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# The Impact of Health Spending, Education Spending and Economic Growth on Human Development: A Provincial Panel Analysis

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### Abstract

This study aims to determine the impact of health spending, education spending, and regional economic growth on human development in 34 provinces across Indonesia from 2012-2020. The panel data regression method examined the association between the studied variables. The random effect model demonstrated a positive and significant impact of education spending and regional economic growth on human development in 34 provinces. Meanwhile, inconsistent economic growth findings negatively and significantly affect human development. By contrast, health spending is not significantly associated with subsequent HDI in the model estimated. The study's results imply that government spending on education was the most profitable investment in human resource development in the period under review.

#### Keywords

human development; public spending; panel analysis.



# **I. Introduction**

Public spending, especially health and education, plays a vital role in increasing a region's economic progress and growth. Health is considered a component of human capital, and the health sector also plays a crucial role in generating increased human resources. This increase will occur through the accumulation of health capital and health improvement through longevity and increased workforce productivity (Ruzima & Veerachamy, 2021; Edeme & Nkalu, 2019). The cost of human resource health expenditure will improve the quality and increase life expectancy and longevity. In other words, spending on health will result in public health promotion and health capital accumulation channels, and its impact on human capital and economic growth affects human development (Das, Mandal & Patra, 2021; Linhartova, 2021).

The education sector is also one of the crucial sectors in creating quality human resources. Therefore, the government of a country generally pays excellent attention to investment in the education sector. Conditions make public spending on education an essential part of education investment (Bloom, Kufenko, & Prettner, 2020).

The government budget affects Human Development. Human development can be seen as physical and mental development, which means increasing the primary population. The human development index in Indonesia continues to increase every year. Human development in certain countries or regions is also influenced by government spending. The government's efforts to improve human quality are undertaken through allocating government spendings in the public sector, such as education and health. Government expenditure in the health and education sector is public expenditure allocated by the government in the health and education sector to improve human resource development. The Human Development Report 2021 places Indonesia at 108 out of 189 countries based on the life expectancy index, educational attainment, and per capita income. Papua Province only recorded an average HDI value of 58.25 in the last ten years, meaning that Papua Province is the most underdeveloped province in Indonesia regarding human development. The life expectancy index and the achievement of quality education cannot be separated from local government spending. According to Government regulation number 58 of 2005 on regional financial management, regional financial management policies have a target so that governments can clearly and measurably identify something to be achieved in one fiscal year. This target is stated in the regional budget for revenues and s (APBD), which contains the financial plans used by local governments.

There are two types of regional spending: direct and indirect. Direct spending is an investment by local governments to increase development, while indirect spending is used for routine activities. The process of administering the government and managing regional finances is carried out with the concept of decentralization, which is regulated in Law number 32 of 2004 on regional government and Law number 33 of 2004 on the financial balance between the central and regional governments. The preparation of APBD aims to provide a budget more oriented to the public interest to increase development and regional economic growth. In this regard (Widarni & Wilantari, 2021) explained that increased economic growth is associated with increased production of goods and services in people's economic activities. Because basically, economic activity is the process of utilizing production factors to produce output. This process, in turn, produces a flow of remuneration for the production factors owned by the community. One factor that influences economic growth is the quality of human resources.

According to Ranis and Stewart (2005), economic growth is essential in increasing human development; it will not be sustainable without these improvements, both previously and simultaneously. Economic growth is a significant contributor to sustainable progress in Human Development. Indonesia's economic growth data has fluctuated in the last ten years. The highest decline occurred in 2020, which was -2.07 percent (y-on-y). It fell compared to 2019, which grew 5.02 percent, and the worst since the 1998 crisis, minus 13.16 percent. The negative impact of the COVID-19 pandemic is felt throughout the world economy, including Indonesia. This pandemic brings terrible contractions.

In line with that, the basic needs services that need attention from the central and local governments are services in education and health. In this regard, the allocation of local government spending in the education and health sectors needs to be considered with the various problems in education and health. There are still many problems in the education sector, such as the high dropout rate and the low potential of students continuing their education up to S1 because the distance between schools hinders it only in the city center/district. The quality of teachers and the low quality of the curriculum also hinder the development of student's abilities and many other problems. In terms of regional spending, the education sector is still not maximized in some areas, such as in West Papua province, with a percentage of only 7.81% of the total average of West Papua province in 2012-2020 Rp. 6,167 trillion.

