Buletin Ekonomika Pembangunan
https://journal.trunojoyo.ac.id/bep
Vol. 7 No. 1 February 2026, hal 1-10

E-ISSN : 2807-4998 (online)

Trend Analysis of Education and Expenditure Indicators per Capita in East Kalimantan 2020-2025

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DOI: https://10.21107/bep.v7i1.32922

ABSTRACT
Human development and economic welfare are the two main pillars in the progress of a region. This study aims to analyze trends in education indicators, including Expected Length of School (HLS) and Average School Length (RLS), as well as their relationship with Per Capita Expenditure in East Kalimantan Province for the period 2020-2025. This topic was raised because there is a consistent gap between expectations and realization of education that can affect economic productivity. The novelty of this study lies in the use of recent time-series data covering the post-2020 recovery period, providing strong evidence for policymakers. This research method uses a quantitative descriptive approach and simple linear regression analysis with data sources from the Central Statistics Agency (BPS) of East Kalimantan. The results of the study showed a significant positive trend, where RLS grew by 3.38% and Per Capita Expenditure grew by 21.54% during the observation period. The main findings show a very strong correlation (r=0.989) between education and the economy, where the regression model estimates that every 1-year increase in average school length is associated with an increase in per capita expenditure of Rp7.94 million. In conclusion, the acceleration of education realization has direct implications for increasing people's purchasing power. Therefore, the strategy of accelerating compulsory learning is crucial to boost the regional economy.

Keywords: *Education Indicators; Development Economics; Human Capital; Expenditure per Capita; East Kalimantan*

INTRODUCTION

The Human Development Index (HDI), which is based on the fundamental components of education and decent living standards, is the main benchmark for human development (Arifin, 2023; Wulandari, 2023). In *the modern human capital* literature, it is stated that a good education can develop the productivity and capacity of the workforce in daily work. Based on this fact, education has a positive impact on economic development and human development. Recent studies in Indonesia show that the improvement in the quality of education and *the human capital* component has a great impact on economic growth and the development of human development indicators (Burhanuddin et al., 2025). In the context of modern development economies, high levels of education are associated with better technological adaptability and greater income opportunities, which are reflected through indicators

per capita expenditure (Suharti & Monika, 2024). In addition, quality human capital has been proven to be able to accelerate the transformation of the regional economy from the extractive sector to the value-added sector (Pellu, 2024). Therefore, analysis of the dynamics of education is an important instrument for policymakers to think about poverty eradication strategies and equitable distribution of welfare (Fatimah & Sa'roni, 2020).

But the relationship between education and the economy does not always run smoothly without obstacles. Various field evidence indicates that increased access to education does not necessarily boost per capita spending, especially when faced with macroeconomic challenges such as inflation and high unemployment rates (Tobing et al., 2023). In Indonesia, this phenomenon is often associated with uneven quality of education between regions (Manurung & Hutabarat, 2021). Recent research also analyzes the influence of the employment gender gap on poverty and economic growth (Putri et al., 2024). This indicates that education indicators such as Average School Length (RLS) need to be analyzed in tandem with real economic indicators of the community (Mahya & Widowati, 2021).

East Kalimantan Province as one of the centers of economic growth in Indonesia faces unique challenges in the education sector. Based on data from the Central Statistics Agency, although the trend of the Human Development Index (HDI) continues to show a positive increase until it reaches 79.39 in 2025, there is still a real difference between expectations and education realization (BPS Kaltim, 2025). Data shows that the Average School Length of Expectation (HLS) in East Kalimantan has reached a figure above 14 years, but the realization of the Average School Length (RLS) is still lagging behind. This inequality of access to education, especially between urban and rural areas, is a structural obstacle for communities to enjoy the results of development equally. (Ayuningtyas, 2021). These findings are in line with national conditions where investment inequality and the quality of education between regions of Indonesia continue to have an impact on differences in human resource development and economic indicators such as per capita expenditure (Julistia et al., 2025).

Although many studies have discussed the relationship between education and the economy, the majority of studies still focus on one-way analysis or using data that have not yet covered periods of post-pandemic economic volatility in East Kalimantan (Johar, 2023). There is still limited literature that specifically analyzes *the time-series* trends of education indicators and gaps (*gaps*) and their impact on per capita expenditure in East Kalimantan in the 2020-2025 period (BPS Kaltim, 2024). Based on the research gap, the objectives of this study are: (1) to analyze the development trend of HLS and RLS in East Kalimantan for the 2020-2025 period, (2) to determine the trend of per capita expenditure in the same period, and (3) to analyze the relationship between these education indicators and the level of economic welfare of the community.

