Bulletin of Community Engagement
Vol. 6, No. 2, August 2026
https://attractivejournal.com/index.php/bce//index

Analysis of Determination of Human Development Index

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ARTICLE INFO
Article history:
Received
January 02,, 2026
Revised
June 26, 2026
Accepted
July 07, 2026

Abstract

This study aims to analyze the influence of the Poverty Level and Government Expenditure in Education on the Human Development Index (HDI) in Papua Province. The data used are secondary data taken from 2013 to 2024. The data were analyzed using quantitative methods and multiple linear regression analysis techniques with the help of the SPSS version 21 application. The results of the study indicate that partially the poverty level does not have a significant effect on the Human Development Index with a calculated t value of 1.532 and a t table value of 2.25462 obtained from the t table formula and a significance value of 0.195. If seen the calculated t value <t table and significance value> 0.05. In the variable of government expenditure partially has a significant effect on the human development index with a calculated t value of 10.455 and a t table value of 2.26462 obtained from the t table formula and a significance value of 0.000. If seen the calculated t value> t table and significance value < 0.05. Meanwhile, simultaneously, the variables of poverty level and government spending in the education sector have an influence on the human development index in Papua Province.

Keywords: Poverty Level; Government Expenditure; Human Development Index.

Published by CV. Creative Tugu Pena
ISSN 2774-7077
Website https://attractivejournal.com/index.php/bce/

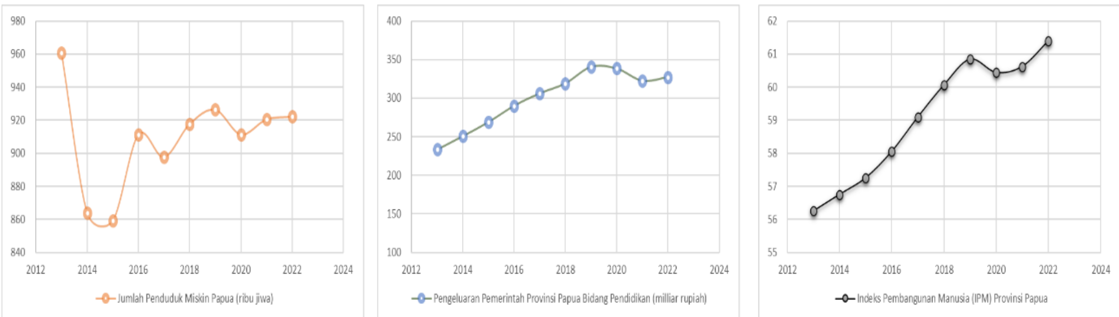
INTRODUCTION

The Human Development Index (HDI) is a comparative measure of life expectancy, literacy, education, and standard of living. The HDI explains how people can access development outcomes in terms of income, health, education, and so on. Achievements indicate that human development efforts have begun to run well, although there are slight obstacles where fluctuations in the development of the HDI in Papua Province occur. Therefore, the need for advanced and independent national development to achieve prosperity requires the development of a development concept that is based on humans and their communities (Aryo, 2020) . According to the Human Development Report (HDR), 1990 defines human development as a process to expand the choices that humans have, especially in accessing development outcomes such as obtaining income, health, and education. The budget in the education sector will increase public access to good and affordable education, thereby increasing the expected number of years of schooling (Akbar, 2016) . One of the government expenditures for development in the public sector in supporting human development is government spending on education, to support and achieve indicators in the human development index (HDI). Government expenditure allocated to the education sector improves the quality of human resources and can also improve the quality of community empowerment.

Previous research references highlight the role of several factors in influencing the Human Development Index (HDI), an important measure of human well-being. found that the Human Development Index has a significant negative effect on poverty levels. This indicates that the higher the HDI, the greater the likelihood of low poverty levels (Lewaherilla, 2021) . On the other hand, (Fangohoy, 2020) revealed that increasing the Special Autonomy Fund had no impact on improving the Human Development Index in Merauke. This raises questions about the effectiveness of fund allocation policies in improving human well-being in the region. (Lembang & Siman, 2024) In their book "Transformation of Human Resource Quality in Papua Province," they highlight that human development and well-being remain major challenges, especially due to the very large number of poor people concentrated in rural areas. This illustrates that efforts to improve the Human Development Index in Papua require special attention to poverty alleviation and increased government investment in education. This condition illustrates the complexity of the relationship between human development, poverty, and government funding allocation.

