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The Effect of Expected Years of Schooling and Adjusted Expenditure per Capita on Life Expectancy in East Kalimantan Province (2022- 2024)

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ABSTRACT
This study examines the impact of Expected Years of Schooling (EYS) and Adjusted Expenditure per Capita (AEPC) on Life Expectancy (LE) in 10 regencies and cities in East Kalimantan Province during 2022–2024 (BPS East Kalimantan Province, 2024). This topic is relevant because East Kalimantan exhibits strong economic performance yet continues to face disparities in human development across regions. At the same time, empirical studies that directly link education and household purchasing power to life expectancy at the district and municipal level in this province remain limited (Susanti & Hidayat, 2020; Williyan & Hasmarini, 2024). The novelty of this study lies in the use of recent panel data for 10 regencies and cities that simultaneously incorporate AEPC and EYS as determinants of LE, thereby providing more context-specific empirical evidence for East Kalimantan (Hasanah et al., 2021; Swastika & Arifin, 2023). The study employs secondary data sourced from BPS East Kalimantan Province, comprising EYS, AEPC, and LE for 2022–2024, which are analysed using panel data regression, specifically the Common Effect Model (CEM). The model's validity is assessed using statistical tests, namely the t-test, the F-test, and the coefficient of determination (Statistics Indonesia, 2024; BPS East Kalimantan Province, 2024). The estimation results indicate a positive and statistically significant relationship between EYS and AEPC, and an increase in LE, while these two variables jointly explain approximately 71–73% of the variation in LE across regencies and cities (Hasanah et al., 2021; Meilinna et al., 2024). These findings suggest that expanding access to and improving the quality of education, alongside strengthening household economic capacity, are crucial prerequisites for improving health status and overall quality of life in East Kalimantan (Sari & Syechalad, 2022; Swastika & Arifin, 2023).

Keywords: *Life Expectancy (LE), Expected Years of Schooling (EYS), Adjusted Expenditure per Capita (AEPC), Panel data, Multiple linear regression.*

INTRODUCTION

Human development is a primary objective of regional development because it is directly related to population quality of life, economic productivity, and long-term sustainability (Statistics Indonesia, 2024). At the national level, the benchmark for long-run development quality is the Human Development Index (HDI). The HDI is constructed based on three main pillars, namely health, education, and a decent standard of living, represented respectively by indicators of Life Expectancy (LE), Expected Years of Schooling (EYS), and per capita expenditure as a proxy for living standards (Statistics Indonesia, 2024).

East Kalimantan Province is known for its strong economic performance;

however, differences in HDI scores across its administrative regions (regencies and cities) remain pronounced. Records from BPS East Kalimantan Province for 2024 show that EYS and per capita expenditure increased gradually over the 2022-2024 period, per capita expenditure rose from IDR 12,606 thousand to IDR 13,727 thousand per year, while average LE increased from 74.16 years to 74.49 years (BPS East Kalimantan Province, 2024). These improvements indicate progress in educational attainment, purchasing power, and public health, yet they do not fully capture how interregional differences shape the population's quality of life.

EYS measures the projected duration of formal education. In contrast, AEPC reflects households' financial capacity to meet basic needs, including adequate nutrition, access to health services, and proper housing (Statistics Indonesia, 2024). Theoretically, improvements in these two indicators are expected to positively affect health status and LE, as higher educational attainment tends to enhance health literacy and the adoption of healthy behaviors. At the same time, greater purchasing power enables better access to health care and more adequate living conditions.

Various regional-level studies in Indonesia indicate that education indicators, life expectancy, and per capita expenditure play essential roles in improving the HDI and regional development performance (Swastika & Arifin, 2023; Meilinna et al., 2024). These studies emphasizes education and decent living standards as key determinants of the quality of human development. Still, they remain limited in examining the direct relationship between EYS, AEPC, and LE at the level of autonomous regions (regencies and cities) in East Kalimantan Province. Addressing this gap is essential to ensure that policies to improve human resource development in East Kalimantan better account for differences in educational characteristics and economic capacity across regions.

Against this backdrop, the present study aims to analyse the relationships among EYS, AEPC, and LE across all administrative regions (regencies and cities) in East Kalimantan Province during 2022-2024. Specifically, the study investigates: (1) the partial effect of EYS on LE, (2) the partial contribution of AEPC in explaining LE, and (3) the joint effect of EYS and AEPC on LE in regencies and cities in East Kalimantan Province for the 2022-2024 period.

