

The Effect of Economic Growth, Minimum Wage, and Education on Poverty in the Horseshoe Region

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Abstract: This study aims to analyze the effect of economic growth, district/city minimum wage (UMK), and education on poverty in the Tapal Kuda region of East Java. The study employs a quantitative approach using balanced panel data from seven regencies during 2018–2024 obtained from Statistics Indonesia (BPS). Data were analyzed using panel data regression with the Fixed Effect Model (FEM) selected through the Chow, Hausman, and Lagrange Multiplier tests. The results indicate that economic growth and district/city minimum wage have a negative and significant effect on poverty, while the average years of schooling has no significant effect. These findings suggest that poverty reduction in the Tapal Kuda region is more strongly influenced by economic factors that directly increase community income than by improvements in education, whose benefits tend to emerge in the longer term. The study provides empirical evidence to support regional poverty reduction policies based on local development characteristics.

Keywords: Economic Growth; Education; Minimum Wage; Panel Data Regression; Poverty.

1. Introduction

Poverty is still one of the main challenges in development because it is related to the limitations of the community in meeting basic needs and gaining access to education, employment, and economic opportunities (Annur, 2013). Although the number of poor people in Indonesia continues to decrease, in September 2024 it will still be recorded as many as 24.06 million people or 8.57 percent of the total population (BPS Jatim, 2025). This condition shows that the reduction in poverty rates nationally has not completely solved the problem of poverty in various regions (Arham & Payu, 2019). The difference in poverty levels between regions shows that the results of development have not been felt equally by the entire community (Gafur et al., 2025). Data from the Central Statistics Agency shows that the percentage of poor people in rural areas is still higher than in urban areas (BPS East Java, 2024). Therefore, poverty alleviation remains one of the main focuses in the implementation of national development.

One of the areas that still faces this challenge is the Horseshoe area in East Java, which consists of Banyuwangi, Bondowoso, Situbondo, Jember, Lumajang, Probolinggo, and Pasuruan Regencies. Based on data from the Central Statistics Agency of East Java Province, the poverty rate between districts in this region still shows a considerable gap. In 2024, Probolinggo Regency will record a poverty rate of 16.45 percent, much higher than the average of East Java Province of 9.79 percent, while Banyuwangi Regency has a poverty rate of 6.54 percent (BPS Jawa Timur, 2024). Aliyadzi et al., (2021) found differences in economic growth rates, per capita income, development classification, and income inequality between districts/cities in the Horseshoe area. This difference shows that development achievements have not occurred evenly throughout the Horseshoe area. In addition, each region has different economic characteristics, ranging from areas that develop through the industrial sector to areas that are still dominated by the agricultural sector. These differences in characteristics

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allow each region to respond to development policies in a different way, so it is interesting to learn more (Diantika & Pramonono, 2021).

This difference in conditions becomes even more interesting when it is associated with the development of regional development indicators. After experiencing a decline due to the COVID-19 pandemic in 2020, economic activity in all districts in the Horseshoe region began to recover gradually in the following period (Drajat, 2023). The Regency/City Minimum Wage (MSE) also continues to be adjusted every year, while the average length of school shows an increasing tendency as an indicator of improving the quality of human resources. However, the improvement of these various indicators has not been fully followed by a decrease in poverty rates in all districts. Wijayanti (2025) It is explained that economic growth can promote poverty reduction if the benefits of development can be felt more equitably by the Community. In line with that, Pranata & Dewi (2023) The report shows that the influence of economic growth and education on poverty is influenced by the socioeconomic characteristics of each region. The findings show that the relationship between economic growth, minimum wage, education, and poverty does not always show the same pattern in every region.

Economic growth, minimum wage, and education are three indicators that are often used to explain changes in a region's poverty level. Economic growth is expected to expand employment opportunities and increase people's incomes, while minimum wage policies play a role in maintaining workers' purchasing power through the establishment of decent wage standards. On the other hand, the increase in the average length of education reflects an improvement in the quality of human resources which is expected to increase the productivity and competitiveness of the workforce. However, the effectiveness of these three indicators in reducing poverty does not always show the same results in each region because it is influenced by economic conditions, labor market structure, and development characteristics of each region.

This picture can also be seen in various studies on the determinants of poverty. Akbar et al. (2022) found that economic growth and the minimum wage had an impact on poverty levels. On the other hand Widyantoro & Agustin (2025) obtained different results after considering regional characteristics and socioeconomic factors in the research model. Regarding the educational variables, Kevin et al. (2022) shows that an increase in average school years contributes to poverty reduction, while Lasmini (2025) obtained different findings in other areas of research. The differences in results show that the influence of economic growth, minimum wage, and education on poverty is still influenced by the characteristics of each region. Each district in the Horseshoe region has different development characteristics, both in terms of economic structure, level of industrialization, and quality of human resources. These differences allow that the relationship between economic growth, minimum wage, education, and poverty does not always show the same pattern. Testing at the regional level is important to obtain an empirical picture of the influence of these three variables on poverty.

