



The Relationship of Budget Expenditure in the Education Sector to HDI in the Island of Java

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Abstract

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This study aims to analyze the relationship between budget expenditure in the education sector and the Human Development Index (HDI) in six provinces on the island of Java in 2021. The approach used is a quantitative method with Pearson correlation analysis techniques using the SPSS program. The research data is secondary data obtained from official publications of the Central Statistics Agency and the Directorate General of Financial Balance. The results of the analysis showed that the correlation coefficient value was 0.157 with a significance level of 0.767, which means that there is a positive but very weak and insignificant relationship between education budget expenditure and Human Development Index. The value of the determination coefficient (R^2) of 0.0246 shows that education expenditure is only able to explain 2.46% of the variation in the Human Development Index, while 97.54% is influenced by other factors. Thus, the null (H_0) hypothesis is accepted, which states that budget expenditure in the education sector has no significant effect on HDI. These results confirm the importance of the effectiveness and equitable distribution of education policies compared to the amount of budget allocation alone in improving human development.



1. Introduction

Human development is a fundamental element in improving the quality of life of society. In Indonesia, the success of human development is measured using the Human Development Index (HDI), introduced by the United Nations Development Programme (UNDP) and adopted by the Central Statistics Agency (BPS) as a key macro indicator of regional development. HDI reflects three core dimensions: longevity and healthy living, knowledge, and a decent standard of living. An increase in HDI indicates the government's success in expanding access to education, healthcare, and economic welfare.

The education sector holds a strategic role in human development, particularly in improving the knowledge dimension measured through indicators such as mean years of schooling and expected years of schooling (Herdiansyah & Kurniati, 2020). Education budget expenditure represents a tangible commitment of local governments to improving human resource quality. Through fiscal policy, allocating sufficient funds to education is expected to encourage sustainable HDI improvement. However, a large budget allocation does not automatically guarantee optimal human development outcomes, as effectiveness depends on planning quality, implementation, and governance.

Java Island plays a crucial role in Indonesia's development as the nation's economic center. The six provinces on Java, DKI Jakarta, West Java, Central Java, the Special Region of Yogyakarta, East Java, and Banten, contribute more than half of national Gross Domestic Product (GDP) and serve as benchmarks for socio-economic progress. According to BPS data in 2021, the average HDI on Java

exceeded 72 points, although disparities remain significant. DKI Jakarta recorded the highest HDI at 81.11, while Central Java recorded approximately 72.77, indicating uneven human development despite geographic proximity.

Disparities are also evident in education budget allocation among provinces. DKI Jakarta and West Java receive the largest education budgets nationally, while provinces such as Banten and Central Java allocate relatively smaller proportions of regional expenditure to education. This raises an important question regarding whether higher education spending directly leads to higher HDI or whether other factors play a more dominant role in determining human development outcomes.

Previous empirical studies show mixed results. Rahmawati and Intan (2020) found that education spending significantly increased HDI in East Java. Indrayana (2021) reported that education expenditure positively influenced HDI in Jambi Province, though its effect was smaller than health-related variables. Similarly, Putra (2017) identified a positive but low elasticity relationship between education spending and HDI in East Kalimantan. Yasinta (2018) also found a positive effect of education variables on HDI in Riau, while infrastructure spending played a more dominant role.

These findings highlight a research gap related to regional scope and time period. Most previous studies focused on individual provinces, while comparative analysis across provinces on Java remains limited. Furthermore, many studies did not sufficiently capture the dynamics of the COVID-19 pandemic, which potentially affected the effectiveness of education spending. Therefore, this study is relevant in

examining the relationship between education budget expenditure and HDI across six provinces on Java up to 2021.

The primary objective of this study is to analyze the effect of education budget expenditure on HDI in Java's provinces and explain variations in HDI achievement based on education spending levels. The hypotheses proposed are that education expenditure either has no significant effect or has a positive and significant effect on HDI. The results are expected to contribute academically to development economics literature and practically assist local governments in evaluating education budget effectiveness to improve community welfare through data-driven policy decisions.