RESEARCH METHOD

This study adopts a quantitative approach, using secondary panel data. The data cover 10 second-level administrative regions in East Kalimantan Province, namely Paser, West Kutai, Kutai Kartanegara, East Kutai, Berau, North Penajam Paser, Mahakam Ulu, Balikpapan, Samarinda, and Bontang. During 2022-2024, a total of 30 panel observations were obtained.

All information analysed in this study is drawn from official publications of BPS East Kalimantan Province, namely: (1) the Expected Years of Schooling (EYS) [New Method] table (years); (2) the Adjusted Expenditure per Capita (AEPC) [New Method] table (thousand rupiah per capita per year); and (3) the Life Expectancy (LE) [New Method] table from the 2020 Population Census Long Form (years) for the 2022-2024 period (BPS East Kalimantan Province, 2024). In the research model, the dependent variable (Y) is LE, measured in years, while the independent variables consist of two indicators: EYS, denoted as X_1, and measured in years, and AEPC, denoted as X_2 and measured in thousand rupiah per capita per year.

Mathematically, the relationship among variables is specified in the

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following panel regression equation:

$$LE_{it} = \alpha + \beta_1 EYS_{it} + \beta_2 AEPC_{it} + \varepsilon_{it} \quad (1)$$

where:
LE_{it} = Life Expectancy in regency/city i in year t (years)
EYS_{it} = Expected Years of Schooling in regency/city i in year t (years)
$AEPC_{it}$ = Adjusted Expenditure per Capita in regency/city i in year t (thousand rupiah per capita per year)
α = Constant term
β_1, β_2 = Regression coefficients representing the effect of each independent variable
ε_{it} = Error term for regency/city i in year t

Data analysis is conducted using panel data regression, with estimation carried out under three model specifications: the Common Effects Model (CEM), the Fixed Effects Model (FEM), and the Random Effects Model (REM). The process of selecting the most appropriate model begins with the Chow test to determine whether CEM or FEM is more suitable. The decision rule is that if the p-value of the cross-section F-statistic is at or below 0.05, FEM is selected; otherwise, CEM is retained as the relevant model (Gujarati & Porter, 2012). Once the preferred model is identified, parameter significance is assessed individually (partial) using t-tests and jointly (joint) using F-tests, and the coefficient of determination (R^2 and Adjusted R^2) is evaluated to determine the model's ability to explain variation in LE across regions in East Kalimantan Province.

RESULTS AND DISCUSSION

Model selection begins by estimating three panel data regression specifications, namely the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM), with LE as the dependent variable (Y) and EYS (X_1) and AEPC (X_2) as the independent variables.

Based on the Chow test, the p-value for the cross-section F-statistic is 0.0776 (greater than 0.05), indicating no significant difference in intercepts across regencies and cities; therefore, the most appropriate specification is the CEM. Consequently, all subsequent tests, namely the t-test, F-test, and evaluation of the coefficient of determination, are conducted using the CEM.

CEM estimation results (t-test)

The validity of the CEM estimation model is confirmed by an F-statistic with p-value 1.98×10^{-8}, which is well below the significance level, and an F-statistic of 36.721. These values show that, jointly, the education and economic expenditure variables have a statistically significant effect on LE in East Kalimantan. The explanatory power of the model is also relatively strong, as indicated by an R^2 of 0.731 and an Adjusted R^2 of 0.711. In the partial test, the EYS variable records a regression coefficient of 0.4120 (p-value 0.003; t-statistic 3.246), which can be interpreted to mean that a one-year increase in expected years of schooling is associated with an increase in LE of approximately 0.41 years, holding other factors constant. Meanwhile, the AEPC variable also shows a positive and statistically significant relationship with LE (p-value < 0.001; t-statistic = 4.110), with a coefficient of 0.0001, confirming its contribution to improvements in quality of life.

Table 1 Common Effect Model (CEM) estimation results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Constant	66,7974	1,4650	45,610	0,0000
X1	0,4120	0,1270	3,246	0,0030
X2	0,0001	0,000036	4,110	0,0000

These empirical findings are consistent with prior literature, which shows that public health is positively associated with access to education and household economic stability.

F-test and goodness-of-fit of the CEM

The model's overall significance is confirmed by an F-statistic of 36.7241 ($p < 1.98 \times 10^{-8}$), well below the conventional alpha threshold, indicating that the education and economic variables together significantly affect LE. The model's predictive strength is relatively high, as reflected in an R^2 of 0.7312 and an Adjusted R^2 of 0.7113. This implies that about 71–73% of the variation in LE across the 10 regencies and cities in East Kalimantan can be explained by the variables included in the model, while the remaining 27–29% is attributable to residual factors such as disparities in medical facilities, environmental conditions, and unobserved socio-demographic characteristics. The validity of the model is further supported by a Durbin-Watson statistic of 2.548, which indicates that the estimation is free from serious autocorrelation problems. Hence, the assumption of error independence is reasonably satisfied, and the regression results provide a basis for empirical conclusions.