The differences in characteristics between regions cause the relationship between economic growth, minimum wage, education, and poverty to be generalized simply (Nur Rizqi et al., 2022). Regions with an economic structure dominated by the industrial sector, for example, may feel the impact of minimum wage policies differently than areas where the majority of the workforce is in the agricultural or informal sector (Mahaesa & Huda, 2022). Similarly, an increase in education levels is not always directly followed by a reduction in poverty if available employment opportunities are not able to absorb the workforce in accordance with the quality of their education (Mahsunah, 2013). Therefore, empirical testing in areas with diverse development characteristics is important to gain a more comprehensive understanding of the factors that influence poverty (Kurniasari & Oktavilia, 2023).

Based on the problems that have been described, this study aims to analyze the influence of economic growth, Regency/City Minimum Wage (MSE), and average length of school (RLS) on the poverty rate in the Horseshoe area, East Java. Through the results of the analysis, this study is expected to contribute to the development of studies in the field of Development Economics, especially related to the factors that affect the poverty rate at the regional level by using a panel data regression approach. The findings obtained are also expected to complement the results of previous research and become a reference for future research that examines the relationship between economic growth, minimum wage, education, and poverty. From a practical perspective, the results of this study are expected to be a source of information and consideration for local governments, especially in the Horseshoe region of East Java, in formulating economic development policies, improving the quality of human resources, and more effective poverty alleviation strategies according to the characteristics of each district.

2. Preliminaries or Related Work or Literature Review

Vicious Circle of Poverty

The persistent poverty in developing countries can be explained through *Vicious Circle of Poverty* proposed by Nurkse (1953). This theory explains that low income levels cause people's ability to save and invest to be limited. This condition hinders capital formation, so productivity remains low and people's income is difficult to increase. This cycle lasts repeatedly, so poverty tends to persist from one period to the next. Todaro & Smith (2011) emphasized that the cycle of poverty can only be broken through efforts that are able to increase productivity, expand employment opportunities, and encourage sustainable human capital accumulation.

In this study, *Vicious Circle of Poverty* It is used as a theoretical basis to explain the relationship between economic growth, minimum wage, education, and poverty levels. Economic growth is seen as a factor that can increase economic activity, expand employment opportunities, and encourage capital accumulation. The Regency/City Minimum Wage (MSE) plays a role as a policy instrument that is expected to increase the income and purchasing power of workers, especially in the formal sector. Meanwhile, education is seen as an investment in human capital (*human capital*) that contribute to increasing labor productivity and income in the long run (Schultz, 1961). The interconnectedness of these three variables makes *Vicious Circle of Poverty* relevant as a basis for analyzing the factors that affect the poverty level in the Horseshoe region of East Java which still has diverse economic characteristics, especially in the agricultural sector and the informal sector.

Economic Growth and Poverty

Economic growth is the process of increasing production capacity which is reflected in the increase in output or income of a region in the long term. Increasing economic activity is expected to be able to create job opportunities, increase people's income, and encourage poverty reduction (Arsyad, 2004). However, economic growth is not always followed by poverty reduction if the benefits of growth have not been enjoyed equally by all levels of society. Wau (2022) shows that economic growth has a role in reducing poverty, but its effectiveness is influenced by the quality of human resources and public investment. This shows that economic growth needs to be supported by more inclusive development in order to improve the welfare of the community as a whole.

The results of research in Indonesia also show that the relationship between economic growth and poverty is still diverse. Aini & Nugroho (2023) found that economic growth in East Java Province has an effect on the poverty rate, but the effect is influenced by income inequality and unemployment. Meanwhile, Ashari & Athoillah (2023) proving that economic growth is one of the factors that affect poverty in the Horseshoe area of East Java, although the magnitude of the influence is different in each region. The findings are in line with the theory *Vicious Circle of Poverty* stated by Nurkse (1953), that economic growth can be one of the efforts to break the cycle of poverty if it is able to increase people's productivity and income in a sustainable manner.

Minimum Wage and Poverty

The minimum wage is one of the government policy instruments that aims to improve the welfare of workers through the establishment of minimum wage standards that must be met by employers. The increase in the minimum wage is expected to be able to increase the income and purchasing power of workers so as to contribute to reducing poverty levels, especially for households that depend on income from the formal sector (Putri & Putri, 2021). However, the effectiveness of these policies is greatly influenced by labor market conditions, productivity levels, and the ability of the business world to adjust to the increase in labor costs. Agusalm & Novianti (2023) shows that an increase in the minimum wage will provide greater benefits when followed by increased labor productivity and expanded employment opportunities.