RESEARCH METHODS

This study uses a quantitative method that combines descriptive-analytical and inferential concepts. The main goal is to dissect secondary *time series data* over a period of six years (2020-2025). The data was obtained from the official publication document of the Central Statistics Agency (BPS) of East

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Kalimantan Province which includes provincial aggregates and details of ten level II administrative areas, including Paser, West Kutai, Kutai Kartanegara, Berau, North Penajam Paser, Mahakam Ulu, and the cities of Balikpapan, Samarinda, and Bontang. There are also three variables used, namely Expected Length of School (HLS), Average Length of School (RLS), and Expenditure per Capita. In addition, this study produced a new variable called 'Educational Distance' which displays an educational transition that is not optimal. This variable is calculated from the absolute difference between HLS and RLs with the following formula:

$$Jarak_t = HLS_t - RLS_t \quad (1)$$

Data analysis begins with a review of the inter-time dynamics of each indicator. To see geometric trends during the study period, the methods used are the calculation of the *Annual Growth Rate* and the *Compound Annual Growth Rate* (CAGR). To calculate the annual growth rate, the following formula is used:

$$Growth_t = \frac{Value_t - Value_{t-1}}{Value_{t-1}} \quad (2)$$

In order to complete the trend analysis, descriptive statistics are used to present the number of concentrations and causes of the data which include *Mean*, extreme values, Standard Deviation, and Coefficient of Variation (KV). The use of Coefficient of Variation aims in detail to compare the level of data impermanence between the HLS and RLS indicators calculated with the formula:

$$KV = \frac{Standar\ Deviasi}{Mean} \times 1 \quad (3)$$

Finally, an inferential approach is carried out through simple linear regression analysis to test the causality hypothesis regarding the influence of School Length Expectation on the achievement of Average School Length which can be calculated with the formula:

$$RLS_i = \alpha + \beta HLS_i + \epsilon_i \quad (4)$$

About $RLSi$ is the dependent variable, βHLS_i as variable independent, α is a constant, β is a regression coefficient, and ε is *an error term*. The feasibility of the model will be further tested using several statistical tests, namely the Coefficient of Determination R^2 to measure the proportion of variance. The F Test for *Goodnes of Fit*, the t test for partial significance, and the Pearson Correlation Analysis (r) to determine the direction of the linear relationship between variables.

RESULTS AND DISCUSSION

Aggregate Analysis of East Kalimantan Province (2020-2025)

In general, East Kalimantan education shows positive values after the onslaught of the COVID-19 pandemic and the preparation of the Nusantara Capital City (IKN). This trend shows the existence of the defense of the regional education system in responding to external shocks while preparing human resources for new economic transformation. In 2020, the figure showed 13.72 years and in 2025 the figure showed 14.04 years. This shows that the School Expectancy Indicator (HLS) at the provincial level has consistently increased every year.