The problem of poverty in Papua Province, where the number of poor people in Papua Province always fluctuates every year, causing obstacles in the process of achieving prosperity, which is desired by every country in the world. The human development index is a standard of welfare that includes components of education, health, and purchasing power. To achieve prosperity, addressing the existing poverty problem is necessary. Problems related to government spending on education, which has increased every year, is very good, however, the increase in government spending cannot reduce the existing problem, namely the problem of education. Many children still cannot attend school due to economic constraints. The annual increase in spending is not effective and on target, thus preventing the achievement of prosperity in Papua Province. (Nabut, 2021) . Poverty will prevent individuals from consuming nutritious food, obtaining a proper education, and enjoying an environment that supports healthy living. From an economic perspective, all of this will result in human resources that are of poor quality or have a low level of productivity. This will also impact limited wages earned, so that in its development, it can affect the level of human development in a region. One of the human development problems in Papua Province is related to increasing government spending on education which is not commensurate with the increase in human development as reflected in the Human Development Index (HDI). This can be seen from the relatively high number of poor people compared to other regions, especially on the island of Papua (Ramli, 2023) .

Papua Province, with its 29 regencies/cities, is not immune to poverty like other regions, but its management tends to vary from region to region. Geographically, two regencies, Jayapura Regency and Keerom Regency, are located 27 km and 42 km from the capital, respectively. The average distance between the other regencies and the capital is 400 km. This situation, if not supported by adequate transportation infrastructure, can exacerbate poverty levels. (Manuhutu et al., 2023)



Graph: Poor Population; Government Expenditure; Human Development Index

The data trend (chart 1) shows an increase in Papuan provincial government spending on education from year to year. Although the number of poor Papuans fluctuates, there is a general decline. This demonstrates the government's efforts to improve the quality of life of the Papuan people by increasing access to education and poverty alleviation. Consequently, the Human Development Index (HDI) of Papua Province has increased significantly during this period, indicating an improvement in the standard of living of the Papuan people. The purpose of this study is to examine the relationship between poverty levels, government spending on education, and the Human Development Index in Papua Province to provide insight and provide appropriate policy recommendations to improve the Human Development Index in the region.

METHOD

This study uses a quantitative approach to analyze the relationship between poverty levels, government spending on education, and the Human Development Index in Papua Province. Secondary data from the Statistics Indonesia (BPS) includes data on the Human Development Index (HDI), poverty levels (number of poor people), and government spending on education (rupiah) from 2013 to 2022. A multiple linear regression model was used with the following equation:

$$HDI = \beta 0 + \beta 1 * Poverty + \beta 2 * Government\ Expenditure + \varepsilon$$

The use of Natural Logarithm (LN) as a substitute for linear data units in independent variables is done so that the independent variables can be studied against the dependent variables more precisely.

RESULTS AND DISCUSSION

A. Results

The results of the one-sample Kolmogorov-Smirnov test, the p-value (asymptotic significance) is 0.783, which indicates that there is no evidence to reject the null hypothesis. In Model 1 with the dependent variable HDI, it was found that the independent variable "Number of Poor Population" has a regression coefficient of 0.126, indicating that every 1 unit increase in "Number of Poor Population" will increase the HDI by 0.126 units, while "Government expenditure on education" has a coefficient of 229 indicating a strong positive relationship with the HDI, with both independent variables having a significant influence on the HDI ($p < 0.05$). Meanwhile, in Model 2 with the dependent variable Abs_RES, (Overall Regional Government Budget Realization Absorption) as a description of the extent to which local governments have realized or spent their budgets in a certain period as an indicator to see the efficiency of local government budget management and its impact on the economy and community welfare. The regression coefficient of Abs_RES for "Number of Poor Population" is -0.003 indicating a very small and insignificant influence on Abs_RES, while "Government expenditure on education" has a coefficient of 0.013 indicating a positive and significant influence on Abs_RES.