The results of research on the effect of the minimum wage on poverty still show mixed findings. Widyantoro & Agustin (2025) found that the increase in the minimum wage is not necessarily able to reduce poverty if most of the workforce is still in the informal sector which is not covered by wage policies. The findings are in line with *Vicious Circle of Poverty* stated by Nurkse (1953), that an increase in income will only be effective in breaking the cycle of poverty if it is able to reach low-income groups at large. Therefore, the influence of the Regency/City Minimum Wage (UMK) on poverty is estimated to depend on the structure of the labor market and the level of dominance of the formal sector in each region.

Education and Poverty

Human Capital Theory developed by Schultz (1961) and Becker (1993) explained that education is a form of investment that can improve the quality of human resources through

increasing individual knowledge, skills, and productivity. Improving the quality will increase the chances of getting a job with a better level of income, thus contributing to poverty reduction. In this study, education was proxied using the average length of school (RLS) which reflects the average number of years of formal education that the population has taken. Hasanah, Syaparudin, and Rosmeli (2021) It found that average school time plays a role in reducing poverty rates through improving the quality of human resources supported by other development indicators.

Nonetheless, the relationship between education and poverty does not always show consistent results. Utami and Faizin (2025) found that the average length of school did not have a significant effect on the poverty rate in districts/cities in East Java Province. These results show that increasing education does not necessarily directly reduce poverty if it is not followed by the availability of jobs that are able to absorb educated workers. These findings are in line with *Vicious Circle of Poverty* stated by Nurkse (1953), namely that improving the quality of human resources will be more effective in breaking the cycle of poverty if supported by economic opportunities that are able to increase people's productivity and income.

3. Proposed Method

This study uses a quantitative approach with the type of explanatory research to analyze the influence of economic growth, Regency/City Minimum Wage (MSE), and education on the poverty level in the Horseshoe region of East Java. The research area includes seven districts, namely Banyuwangi, Bondowoso, Situbondo, Jember, Lumajang, Probolinggo, and Pasuruan. The data used is secondary data in the form of panel data that combines data *cross section* Seven Districts and Data *time series* During the 2018–2024 period, 49 observations were obtained. All data were obtained through documentation techniques from official publications of the Central Statistics Agency (BPS), including Regencies/Cities in Numbers, East Java Province in Numbers, and other statistical publications related to research variables.

The dependent variable in this study is the poverty level measured using the percentage of the poor population. The independent variable consists of economic growth measured based on the growth rate of Gross Regional Domestic Product (GDP) on the basis of constant prices, Regency/City Minimum Wage (UMK) which is measured in rupiah units and transformed into the form of natural logarithm (Ln), and education that is proxied using the average length of school (RLS) in units of years. The operationalization of the research variables is presented in Table 1.

Table 1. Operational Research Variables.

Variabel	Proxies	Units	Source
Poverty Level (TK)	Percentage of poor population	Percent (%)	BPS
Economic Growth (PE)	ADHK GDP growth rate	Percent (%)	BPS
Minimum Wage (LnUMK)	Logaritma natural UMK	Rupiah (Ln)	BPS
Education (RLS)	Average School Length	Year	BPS

Source : BPS, Data processed (2026).

Data analysis was carried out using panel data regression because it was able to accommodate data variations between regions (*cross section*) and intertime (*time series*) simultaneously so as to produce more efficient estimates. The estimated models include *Common Effect Model (CEM)*, *Fixed Effect Model (FEM)*, dan *Random Effect Model (REM)*. The selection of the best model is done through the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test. The Chow Test is used to determine the most suitable model between CEM and FEM, the Hausman Test is used to choose between FEM and REM, while the LM Test is used to determine the best model between CEM and REM.

The panel data regression model used in this study is formulated as follows:

$$TK_{it} = \beta_0 + \beta_1 PE_{it} + \beta_2 LnUMK_{it} + \beta_3 RLS_{it} + \epsilon_{it} \dots \dots \dots (i)$$

The entire data processing process was carried out using the EViews 13 software. Hypothesis testing was carried out through a partial test (t-test) to determine the influence of each independent variable on poverty level, a simultaneous test (F test) to determine the influence of all independent variables together, and a determination coefficient (R^2) to measure the model's ability to explain variations in poverty levels.

4. Results and Discussion

Results of Selection of Panel Data Regression Model

Table 2. Results of Panel Data Regression Model Selection.