The health sector is faced with the problem of the COVID-19 pandemic, which is still unresolved. The provision of health facilities during the time of the COVID-19 pandemic seemed to be aware that health facilities in the regions were not ready to face situations that could not be predicted. Although the improvement of health facilities has been improved, it is still inadequate in some areas. This is inseparable from the insufficient attention of local governments through regional spending. The allocation of provincial

health spending in West Papua Province had percentage of only 2.39% of the total average public spending in West Papua province in 2012-2020.

In addition to public spending, HDI is closely related to the region's economic development level. Stable economic growth can encourage the government of a country or region to make better investments in education and other human capital development. The higher the level of economic growth, the higher the opportunities for increasing human resources, as well as the effectiveness of human resource development policies that the government can carry out. Several studies have also shown that economic growth is necessary for human development. In addition, equitable distribution of economic development is also one of the conditions for human development. Therefore, human resource development is often associated with economic growth and an increase in per capita income and income distribution. The role of economic growth in human development depends on various public policies, including policies regarding budget allocations. Linhartova (2021) argues that providing the community with educational, health, cultural, and athletic facilities is one of the main ways to improve the quality of human resources. Based on this thought, it is crucial to investigate the link between health spending, education spending, and economic growth on human development. Thus, the present study aims to determine the impact of health spending, education spending, and regional economic growth on human development at the provincial level in Indonesia.

The average Health Expenditure of the total expenditure of each province in Indonesia from 2012 to 2020. Expenditures by health function are divided into personnel, goods and services, capital, and other expenditures. From the results above, the highest average percentage of health spending is in the province of South Kalimantan, with 21.79% of the average total expenditure of South Kalimantan Province in 2012-2020, Rp. 5,037 trillion. Meanwhile, the province with the lowest average percentage of health spending is West Papua, with a percentage of only 2.39% of the total average expenditure of West Papua province in 2012-2020, which is Rp. 6,167 trillion.



Figure 1. The Average Health Expenditure of Total Spending (%), 2012-2020

Figure 2 exhibits the average education expenditure of the total expenditure of each province in Indonesia in 2012-2020. The education function divides expenditures into personnel, goods and services, capital, and other expenditures. From the results above, the highest average percentage of education spending is in the province of East Nusa Tenggara, with a percentage of 36.83% for education spending from the average total expenditure of East Nusa Tenggara Province in 2012-2020, which is Rp. 3,784 trillion. Meanwhile, the province with the lowest average percentage of education spending is West Papua province, with only 7.81% of the total average expenditure of West Papua province in 2012-2020, which is Rp. 6,167 trillion.



Figure 2. The Average Education Expenditure of Total Spending (%), 2012-2020

The graph of average economic growth based on constant prices for each province in Indonesia in 2012-2020 shows that the highest average growth is in Central Sulawesi, with an average growth value of 10.11 percent (Figure 3). The high rate of economic growth in Central Sulawesi was driven by the performance of the agricultural, trade, and mining business fields. Meanwhile, it was also driven by the other two main growth drivers of Central Sulawesi, such as the manufacturing and construction industries. On the expenditure side, the increase in Central Sulawesi's economic growth was contributed by increasing household consumption and continued high growth in investment and exports. Meanwhile, the lowest average growth is in East Kalimantan Province, with an average value of 1.77 percent, meaning that East Kalimantan is the most lagging province in Indonesia regarding economic growth.



Figure 3. The Average Regional Economic Growth (%), 2012-2020

The average HDI for each province in Indonesia in 2012-2020 is indicated in Figure 4. The figure shows that the highest HDI average is in the province of DKI Jakarta, with an average HDI value of 79.41. This indicates that the human development index in DKI Jakarta is relatively high, and the population already has good independence. While the lowest HDI average is in Papua Province, with an average HDI value of 58.25, meaning that Papua is the most underdeveloped province in Indonesia regarding human development.