The analysis results indicate that there are no multicollinearity issues between the independent variables in both models, due to the high tolerance value (> 0.9) and low VIF (< 1.1). Therefore, no corrective action is required regarding multicollinearity. Furthermore, the Runs Test showed a p-value of 0.737, indicating that there is no significant evidence of autocorrelation in the tested data. Therefore, there is no autocorrelation to worry about in the analysis. (see table 2)

Table 2. Summary of Statistical Regression Test Results

Test	Results statistics test	Description	Conclusion
Kolmogorov-Smirnov	p-value = 0.783	The residuals of the regression model are normally distributed	Residue model normally distributed
Regression Coefficient (Model 1)	"Amount Poor People ": coefficient = 0.126, p < 0.05	Significant influence of "Number of Poor People" on HDI, " Government Expenditure" is positively correlated with HDI	Influence significant "Number of Poor People" and " Government Expenditure" on HDI

The regression test results show that the variable "Government Expenditure" has a significant and positive influence on the HDI. This is indicated by a very small significance value (Sig.) (0.000) and a large t-statistic value (10.355). This indicates that increasing government spending on education will have a positive impact on increasing the HDI. Conversely, the variable "Number of Poor People" does not have a significant influence on the HDI. A significance value (Sig.) greater than 0.05 (0.195) indicates that the influence of this variable is not significant. (see table 3)

Table 3. Multiple Regression Test

Independent Variables	Coefficient (B)	Std. Error	Beta	t-statistic	Sig.
Constant	-4,221	1,265	0.000	-3,337	0.012
Resident Poor	-0.117	0.088	0.130	-1,434	0.195
Expenditure Government	0.139	0.022	0.941	10,355	0.000

Based on the test results, it was found that the model constant had a significant influence on the Human Development Index (HDI) in the Province, as indicated by a significant t-value (-3.337). The test results also showed that the variable number of poor people was not significantly different from zero, meaning it had no significant influence on the HDI. On the other hand, the variable government expenditure in the education sector showed a significant influence on the HDI with a t-value of 10.355. The F test confirmed that the overall regression model was significant, where at least one independent variable had a significant influence on the HDI. With an R Square value of 0.944, 94.4% of the HDI variance can be explained by the independent variables in the model, namely government expenditure in the education sector and the number of poor people. Thus, it can be concluded that government expenditure in the education sector is an important factor in increasing the Human Development Index in the Province.

Table 4. T-Test, F-Test, and Determination Test

Test	Results Test	Description	Conclusion
Constant t-test	t = -3,337	Constant model different in a way significant from zero at the 5% significance level	Constant own significant influence on HDI
Population t-test	t = -1.434	The variable number of poor people is NOT significantly different from zero at the 5% significance level.	Amount resident poor does not have a significant influence on the HDI
Government Expenditure t-Test	t = 10,355	The variable of government expenditure in the education sector is significantly different from zero at the 5% significance level.	Expenditure government has a significant influence on the HDI
Test F	F = 58,708	The overall regression model is significant (p = 0.000). At least one variable independent own significant influence on the dependent variable (HDI).	The overall regression model has a significant influence on the HDI
R Square	0.944	94.4% of the variance in the HDI can be explained by the independent variables in the model, namely government expenditure on education. And amount poor people.	Variables independent in the model is able to explain most of the variance in HDI.

DISCUSSION

1. Poverty Level Against Human Development Index

The results of the t-test analysis indicate that the poverty level variable has no effect and is not significant on the Human Development Index in Papua Province. This can be seen from the large value of the poverty level regression coefficient (X1) of -0.117, meaning that when the poverty level increases, the human development index will decrease. This is in accordance with what should be if the government tries to reduce the poverty rate, of course the human development index will decrease. So there is a unidirectional relationship between the HDI and the poverty level (Lumi et al., 2022) and is in line with the hypothesis that the poverty level has a significant effect on the human development index in Papua Province. This is in line with the results of research conducted by (Sapaat, 2020) entitled "Analysis of Factors Affecting the Human Development Index in North Sulawesi Province". The results of the study show that partially the poverty level has a significant effect on the human development index in North Sulawesi Province. And research conducted by (Hasibuan, 2020) entitled "Analysis of Determinants of the Human Development Index (HDI) in Indonesia" which states that poverty affects the Human Development Index in Indonesia.

