Regency. The district/city that has the lowest average efficiency score is Mukomuko District with an average efficiency score of 0.733. This means that Mukomuko Regency is only able to produce an output of 73.3% of the maximum output that should be achieved with the input provided.

Tabel 4. Peer and Amount kab/kota Benchmark

Tahun	Peer	Inefficient number of cities for benchmark
2019	Kab. Bengkulu Tengah	9
2020	Kab. Bengkulu Tengah	9
	Kab. Bengkulu Selatan	5
2021	Kab. Kaur	1
	Kab. Bengkulu Tengah	6

Source: processed data, 2023

From Table 4, it can be seen that Central Bengkulu Regency is the district with the most peer participation in the 2019-2021 period. This shows that Central Bengkulu Regency has very good performance in terms of efficiency in capital expenditure in the health sector.

The research results show that the efficiency of capital expenditure in the education sector in Bengkulu Regency/City in the 2019-2021 period varies. Some districts/cities may have succeeded in using their resources efficiently, while others may still need to make improvements in resource use. In the 2019-2021 period, there are 7 regency/city that always experience inefficiency or never experience efficiency in capital expenditure in the education sector, namely South Bengkulu Regency, North Bengkulu Regency, Bengkulu City, Kaur Regency, Mukomuko Regency, Lebong Regency, and Kepahiang Regency. This can be seen from the comparison between input (capital expenditure) and output (number of school facilities, number of teachers, and number of students) which shows that there are differences in the level of efficiency of capital expenditure in the education sector between districts/cities in Bengkulu Province.

There are several influencing factors such as: Budget planning that is not by the needs and priorities of the education sector in each region. Ineffective supervision and evaluation in the implementation of capital expenditure in the education sector. Limited human resources, technology and information in managing capital expenditure in the education sector. Other districts/cities that are inefficient can learn from their peer groups and benchmark provinces to find out the factors that influence their efficiency. They can carry out benchmarking or comparisons with regency/city or provinces that have better performance in terms of input and output. They can also evaluate and adjust the budget, the number of school facilities, the number of teachers and the number of students they have.

The efficiency of capital expenditure in the health sector in the districts/cities of Bengkulu Province during the 2019-2021 period varies. Several districts/cities have succeeded in achieving a high level of efficiency, while some still need to improve the efficiency of their capital expenditure. In the 2019-2021 period, there is 1 Regency/City that always experiences efficiency in capital expenditure in the health sector, namely Central Bengkulu Regency. Meanwhile, in that year, there were 7 regency/city that had not experienced efficiency in capital expenditure in the health sector, namely North Bengkulu Regency, Rejang Lebong Regency, Bengkulu City, Seluma Regency, Mukomuko Regency, Lebong Regency, and Kepahiang Regency.

One of the factors that influence the inefficiency of capital expenditure in the health sector is resource management which is not yet effective and efficient. The use of health personnel and health facilities that are not yet optimal will have a negative impact on the efficiency of capital expenditure. Apart from that, the number of people covered by the public health insurance program is also an important factor in determining the efficiency of capital expenditure in the health sector.

CONCLUSION

Based on the research conducted, it can be concluded that the efficiency of regional spending in the education sector is that in the 2021 period, there are only 2 regencies out of 10 regency/city in Bengkulu that are efficient, namely Rejang Lebong Regency and Central Bengkulu Regency. Meanwhile, in the health sector in Bengkulu Regency/City, in 2021 there are 3 efficient districts, namely South Bengkulu Regency, Kaur Regency and Central Bengkulu Regency. Therefore, improvements are needed in the use of regional budgets through more optimal budget allocations, improving the quality of human resources, and improving infrastructure. The implication of the results of this research is the importance of making wise decisions in allocating regional budgets to improve the efficiency and quality of education and health services for the people of Bengkulu Regency/City. Recommendations for further research are to conduct a more in-depth analysis of the factors that contribute to regional spending inefficiency and identify effective strategies to increase the efficiency of regional spending in the fields of education and health.

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