Figure 4. Human Development Index by Provinces, Average of 2012-2020

# **II. Review of Literature**

## 2.1 The Impact of Education Spemding on Human Development

Linhartova (2021) highlighted that education is a natural part of well-being. Furthermore, forms of human capital enhance individual capabilities. An increase in education spending can lead to an increase in human development. The condition of the population is a determining factor of production and emphasizes the intrinsic value of the investment in education. Providing the community with educational, health, cultural, and athletic activities is one of the main ways to improve the quality of human resources.

According to Sousa, Paulo, and Maroco (2017), the focus on maintaining fiscal balance, associated with a reduction in public spending, can affect the improvement of Human Development. However, the transfer of all resources into the direct application of social policy may no longer achieve additional results in improving or growing human development conditions, mainly because of the low investment in economic spending. The model analysis shows the relevant contribution of economic spending policies, namely policies that provide adequate infrastructure to absorb and distribute cash flows generated due to improved human development conditions and the need to consider reorientation.

Patel and Annapoorna (2019) revealed that public education as a percent of the total public causes HDI, and HDI does not cause public education as a percent of the total public. Therefore, the causal relationship is temporal, and public education as a percent of the total public is considered endogenous to HDI. Since public education spending causes HDI, it can be expected that it causes the level of educational attainment expressed as an education index, a component of HDI calculated using the average and expected years of schooling.

According to Sartiyah et al. (2017), improving education quality is a significant part of a development strategy and is controversial because improvement allows a country to improve its economy. The Aceh Provincial Government has made efforts to improve the education level of the community through education spending. The accumulation of education plays a critical role in the labor market, more significant job opportunities, and better jobs compared to the less educated population.

Human resource development can be achieved through Nigeria's more efficient health and education spending. Therefore, the federal government should substantially increase capital spending on education and health to achieve meaningful human resource development in Nigeria. Education and training are essential factors in human resource development (Orji, Nwokoye, & Udu, 2017)

Suwandaru, Alghamdi, and Nurwanto (2021) examined that access to education in Indonesia is essential to improve the quality of future human resource development and to bridge the educational gap between other countries. Increase education spending, and access to education becomes inclusive for the population. Gradually, the quality of human resources will be improved to compete globally.

The study by Tope (2018) revealed that increasing Education and Health spending should be done to enhance human resource development in Nigeria. Correlation between public education spending and human resource development in Nigeria and notes that insufficient and uncertain budget allocations for education have resulted in a worsening of its impact on human resource development.

# 2.2 The Impact of Education Spending on Human Development

The improvement of health quality has increased human resources. This increase will occur through the accumulation of health capital and health improvement through longevity and increased workforce productivity, resulting in human development (Razmi, Abbasian, & Mohammadi, 2012). They indicated that public health spending positively and significantly impacts human development. In other words, as the percentage of government spending on health increases, human health development will increase. The cost of government health spending, equal to the cost of government spending on education and human resources, will improve quality and increase life expectancy and longevity. In other words, government spending on health will accumulate health and public health capital channels. Its impact on human capital and economic growth affects human development.

The research results by Mohsen Pakdaman et al. (2019) revealed that health spending significantly affects the human development index. Increased government spending promotes public health by accumulating health capital and its impact. It directly affects human capital, economic growth, and human development. Health is closely related to growth, and overall development, including economic and human development. Spending on health is an essential factor influencing economic growth. These s can enhance human development along with human resources and physical capital.

The study by Ranjan and Ranjan (2021) suggested that government spending is one of the significant factors in increasing GRDP, HDI, education, and health conditions. Government spending on health is also needed to boost HDI and economic growth. Increased government spending helps advance health, skills development, employee productivity, and, ultimately, various sectors of the economy.

Pervaiz et al. (2021) investigated the presence of environmental sustainability and reduction of human healthcare spending and contribution to human development in countries that significantly impact the global economy and have a long-term impact. Mirahsani (2013) attempted to explore the association between health spending and HDI. The study shows a positive effect of increasing health spending on HDI in Southwest Asian countries. The importance of increasing health spending in these countries can be emphasized as an essential factor influencing the development of these countries. Health spending in the country and period studied positively correlates with HDI. in other words, an increase in health spending in the countries studied increased HDI.