This explains that poverty occurs in Papua Province due to market imperfections that cause residents living in rural areas far from cities to experience economic backwardness where the price of goods and basic necessities in remote areas is very expensive compared to cities. This is in line with the human capital theory regarding community welfare and human productivity which is reinforced by the theory of the circle of poverty, namely poverty arises from economic backwardness so that people cannot access educational and health facilities, thus causing reduced human productivity and impacting human development development. In addition, there are factors that cause poverty in Papua Province such as the lack of basic service facilities and infrastructure, low levels of education, lack of infrastructure, and many remote areas that are difficult to reach are believed to be factors causing the high level of poverty in Papua. In addition, rising food prices and slowing economic growth at the level are the causes. The poverty rate does not affect the human development index in Papua Province.

In the vicious cycle of poverty theory, market imperfections and dependency lead to low productivity. Low productivity results in low income, which in turn leads to lower savings and investment. Low investment leads to low capital levels and inadequate development. Low capital leads to market imperfections and underdevelopment. This cycle continues in a circle with no end in sight, thus being called a vicious cycle. This is what happens in Papua Province: poverty arises from market imperfections and the population's dependence on government assistance, leading to low productivity and resulting in low income. Low savings and inadequate development are the reasons why poverty levels do not significantly impact the human development index in Papua Province.

This is in line with the results of a study conducted by (Sapaat, 2020) entitled "Analysis of Factors Affecting the Human Development Index in North Sulawesi Province." The results of the study indicate that partially the poverty level does not significantly influence the human development index in North Sulawesi Province. And a study conducted by (Hasibuan, 2020) entitled "Analysis of Determinants of the Human Development Index (HDI) in Indonesia" which states that poverty does not affect the Human Development Index in Indonesia. This occurs because, the ability of individuals in society has not been fulfilled to obtain basic needs. In addition, many poverty alleviation programs are not running according to target. Furthermore, the lack of influence of poverty variables in the short term is due to rising prices of goods which impacts low per capita expenditure when poverty decreases.

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However, this is in contrast to research conducted by (Binimkof, 2020) entitled "The Effect of Poverty Levels and Government Expenditures in the Education Sector on the Human Development Index in Merauke Regency 2010-2018" which states that Poverty Levels have a significant effect on the Human Development Index.

High levels of poverty will result in higher costs for economic development (Sukmaraga, nd) . The quality of human resources is the primary factor contributing to poverty.

The quality of human resources can be measured by the Human Development Quality of Life Index. A low Human Development Index will result in low work productivity. Low productivity leads to low incomes, which in turn leads to higher poverty rates.

2. Government Expenditure on the Human Development Index

Based on the data above, it is known that the variable of government expenditure in the field of education has a significant influence on the human development index from 2013 to 2022 with a coefficient value of 0.229, indicating that when government expenditure in the field of education increases by 1%, the human development index will experience an increase of 0.229. This is in accordance with the research hypothesis which explains that the variable of government expenditure in the field of education (X2) has a significant influence on the human development index.

The results of this study are supported by research (Invantoro, 2019) entitled research on "The Effect of Poverty Levels and Government Expenditures in the Education Sector on the Human Development Index in Batam City". The results of the study obtained that government expenditure in the education sector has a positive and significant effect on the human development index in Batam City. The results of this analysis are in accordance with the theory (Putri, 2021) , which states that investment in education is absolutely necessary, so the government must be able to build good educational facilities and systems. This study is also in line with the results of research conducted by (Binimkof, 2020) which examined "The Effect of Poverty Levels and Government Expenditures in the Education Sector on the Human Development Index in Merauke Regency 2010-2018". And the results of the study show that government expenditure in the education sector has a significant effect on the human development index in Merauke Regency. Then this result is strengthened by the theory of Wagner & Weber (1977), stating that if per capita income increases, then relatively government expenditure will also increase.