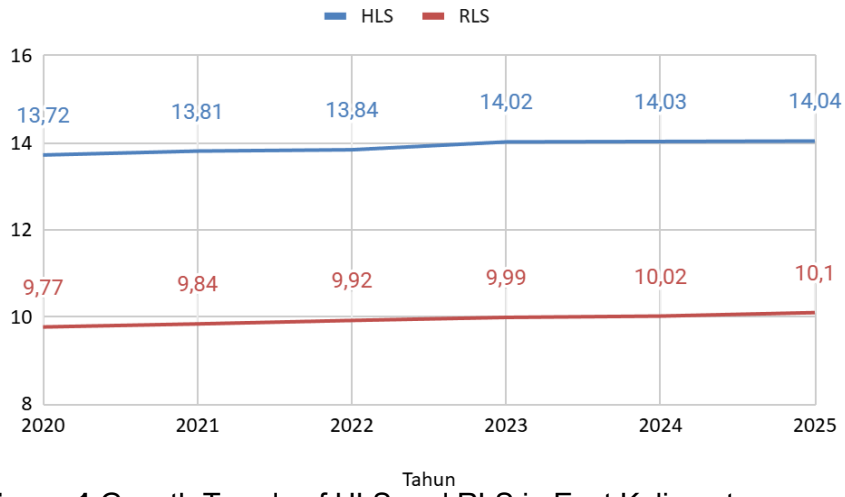


Figure 1 Growth Trends of HLS and RLS in East Kalimantan

The visualization in Figure 1 shows that there is a fairly large gap between expectations and realization of education in East Kalimantan. Although both variables produced an uphill line, the vertical distance between the HLS (blue) and RLS (red) lines was relatively constant throughout the study period. Based on data calculations, the average education gap that occurred during the 2020-2025 period was recorded at 3.97 years. The gap that has almost touched the 4-year figure has caused serious concern. This indicates that although the education system has succeeded in setting high expectations (equivalent to a diploma), the reality is that the average population experiences "dropping out of school" or stopping continuing formal education after graduating from grade 1 of high school (grade 10). This 4-year gap is a crucial time lost, which should be a transition from secondary education to higher education. The high cost of higher education and the availability of campus access that may not be even across the region are indicators of obstacles in the conversion of HLS to RLS.

Table 1 East Kalimantan HLS Growth Trend

Year	HLS (Year)	Growth (%)	Interpretasi Jenjang Education
2020	13,72	-	Diploma I/Awal Diploma II
2021	13,81	0,66%	Diploma I/Awal Diploma II
2022	13,84	0,22%	Diploma I/Awal Diploma II
2023	14,02	1,30%	Diploma II
2024	14,03	0,07%	Diploma II

2025	14,04	0,07%	Diploma II

The highest growth occurred in 2023 with an increase of 1.30%, which is most likely a response to education policies and the normalization of school activities after the pandemic. The number of 14.04 years means that on average, a student who enters school at the age of 7 in East Kalimantan in 2025 has the opportunity to continue his education up to the Diploma II (D2) level.

Table 2 East Kalimantan RLS Growth Trends

Year	HLS (Year)	Growth (%)	Interpretasi Jenjang Education
2020	9,77	-	Grade 1 High School (Dropping Out)
2021	9,84	0,72%	1st Grade High School
2022	9,92	0,81%	1st Grade High School
2023	9,99	0,71%	1st Grade High School (Almost 2nd Grade High School)
2024	10,02	0,30%	Grade 1 High School / Grade 10
2025	10,10	0,80%	Grade 1 High School / Grade 10

Meanwhile, the Average School Length (RLS) indicator, which acts as a stock variable, moves more slowly but surely. The figure of 9.77 years to 10.10 years in a period of 6 years is an important achievement, where the average adult population of East Kalimantan now has a high secondary education standard.

Statistical Validation of HLS and RLS Relationships

To test the importance of the relationship between expectations and educational realization described descriptively above, statistical testing was carried out using a simple linear regression method. The results of the analysis showed a very strong and positive causality relationship between the two variables.

Table 3 Summary of Linear Regression Estimation Results

Variabel	Coeficien	Standard Error	t-Stat	Prob. (P-value)
Konstanta	-1,789	1,850	-0,967	0,388
Old School Expectations	0,843	0,133	6,340	0,003
R-Square	0,909		-	-
F-Statistic	40,194		-	-
Significant F	0,003		-	-

Based on the results of the calculation in Table 3, the value of the

determination coefficient (R^2) was obtained at 0.909. This figure shows that 90.9% of the variation in RLS achievement can be explained by the HLS variable. The probability value (Significant F) of 0.003 (less than $\alpha = 0.05$) explains that this regression model is feasible and significant to be used to predict educational attainment in East Kalimantan.

Spatial Analysis: Disparities Between Districts/Cities

Spatial analysis shows inequality between regions that are divided into several economic levels. In developed urban areas such as Samarinda, Balikpapan, and Bontang, there is a massive dominance as a center of growth in the service and industrial sectors. Samarinda as a center of higher education recorded the highest HLS of 15.41 years and RLS of 11.04 years, equivalent to Balikpapan which is supported by the modern service sector. Bontang, even though it is based in heavy industry, also recorded the efficiency of human development with an RLS of 11.03 years. These three cities have reached the *stage of Universal Secondary Education* in real terms, where the main obstacles have shifted from basic accessibility to the relevance of industrial competence.

In contrast, the IKN buffer areas and areas rich in natural resources (SDA) such as Kutai Kartanegara, East Kutai, and Berau, show an inverted economic situation. Despite having a high GDP per capita, educational attainment in this area is not optimal. Kutai Kartanegara as the core area of the IKN recorded an RLS of 9.28 years, which means that this figure is still below the provincial average and risks causing a competency gap with immigrants. Meanwhile, Berau was able to become the best area in the district category with an RLS of 9.58 years which is likely to be driven by economic diversification to the tourism sector which provides more income for education than the purely extractive sector.