On the other hand, Edeme and Nkalu (2019) identified that health spending is positively related to human development. The success of education, health, agriculture, rural development, and water resources in promoting human development is due to its more lavish spending than spending on energy, housing, and environmental protection. Health spending plays a significant role in the health status of people by lowering the effective price of health improvement inputs to create a conducive environment for healthy living. Public spending on health care is justified by the increased welfare that comes from reducing the disease burden, mainly because of the extensive spillover benefits.

### **2.3 The Impact the Economic Growth on Human Development**

Increased economic growth is associated with increased production of goods and services in people's economic activities. Because basically, economic activity is the process of utilizing production factors to produce output. This process, in turn, produces a flow of remuneration for the production factors owned by the community. One factor influencing economic growth is human resources quality (Widarni & Wilantari, 2021). With good education and a sound health system, the economy has the potential to grow and develop well in Malaysia.

Boozer et al. (2003) examined the empirical determinants of the growth trajectory from Human Development to Economic Growth. They found that Human Development plays is vital in explaining the economic growth trajectory. These findings demonstrate the empirical relevance of endogenous growth models in general and threshold effect models. Boozer et al. (2003) also developed a measure of the strength of the relationship between Economic Growth and Human Development and explored some of its empirical determinants. A strong sequencing implication of this finding is that Human Development should be prioritized to achieve higher Economic growth.

Economic growth influences human development and vice versa. From human development to economic growth, it is found that there is a strong and positive relationship in both directions and spending on social services (Appiah, Amoasi, & Frowne, 2019). Education is a significant association that determines the relationship between economic growth and human development. At the same time, investment is a significant association between the distribution of levels and incomes for severing the relationship between human development and economic growth. Sustainable development in the value of human development is a very vital supporting determinant for economic growth (EG). The resulting increase in Economic Growth will impact the economy, which in turn will encourage cross-border growth in the long term. For example, rising income levels will

play an essential role in expanding the capacity of governments to increase the general level of human development, which in turn will positively affect future economic growth potential (Mukherjee & Chakraborty, 2010).

Economic growth and human development are closely linked and mutually related reciprocally. Economic growth is the primary input for human development in the forward reaction. In the next stage (long term), human development becomes the input for economic growth in reaction to the backward impact, namely human development for economic growth (Bundala, 2019). In another study by Stewart (2005), economic growth is essential in increasing human development, and it will not be sustainable without these improvements, both previously and simultaneously. Economic growth is a significant contributor to sustainable progress in Human Development. In addition, it is not only an increase in Human development that is a fundamental development goal, but Human development itself is an essential contributor to Economic growth from time to time. Therefore, there is a two-way relationship between human development and economic growth.

Recently, Bloom, Kufenko, and Prettner (2020) found a positive relationship between economic growth and human development outcomes, especially in education, life expectancy, and fertility, consistent with economic theory and perhaps reflecting a causal relationship.

Eggoh, Houeninvo, and Sossou (2015) empirically studied the association of public spending on the education and health sector with economic growth. Their study found that public spending on education and health harms economic growth, while the human capital stock indicator has a slightly positive effect. Furthermore, our empirical investigation shows that education and health spending are complementary. Then, public investment in education and health must be jointly increased, and its efficiency is expected to impact human capital growth positively.

This study aimed to analyze the impact of health spending, education spending, and economic growth on the human development index (HDI) across provinces in Indonesia. To pursue the research objectives, the following hypotheses are formulated as follows:

H1: education spending has a positive and significant impact on HDI

H2: health spending has a positive and significant impact on HDI

H3: economic growth has a positive and significant impact on HDI

# **III. Research Method**

#### **3.1 Empirical Model**

This study analyzes the impact of health spending, education spending, and GRDP growth on HDI. For empirical analysis, this study is built on an econometric model. Panel data estimation technique is used by selecting fixed and random effect panel models (Eric, 2019; Baltagi, 2008). The dependent variable in the model analyzed is the Human Development Index (HDI). The independent variables were grouped into two groups for methodological reasons. The first group – related to the research question – contains the two variables, health spending and education spending expressed relative to total spending in the provincial budget in the Regional Revenue and Expenditure Budget or *Anggaran Pendapatan dan Belanja Daerah* (APBD. The other independent variable is the growth of domestic and regional products as a measure of regional economic growth (GRDP). All data for the dependent and independent variables were obtained from the Statistics Office.