High government spending on education will impact development in the sector, particularly by increasing the number of students who complete higher education. The higher the average level of knowledge and skills possessed by the population, the easier it will be for every working-age individual to understand, apply, and benefit from technological advances, ultimately improving the nation's economic and living standards.

However, the results of this study contradict those of Rosmia (2018) on the "Effect of Government Expenditure in Education and Health on the Human Development Index in East Kalimantan Province." The results indicate that government expenditure in education and health does not significantly influence the Human Development Index in East Kalimantan Province. The insignificant effect of government expenditure in education is due to the still significant disparity in government expenditure for the education sector.

There are several areas that do not have Kindergarten (TK) schools, such as Puncak Jaya Regency, which is the only regency that does not have educational facilities, either TK or RA/BA. Puncak Jaya is a regency with the lowest percentage of villages/sub-districts that have Elementary Schools/Islamic Elementary Schools in Papua Province, namely only 8.61 percent of villages/sub-districts that have Elementary Schools/Islamic Elementary Schools in their area. This is slightly different from Tolikara and Nduga, with the percentage of villages/sub-districts that have Elementary School/Islamic Elementary School educational facilities at 10.64 percent and 10.89 percent, respectively. In addition, the distribution of junior high school-level educational facilities is still uneven in Papua. The total number of villages/sub-districts that have Junior High School/Islamic Junior High School educational facilities in Papua Province only reaches 11.07 percent.

This means that nearly 90 percent of villages and sub-districts in Papua Province do not have junior high school (SMP/MTs) education facilities. Puncak Jaya Regency has the lowest percentage, with only 2.32 percent of villages and sub-districts having SMP/MTs education facilities. Nduga Regency is in second place, with only 3.23 percent of villages and sub-districts having SMP/MTs education facilities.

Yahukimo Regency has the lowest percentage, with only 0.39 percent of villages/sub-districts having high school/Islamic high school/vocational high school (SMA/MA/SMK) facilities. This is followed by Nduga Regency with 0.81 percent. This is quite alarming considering that compulsory education has now been set at 12 years, but high school-level educational facilities are still not widely distributed in Papua Province. The development of academy/university infrastructure must begin to receive attention and a good management system, along with the

Papuan population's awareness of the importance of further education after secondary school in facing the demands of the times. (BPS PAPUA, 2020) The government should pay more attention to the availability of elementary school/Islamic elementary school infrastructure because elementary school education is a crucial basic education for human resource development in Papua. In addition to the availability of elementary school-level facilities in a village, easy access to similar facilities from villages without elementary school/Islamic elementary school facilities to facilities in nearby villages is something that needs to be improved. In addition to elementary school-level educational facilities, junior high school-level educational facilities also need attention, especially considering that compulsory education has now been increased to 12 years. Unfortunately, the distribution of junior high school-level educational facilities is still uneven in Papua. The total number of villages/sub-districts with junior high school/Islamic junior high school (SMP/MTs) educational facilities in Papua Province only reaches 11.07 percent. This means that nearly 90 percent of villages/sub-districts in Papua Province do not have SMP/MTs educational facilities. Difficulty accessing educational facilities remains a major challenge in Papua. Many school-age children ultimately do not continue their education to the junior high school level or equivalent due to the difficulty of accessing SMP-level educational facilities. Many children also have to live far from their parents to continue their education to the junior high school level because they must live in areas that have SMP-level educational facilities. This is reinforced by the results of the study (Damayanti, 2014) "Factors Causing Poverty in Papua Province: A Spatial Heterogeneity Analysis". Government spending in the education sector is also still not focused on improving the quality of education and training for teachers and students but is mostly used for infrastructure development. Therefore, this does not have a direct impact on improving the human development index.