The most worrying conditions are found in developing and border areas, especially North Penajam Paser and Mahakam Ulu. North Penajam Paser as the zero point of the IKN recorded an RLS of only 8.72 years. This sharp gap in the quality of human resources requires policy intervention so that local communities are not replaced. On the other hand, Mahakam Ulu as the outermost area recorded the lowest indicator due to geographical constraints, but showed a positive HLS growth trend.

Table 4 Per Capita Expenditure Matrix vs RLS (Year 2025)

Region	Production per Capita (Rp Thousand/Year)	Average School Length (Years)	Category
Bontang	18.861	11,03	High Income - Higher Education
Balikpapan	17.482	11,04	Revenue Height - Higher Education
Samarinda	16.345	11,04	High Income - Higher Education

Berau	14.582	9,58	Middle Income - Education Intermediate
PPU	13.636	8,72	Revenue
			Intermediate - Primary Education
Kukar	13.365	9,28	Middle Income - Education Low
Kutim	12.755	9,48	Low Income - Secondary Education
Pass	12.709	9,04	Low Income - Primary Education
Kubar	12.251	9,01	Revenue Low - Primary Education
Mahakam Ulu	9.381	8,71	Very Low Income - Education Low
East Kalimantan	14.254	10,10	-

Table 4 clearly proves the pattern of the relationship between education and the economy. Areas with high Average School Length (RLS) such as Bontang and Balikpapan consistently recorded the highest per capita expenditure.

However, an in-depth analysis revealed irregularities in North Penajam Paser and Kutai Kartanegara which are included in the middle-income category but are poorly educated. This indicates that the conversion of income into human capital investment is not optimal, which may be caused by the high cost of living in the IKN area or the high *cost of* educational opportunities due to job offers in the informal sector. This is different from people in urban areas who have a positive linear relationship between income and education. This emphasizes the need for specific policies for the IKN buffer areas so that economic improvement runs in parallel with the quality of human resources.

CONCLUSION

Based on the comprehensive analysis that has been carried out, this study concludes several strategic points:

1. Positive but Uneven Trends: Education in East Kalimantan shows strong progress during the 2020-2025 period. HLS grew to 14.04 years and RLS reached 10.10 years. However, this growth is dominated by three

main cities, namely Samarinda, Balikpapan and Bontang.
Urgency of Handling the IKN Area: North Penajam Paser and Kutai Kartanegara actually show lag in RLS compared to neighboring cities. RLS Penajam Paser Utara, which only reached 8.72 years, has the potential to create a shortage of local labor in the new economic system of the IKN.

2. Economic-Education Correlations: A strong linear relationship between Expenditure per Capita and educational attainment. Areas with high buying interest have higher education achievements. This shows that economic barriers are still the main barriers to access to education in East Kalimantan.
3. Structural Gap: The 3.97-year gap between expectations and realization is evidence of the imoptimal transition from secondary education to higher education. East Kalimantan lost its leading human resources potential in post-high school.
4. Statistical Validity: The regression model proves that HLS is a very strong predictor of RLS (R^2 = 0,90), so that policies that increase expectations and access to schools will have a significant impact on increasing human capital stocks.

Policy Recommendations:

1. Education Affirmation for the IKN Area: The Provincial Government and the IKN Authority Agency need to launch special scholarship programs and intensive vocational training for productive age residents in North Penajam Paser and Kutai Kartanegara. The construction of universities in the North Penajam Paser area must be prioritized for local high school graduates.
2. Decentralization of Higher Education: To reduce the gap of 4 years, it is necessary to increase access to higher education (branch campuses or PSDKU) in district areas such as West Kutai and Paser, so that access costs (transportation or boarding houses) for local students can be reduced.
3. Mahakam Ulu's Economic Transformation: With the lowest per capita expenditure and education, Mahakam Ulu needs full education subsidies (free to undergraduate) and improved digital connectivity to enable distance *learning*.
4. Vocational-Industry Integration: In industrial cities such as Bontang and Balikpapan, the educational curriculum must be increasingly adapted to the needs of the industry (*Link and Match*) to ensure high HLS is converted into work productivity, not unemployment.

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