The equation of the panel regression model used in this study is written as follows:

$$HDI_{it} = \alpha + \beta_1 HEALTH_{it} + \beta_2 EDU_{it} + \beta_3 GRDP_{it} + \epsilon_{it}$$

Where HDI means the human development index of province *i* in period *t*. HEALTH is the ratio of health spending to total provincial government spending, EDU is the ratio of health spending to total local government spending, GRDP is the gross regional economic domestic product as the proxy of regional economic growth of province *i* in period *t*, *a* is the intercept,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  are the parameters, and  $\epsilon$  is the error term in the model. As mentioned above, the hypothesis of the effect of education and health spending on the human development index (HDI). The study covers the period from 2012 to 2020, consisting of a sample of 34 provinces in Indonesia using panel data econometric models. The nine-year data series is the most extended time series for which the selected data is available. The length of the period is also sufficient to show the possible influence of the independent variables on the dependent variable. Table 1 summarizes the statistics on the used variables.

	HDI	Health	Health Eduction	
		Spending	Spending	
Mean	69.14752	0.090243	0.229158	4.797320
Median	69.17500	0.087300	0.231700	5.345000
Maximum	80.77000	0.550500	0.666700	21.76000
Minimum	55.55000	0.000800	0.000600	-15.74000
Std. Dev.	4.295836	0.045767	0.129916	3.386500
Skewness	-0.000384	3.480124	0.045485	-0.819319
Kurtosis	3.990594	35.33750	2.332148	11.31651
Jarque-Bera	12.51128	13950.53	5.792350	916.0800
Observations	306	306	306	306

Table 1. Descriptive Statistics of Used Variables

This analysis works with panel data, cross-sectional, and time series. It is necessary to determine the best model in this study (Yoon & Galvao, 2020; Hsiao & Yanan, 2006). The fixed and random effect models can be applied in panel regression analysis. In the fixed effects model, the exact-discrete outcomes are random variables that are allowed to be interrelated with the descriptive variables. In the random effects, the different-exact effect is a random variable that is not correlated with the independent variable. Thus, to decide which panel method is relevant to the provincial, the so-called Chow, Hausman, and LM were employed to compare the suitability of using these models.

The Hausman test has the following hypothesis. The null hypothesis is that the Random effect model is suitable for the estimated model (Kiross et al, 2020; Baltagi, 2008). In contrast, the alternative hypothesis is that the Fixed effect model is fitting. The alternative hypothesis is accepted if the probability (p) value is substantial. If the probability (p) value is irrelevant, admit the null hypothesis. The Chow test is also used to decide whether Common Effect (CE) or Fixed Effect (FE) is most appropriately used in estimating the panel model (Abiola & Adefabi, 2021; Yoon & Galvao, 2020; Tanjung, et al., 2021). Next is applying the Lagrange Multiplier Test (LM) to determine whether to use common or random effects. The Lagrange Multiplier test has a function to determine the best estimate, whether using a random effect or not. The Hausman and LM test results show that the Random Effects model is more appropriate than the Fixed Effects and Common Effects model in significance. The Hausman test has the following hypothesis.

The null hypothesis is that the Random effect model is suitable for the estimated model (Yoon & Galvao, 2020). In contrast, the alternative hypothesis is that the Fixed effect model is fitting. The alternative hypothesis is accepted if the probability (p) value is substantial. If the probability (p) value is irrelevant, admit the null hypothesis.

The Chow test is also used to decide whether Common Effect (CE) or Fixed Effect (FE) is most appropriately used in estimating the panel model. Next is applying the Lagrange Multiplier Test (LM) to determine whether to use common or random effects (Eric, 2019; Li & Yiao, 2021). The Lagrange Multiplier test has a function to determine the best estimate, whether using a random effect or not. The Hausman and LM test results show that the Random Effects Model is more appropriate than the Fixed Effects and Common Effects model at a significance level of 5%. Table 2 also compares the fixed effect and random effect model to the probability value, so the random effect model is applied.