DISCUSSION

This study introduces a distinct novelty by comprehensively examining the dynamics of the Human Development Index (HDI) in Papua Province specifically spanning the years 2013 to 2024 , a period characterized by significant regional shifting, infrastructure transitions, and fluctuating socioeconomic conditions. Unlike conventional human development studies that treat regional budget allocations generically, this research isolating government expenditure specifically within the education sector alongside regional poverty levels using a precise multiple linear regression model optimized with Natural Logarithm data adjustments. Furthermore, this paper bridges the empirical quantitative gap by contextualizing numerical regression findings with the unique, challenging geographical realities of Papua's 29 regencies—where vast physical distances and stark infrastructural disparities directly impede public service delivery.

The main findings of this empirical analysis reveal that government expenditure in the education sector exerts a powerful, statistically significant positive effect on the Human Development Index in Papua Province ($t=10.355$, $p=0.000$). Conversely, the localized poverty level—measured by the number of poor population—does not yield a statistically significant partial effect on the HDI ($t=-1.434$, $p=0.195$). Simultaneously, the F-test confirms that both independent variables jointly influence the variance of Papua's HDI significantly ($F=58.708$, $p=0.000$), yielding an exceptionally high R-Square value of 0.944. This indicates that 94.4% of the fluctuations in Papua's human development progress can be robustly explained by the combination of educational funding allocations and poverty dynamics within the model.

When juxtaposed with existing literature, the positive significance of educational spending directly aligns with the findings of Invantoro (2019) in Batam City and Binimkof (2020) in Merauke Regency , both of whom verified that targeted educational budgets systematically improve regional standard living and literacy indicators. Similarly, the lack of partial significance of the poverty level on HDI echoes the empirical outcomes presented by Sapaat (2020) and Hasibuan (2020), who both determined that short-term poverty fluctuations do not immediately manifest as major shifts in overall human development metrics. However, these findings sharply contrast with the study by Lewaherilla (2021) and Lumi et al. (2022) , which argued that high poverty levels possess a strong, direct negative impact on regional HDI indicators. Furthermore, our robust funding significance deviates from Rosmia (2018), who concluded that educational spending in East Kalimantan failed to generate a significant impact on local human development.

The consistencies observed regarding the insignificant direct impact of poverty can be explained by the vicious cycle of poverty and deep-rooted market imperfections. In Papua, high prices of basic necessities and heavily subsidized community dependencies mean that minimal drops in poverty do not immediately translate to improved purchasing power or structural welfare gains. On the other hand, the stark differences between this study and past literature (such as Rosmia, 2018 or Lewaherilla, 2021) stem directly from unique geographic, contextual, and infrastructural variables. While educational spending in more developed provinces goes straight into quality enhancements, nearly 90% of villages in Papua still completely lack junior and senior high school facilities. Thus, the immense financial volume spent in Papua is primarily absorbed by basic hardware infrastructure expansion rather than immediate educational training, explaining the variance in policy-to-outcome mechanics compared to other Indonesian regions.

This study advances regional economic literature by filling a crucial conceptual gap concerning how structural geographical friction alters standard macroeconomic assumptions in developing border territories. Academically, it offers a refined perspective on Human Capital Theory and Wagner's Law within a Special Autonomy framework. For policymakers, the implications are vital: local governments must pivot from merely inflating the educational budget to radically decentralizing school distribution across remote regencies like Puncak Jaya, Nduga, and Yahukimo. Future allocations must aggressively re-target teacher training and student retention programs alongside transportation connectivity , ensuring that physical infrastructure investments finally convert into genuine, long-term gains in Papua's human development quality.

CONCLUSION

Although poverty levels do not significantly impact the Human Development Index in Papua Province, government spending on education has a positive and significant impact. Simultaneously, both factors have a positive and significant impact on human development in Papua Province, indicating that increases in poverty levels and government spending on education can influence increases or decreases in the Human Development Index.

ACKNOWLEDGEMENTS

This research was successfully implemented thanks to the assistance and support of various parties. In this regard, the author would like to express his gratitude to the Dean of the Faculty of Economics and Business, the Head of the Department of Development Economics, the Head of the Merauke Regency Central Bureau of Statistics, and the team of lecturers and researchers involved from the beginning to the completion of this research.

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