2. Literature Review

Education plays a crucial role in improving human resource quality and is a key component in the Human Development Index (HDI). According to UNDP (2020), HDI measures human development achievements based on three dimensions: longevity and health, knowledge, and decent living standards. Among these, education serves as the foundation for enhancing life quality through knowledge and skills. From a development economics perspective, Marginson's (2019) human capital theory emphasizes that education investment represents human capital accumulation, increasing productivity both individually and collectively. Governments play a vital role in promoting this through public education spending, which includes funding for infrastructure, teacher quality improvement, learning facilities, and educational aid for disadvantaged groups. The

more effective and targeted the allocation, the higher the potential for HDI improvement.

Empirical evidence supports this relationship. Rahmawati and Intan (2020) in East Java found that increased education spending positively affected HDI. Similarly, Indrayana (2021) in Jambi Province observed that education spending significantly influenced HDI, although less than health expenditure. Putra (2017) in East Kalimantan confirmed that education spending boosts HDI growth, albeit with low elasticity due to inefficient budget use. Yasinta (2018) in Riau also identified education spending as a main determinant of HDI growth with long-term effects. However, not all findings are consistent. Ananda et al. (2021) revealed that higher education budgets do not always yield proportional HDI gains due to ineffective fund management and uneven regional distribution. This highlights that spending effectiveness, rather than budget size alone, determines the real impact of education on human development.

Strong evidence indicates that education budget expenditure positively influences HDI, though its magnitude varies depending on policy implementation, program priorities, and regional socio-economic conditions. In Java, where HDI disparities persist among provinces such as DKI Jakarta, West Java, and Central Java, examining the effectiveness of education spending is essential to understanding its role in reducing regional inequality. Based on the previous theoretical studies and empirical findings, the hypotheses proposed in this study are as follows:

H₀: Budget expenditure in the education sector has no significant effect on HDI.

H₁: Budget expenditure in the education sector has a positive and significant effect on HDI.

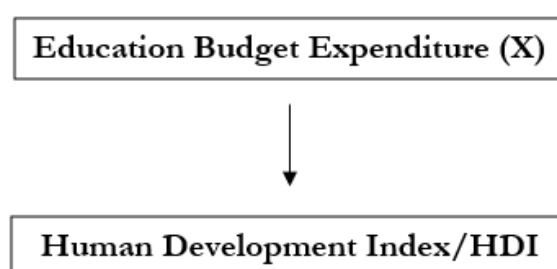


Figure.1 Conceptual Framework

This hypothesis is in line with human capital theory, which emphasizes that education as a social and economic investment will have a positive impact on improving people's welfare through improving the quality of human resources. If an alternative hypothesis is proven, then it can be concluded that the fiscal policy of local governments through the allocation of education expenditures is an important instrument in accelerating the achievement of human development in Indonesia, especially in the provinces of the island of Java.

3. Methods

This study employs a quantitative approach to analyze the relationship between education budget expenditure and the Human Development Index (HDI) across six provinces on the island of Java: DKI Jakarta, West Java, Central Java, Yogyakarta Special Region, East Java, and Banten. The quantitative approach is

chosen because it focuses on hypothesis testing using statistically processed numerical data to measure the strength and direction of relationships between variables. The analytical method used is correlation analysis, a statistical technique for determining the level of relationship between two or more variables. In this context, it examines how strongly education budget expenditure (variable X) relates to HDI (variable Y). A significant positive correlation indicates that higher education spending corresponds to a higher HDI value.

Secondary data were obtained from official sources such as the Central Statistics Agency (BPS) and the Directorate General of Fiscal Balance (DJPK), Ministry of Finance of Indonesia. The dataset includes local government spending in the education sector (in rupiah) and the HDI values of each province for 2021. The year 2021 was selected as it represents the most recent period within the research timeline and reflects post-COVID-19 conditions affecting education and human development policies. Data analysis was conducted using the Statistical Package for the Social Sciences (SPSS). Variable X (education expenditure) and variable Y (HDI) were input into SPSS, followed by a Pearson product-moment correlation test to determine the direction and strength of the relationship. The correlation coefficient (r) ranges from -1 to $+1$, where a positive r indicates a direct relationship, a negative r an inverse one, and an r near 0 a weak or insignificant relationship.

The t-test results were compared with the t-table at a 5% significance level ($\alpha = 0.05$). If $t\text{-calculated} > t\text{-table}$, the null hypothesis (H_0) is rejected, confirming a positive and significant effect of education spending on HDI. The coefficient of

determination (R^2) was also analyzed to assess how much variation in HDI can be explained by education expenditure. Interpretation followed Sugiyono's (2017) correlation strength criteria: 0.00–0.199 (very weak) to 0.80–1.000 (very strong). Through this method, the study identifies the direction and strength of the relationship between education budget expenditure and HDI in Java's provinces for 2021, providing evidence-based recommendations for improving education budget effectiveness to enhance regional human development.