Table 2 F-test and goodness-of-fit statistics for the CEM

Statistic	Value
F-Statistic	36,7241
Prob (F-Statistic)	**0,00000001982**
R-Squared	0,7312
Adjusted R-Squared	0,7113
Durbin-Watson	2,5482

Table 2 shows that the large F-statistic, combined with a very small p-value, confirms that the CEM is significant overall, while the R^2 and Adjusted R^2 values above 0.70 indicate that the model has reasonably strong explanatory power, with residuals not affected by serious autocorrelation.

Interpretation of the effect of EYS

From a statistical perspective, the coefficient of 0.4120 on the education variable confirms that each additional year in EYS is associated with an increase in LE of about 0.41 years, assuming AEPC remains constant. From a human development perspective, this result suggests that education acts as a catalyst for health, since higher educational attainment tends to improve health literacy, encourage preventive behaviours, and facilitate the effective use of medical services. This conclusion reinforces empirical evidence from Sari and Syechalad (2022) and Meilinna et al. (2024), which highlights the education sector as a

fundamental pillar for accelerating the HDI and improving quality of life in Indonesia.

Interpretation of the effect of AEPC

The positive and significant coefficient on AEPC indicates that higher household economic capacity is associated with longer LE. Stronger purchasing power allows households to meet better nutritional needs, access adequate health services, and secure more livable housing conditions, all of which contribute to reducing disease risk and enhancing overall quality of life. These findings are consistent with the results of Susanti and Hidayat (2020), Williyan and Hasmarini (2024), and other studies documenting a positive relationship between increases in income and per capita expenditure and improvements in HDI and welfare indicators at the regional level.

Simultaneous implications and interregional variation

An R^2 of around 0.73 indicates that EYS and AEPC together explain a substantial share of the variation in LE across regencies and cities in East Kalimantan. However, approximately 27–29% of the variation remains attributable to factors outside the model. These factors may include the availability and quality of health facilities, physical environmental conditions, disease patterns, and demographic and social characteristics that are not captured by the education and economic variables. This is consistent with studies by Hargono and Widodo (2023) and Maulidiyah et al. (2024), which emphasise that LE is shaped by a complex interaction of educational, economic, health, and environmental factors.

The findings also underscore the urgency of fiscal interventions, in which regional spending on education and health serves as a vital instrument for accelerating the HDI. This is consistent with arguments by Simamora et al. (2025) and Rahmawati and Indahsari (2023) regarding the need for budgetary synergy, as well as evidence from Suprapti and Anggara (2024) and Banase and Purwono (2024), who show the direct impact of fiscal policy on regional health indicators. In addition, broader macroeconomic and social aspects also play an essential role: Sitorus et al. (2024) and Mahendra (2020) point out that regional economic stability provides the foundation for access to basic services, while Atunnisa et al. (2024), Nizar and Arif (2023), and Jannah and Sari (2023) remind that poverty and unemployment can hinder gains in LE if not mitigated through appropriate education policies, as suggested by Pradipta and Dewi (2020), Henukh and Atti (2021), and Huda and Indahsari (2021).

CONCLUSION

This study concludes that Expected Years of Schooling (EYS) and Adjusted Expenditure per Capita (AEPC) have a statistically significant effect on Life Expectancy (LE) in regencies and cities in East Kalimantan Province during the 2022-2024 period. An increase of one year in EYS is associated with an increase in LE of approximately 0.41 years, while higher AEPC also contributes to longer LE, with the model explaining about 71–73% of the variation in LE across region These findings confirm that improvements in education and household purchasing power are key factors in enhancing the quality of human development in East Kalimantan, consistent with previous studies that identify education and decent living standards as essential determinants of welfare.

From a theoretical perspective, the results reinforce the human capital

theory view that investment in education and strengthening household economic capacity increase individuals' access to information, health services, and better living environments, thereby promoting higher LE (Gujarati and Porter, 2012). From a policy perspective, the findings suggest that programmes aimed at expanding access to and improving the quality of education, raising incomes, and strengthening social protection have the potential to generate long-term benefits, including a healthier, more productive, and more competitive population in East Kalimantan Province.

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