Test	Result	Best Model
Chow Test	0.0000	Fixed Effect Model
Hausman Test	0.7869	Random Effect Model
LM Test	0.0000	Random Effect Model

Table 2. Panel Model Selection Result

#### **IV. Result and Discussion**

Table 3 presents the result of the random effect model of panel data regression. Two of the three independent variables are statistically significant: education spending (t-statistic = 11.741) and Regional gross domestic product (GRDP) ((t-statistic = -5.526); thus H2 and H3 are confirmed. By contrast, health spending is not significantly associated with the HDI based on the REM result indicates that health spending (HEALTH) is negative and insignificant at a 5% level of consequence. According to the estimation results, there is a clear positive association between education spending (EDU) and Human Development Index (HDI). It implies that the provinces with a proportion of education spending in their total spending, on average, have higher HDI. Based on the REM result, it can be stated that there is a negative relationship between regional economic growth (GRDP) and the HDI. This result may be interpreted in the following way: on average, the provinces with a higher GRDP had lower initial rates of HDI. When evaluating the coefficient values, the greatest influence upon the dependent variable is education spending ( $\beta = 7.238$ ), followed by GRDP ( $\beta = -0.123$ ).

Parameter estimation according to the model built above is done using a model with Random Effects. The coefficient of determination (R2) is 0.44, which means that the three independent variables (health spending, education spending, and regional economic growth) can explain 44.6% of the variation in the dependent variable Y (HDI). Other variables outside the model explain the remaining 55.4% or not studied. The REM results suggest the following associations. First, a one percent increase in education spending corresponds to a 7.238 percentage points increase in the HDI. Second, a one percent increase in provincial economic growth leads to a significant reduction in human development of 0.123 percentage points. The positive statistical significance of the impact of education spending on human development is consistent with some previous research (among others, Patel & Annapoorna, 2019; Linhartova, 2021). The present study revealed that education is a natural part of human well-being and a form of human capital that

enhances individual abilities. An increase in education spending can lead to an increase in human development.

Hypothesis	Coefficient	<b>T-statistic</b>	T-table	Decision			
Health spending	-1.972634	0.818093	1,64912	Hypothesis			
affects HDI				rejected			
Education spending	7.238331	11.74140	1,64912	Hypothesis			
affects HDI				accepted			
Regional economic	-0.123409	5.526243	1,64912	Hypothesis			
growth affects HDI				accepted			
Adjusted R-squared= 0.440							
F-statistic = 81.071							
Obs = 306							

Table 3. Coefficients for the Random Effect Model

On the other hand, the low statistical significance of the impact of health spending on human resource development is surprising. Many studies to date emphasize the impact of health on human resource development. As mentioned in the introduction, developed countries have moved from a knowledge economy to a creative economy, no longer focused on health. However, specifically for Indonesia, an increase in health spending should mean a decrease in mortality and an increase in life expectancy, so through this channel, it can be said that government health spending has not been/is not adequate for human development. Healthy people may have a longer life does not guarantee better work with high production rates.

Surprisingly, panel data analysis also demonstrates that regional economic growth has a negative/reducing impact on human development. In practice, this shows that increasing economic growth can slow down the development of human resources. Such a conclusion is in stark contrast to studies (Bloom, Kufenko, & Prettner, 2020) & (Appiah, Amoasi, & Frowne, 2019) which claim that there is a positive relationship between economic growth and human development outcomes. On the other hand, Mukherjee and Chakraborty (2010) claim that the resulting increase in economic growth will create complex effects/impacts on the economy. They argue that the human development process is closely related to the government's capacity to increase the general level of human development.

# **V.** Conclusion

Human development is currently one of the main goals of the economy. Human capital is the variable that determines the country's economic development and thus represents the main competitive advantage of the country. Panel estimates on the effect of spending on education, health, and economic growth on regional human development show that education spending has a positive and significant effect on regional human development, and health spending has an insignificant negative effect on regional human development. Meanwhile, economic growth negatively and significantly impacts regional human development.

Using panel data from 34 provinces in Indonesia for 2012-2020, this study finds that education spending and economic growth have the highest impact on human development in the provincies. Several empirical studies have demonstrated the significant impact of education spending and economic growth on human development. In simple terms,

government spending on education was the most profitable investment in human resource development in the period under review. Human capital is a complex component. Therefore, it is very quickly affected by the entire spectrum of economic development.

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