4. Results

This study aims to determine the relationship between education budget expenditure and the Human Development Index (HDI) in six provinces on the island of Java in 2021. The data used is secondary data obtained from the official publication of the Central Statistics Agency (*Badan Pusat Statistik/BPS*) and the Directorate General of Financial Balance (*Direktorat Jenderal Perimbangan Keuangan/DJPK*) of the Ministry of Finance of the Republic of Indonesia, which includes the total expenditure of the local government budget in the field of education and the HDI achievements of each province. The analysis was carried out using the SPSS program with a Pearson correlation test to see the direction and strength of the relationship between variables, as well as a determination coefficient test (R^2) to determine the amount of contribution of education expenditure to HDI.

Table.1 Pearson Correlation Test SPSS Output

Correlations		
	educationtrillions	IPM2021

educationtrillions	Pearson Correlation	1	.157
	Sig. (2-tailed)		.767
	N	6	6
IPM2021	Pearson Correlation	.157	1
	Sig. (2-tailed)	.767	
	N	6	6

Based on table 1, the results of the Pearson correlation test displayed on the SPSS output obtained a correlation coefficient value (r) of 0.157 with a significance value (Sig. 2-tailed) of 0.767. The positive correlation value indicates that the relationship between education budget expenditure and HDI is unidirectional, meaning that the greater the education budget expenditure, the more likely it is to be followed by an increase in HDI. However, the strength of the relationship is very weak because the correlation value is close to zero. According to Sugiyono's (2017) classification, the correlation value between 0.00–0.199 is included in the relationship category is very weak. In addition, a significance value of 0.767 which is greater than the error level of 0.05, indicates that the relationship between the two variables is not statistically significant. Thus, it can be concluded that the increase in education budget expenditure in six provinces of Java Island in 2021 did not have a significant effect on changes in HDI values.

These results show that despite the positive direction of the relationship, the influence of education expenditure on HDI is still very small. This condition can occur because a large allocation of the education budget is not necessarily followed by improving the quality or equitable access to education. In many cases, most of the education budget is used for routine expenditures such as teacher salaries and

school operations, while the portion for improving the quality of education and improving learning facilities is relatively limited. As a result, the impact on educational indicators in HDI, such as average school length and school length expectation, is not very significant.

Table.2 Output SPSS Test determination coefficient (R^2)

Model Summary				
Models	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.157a	.025	-.219	4.77406
a. Predictors: (Constant), pendidikantriliun				

Table 2 show clarify the contribution of education expenditure to HDI, the determination coefficient (R^2) was also calculated. Based on table 2, the results of the calculation from the correlation value $r=0.157$, the value $R^2=r^2=0.0246$ or equivalent to 2.46% was obtained. This means that education budget expenditure is only able to explain 2.46% of the variation in HDI changes, while the remaining 97.54% is influenced by other factors outside of education expenditure variables. Other factors that may be more dominant in determining HDI include the quality of health services, poverty levels, economic growth, and the equitable distribution of educational facilities between regions. This very small determination value shows that the education budget policy on the island of Java in 2021 has not had a great influence on human development achievements.

Empirically, the results of this study do not support the H_1 hypothesis which states that budget expenditure in the education sector has a positive and significant effect on HDI. On the contrary, the results support the zero (H_0) hypothesis that education expenditure has no significant effect on HDI. This is in line with the findings of Ananda et al. (2021) who stated that an increase in the education budget in several provinces in Indonesia is not always followed by a proportional increase in HDI, because the effectiveness of policy implementation and the quality of budget management are still the main obstacles.

The results of this study also provide important policy implications. It is not enough for local governments to increase the amount of education budget, but also need to ensure that the budget is on target and oriented towards improving the quality of human resources. Efforts that need to be improved include equitable access to education between regions, improving the quality of teachers, and providing learning facilities that support students' innovation and creativity. With the improvement of the implementation aspect, it is hoped that education budget expenditure can have a more significant influence on the increase in HDI in the future.

Overall, the results of this study show that the amount of local government spending in the education sector has not been the main determining factor for the increase in HDI in the provinces of Java in 2021. Although the direction of the relationship is positive, its strength and significance are still very weak. Therefore, policies that are more focused on improving the quality of education and efficient budget management are needed so that their impact on human development can be

more optimal. These findings also open up space for further research by adding other variables such as health expenditure, economic growth, and poverty to obtain a more comprehensive picture of the determinants of HDI at the provincial level.

5. Discussion

The results of this study reveal that the relationship between education budget expenditure and the Human Development Index (HDI) in six provinces on Java Island in 2021 is positive but very weak, with a correlation coefficient of 0.157 and a significance level of 0.767. The determination coefficient (R^2) of 0.0246 indicates that only 2.46% of the variation in HDI can be explained by education budget expenditure, while 97.54% is influenced by other factors. Statistically, education spending has no significant effect on HDI, leading to the acceptance of the null hypothesis (H_0) and rejection of the alternative (H_1). This finding contrasts with the Human Capital Theory (Marginson, 2019), which suggests that investment in education enhances human capability and productivity, driving economic growth and development. In the empirical context of Java in 2021, the insignificant correlation suggests a gap between theoretical expectations and real policy outcomes, influenced by several factors.

First, education budget size does not necessarily reflect fund effectiveness. A large portion of education budgets is allocated to routine expenditures such as teacher salaries and school operations, which, although essential, do not directly improve HDI components like mean years of schooling (RLS) and expected years of schooling (HLS). Hence, higher spending does not automatically translate to

better educational outcomes. Second, inequality in education access persists across provinces. DKI Jakarta and Yogyakarta have higher HDI values due to better facilities and education quality, while Central Java and Banten face limited access and infrastructure gaps. This regional disparity dilutes the overall impact of education spending.

Third, 2021 marked the post-COVID-19 recovery phase, during which education budgets were directed toward pandemic response, including digital learning infrastructure and operational aid. These expenditures, while necessary, have long-term rather than immediate effects on HDI, suggesting a lag in measurable outcomes. These results align with Ananda et al. (2021), who found that education spending often fails to significantly influence HDI due to inefficiencies. In contrast, Rahmawati and Intan (2020) found a significant positive effect in East Java, highlighting that local context and policy effectiveness determine spending outcomes. Theoretically, the findings emphasize that human capital theory must be contextualized. Education spending yields results only when combined with institutional quality, effective policy planning, and alignment between education and labor market needs. A mismatch between education outcomes and economic demands limits HDI gains.

Moreover, the low R^2 value suggests that HDI is more strongly affected by non-education variables such as health expenditure, economic growth, and poverty reduction. Indrayana (2021) supports this, showing that health sector spending has a greater influence on HDI improvement. Policy-wise, local governments must focus on the effectiveness and outcomes of education spending rather than its

nominal size. Integrating education, health, and economic strategies through cross-sector collaboration will yield more comprehensive human development. In conclusion, while education spending is positively related to HDI, the effect remains weak and insignificant, emphasizing that strategic, equitable, and outcome-based budgeting is crucial to advancing human development on Java Island.

6. Conclusion

This study aims to analyze the relationship between budget expenditure in the education sector and the Human Development Index (HDI) in six provinces on the island of Java in 2021. Based on the results of data processing using a quantitative method with the Pearson correlation test through SPSS, a correlation coefficient value of 0.157 with a significance value of 0.767 was obtained. The correlation value shows that the relationship between education budget expenditure and HDI is positive but very weak, and not statistically significant because the significance value is greater than the $\alpha = 0.05$ level. The calculation of the determination coefficient (R^2) of 0.0246 or 2.46% shows that education budget expenditure is only able to explain about 2.46% of the variation in HDI in the provinces of Java, while the remaining 97.54% is influenced by other factors outside the research variables, such as health, economic growth, and education equity.

These results confirm that the size of the education budget has not been the main determinant of the increase in HDI, because the effectiveness and quality of policy implementation play a greater role than the amount of fund allocation. Thus, the results of this study support the zero hypothesis (H_0) which states that education

budget expenditure has no significant effect on HDI, and rejects the alternative hypothesis (H_1). Theoretically, these findings suggest that education investment requires time and high policy effectiveness to have a real impact on human development. Therefore, the increase in HDI on the island of Java is not only determined by the amount of education spending, but also by how the budget is allocated efficiently and on target to improve the quality of human resources in a sustainable manner.

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