Testing	Probability Value	Verdict
Chow Test	0,0000	Fixed Effect Model (FEM)
Hausman Test	0,0349	Fixed Effect Model (FEM)
Lagrange Multiplier Test	0,0000	Random Effect Model (REM)

Source: EVIEWS 13, (2026).

The selection of the panel data regression model was carried out through the Chow Test, Hausman Test, and Lagrange Multiplier (LM) Test. Based on Table 2, the Chow Test produced a probability value of 0.0000 or less than the significance level of 5 percent, so that the Fixed Effect Model (FEM) was more suitable for use than the Common Effect Model (CEM). Furthermore, the Hausman Test showed a probability value of 0.0349, so FEM was chosen as a more appropriate model than the Random Effect Model (REM). Although the results of the LM Test showed that REM was better than CEM with a probability value of 0.0000, the determination of the final model still referred to the results of the Hausman Test. Thus, the Fixed Effect Model (FEM) was chosen as a panel data regression model used to analyze the influence of economic growth, Regency/City Minimum Wage (MSE), and average length of school (RLS) on poverty levels in the Horseshoe area of East Java.

Classic Assumption Test

Multicollinearity Test

Table 3. Multicollinearity Test Results.

Variabel	OR	Log(UMK)	RLS
OR	1,0000	0.036880	0.070259
Log(UMK)	0.036880	1,0000	0.566653
RLS	0.070259	0.566653	1,0000

Source: Processed data (Output Eviews, 2026).

The multicollinearity test was carried out to determine whether or not there was a strong relationship between independent variables in the regression model. Based on Table 3, the correlation value between independent variables was all below 0.80, so it can be concluded that the research model did not experience symptoms of multicollinearity. These results show that the variables of economic growth, Regency/City Minimum Wage (UMK), and average length of school (RLS) do not have a strong relationship with each other so that they are suitable for use in panel data regression analysis.

Heteroschidasticity Test

Table 4. Heteroscedasticity Test Results.

Variabel	Probability
Economic Growth (PE)	0,5728
Regency/City Minimum Wage Log (LnUMK)	0,9193
Average School Length (RLS)	0,9050

Source: Processed data (Output Eviews, 2026).

The heteroscedasticity test was carried out using the Glejser method to determine whether or not there is a residual variance inequality in the regression model. Based on Table 4, all independent variables have a probability value greater than the significance level of 5 percent, namely economic growth of 0.5728, Regency/City Minimum Wage (LnUMK) of 0.9193, and average length of school (RLS) of 0.9050. These results show that the regression model does not experience symptoms of heteroscedasticity, so the model meets one of the basic assumptions of the panel data regression and is suitable for hypothesis testing.

Hypothesis Test

Coefficient of Determination

Table 5. Coefficient of Determination.

Statistics	Value
R-squared	0,982258
Adjusted R-squared	0,978230

Source: Processed data (Output Eviews, 2026).

The determination coefficient is used to measure the ability of independent variables to explain the variation of dependent variables. Based on Table 5, an Adjusted R-squared value of 0.978230 was obtained, which shows that 97.82 percent of the variation in poverty rate in

the Horseshoe region of East Java can be explained by economic growth variables, Regency/City Minimum Wage (LnUMK), and average length of schooling (RLS). Meanwhile, 2.18 percent was influenced by other variables outside the research model.

Test F

Table 6. Test Results F.

Statistics	Value
Prob(F-statistic)	0,0000

Source: Processed data (Output Eviews, 2026).

Based on Table 6, an F-statistical value of 239.9119 was obtained with a Prob(F-statistic) value of 0.0000, which is smaller than the significance level of 0.05. These results show that the variables of economic growth, Regency/City Minimum Wage (LnUMK), and Mean Years of Schooling (MYS) simultaneously have a significant effect on the poverty level in the Horseshoe area of East Java. Thus, the regression model used in this study is suitable to explain the relationship between independent variables and dependent variables.

T Test

Table 7. T Test Results.

Variabel	Coeficin	t-Statistics	Probability	Remarks
Economic Growth (PE)	-0,102903	-3,595019	0,0009	Negative and significant effects
LnUMK	-3,628993	-2,110157	0,0413	Negative and significant effects
Mean Years of Schooling (MYS)	0,244184	0,420321	0,6766	No significant effect

Source: Processed data (Output Eviews, 2026).

A partial test (t-test) was used to determine the influence of each independent variable on the poverty level in the Horseshoe area of East Java. Based on Table 6, the economic growth variable has a coefficient of -0.102903 with a probability value of 0.0009, so it has a negative and significant effect on the poverty rate. The LnUMK variable also shows a negative and significant influence with a coefficient of -3.628993 and a probability value of 0.0413. Meanwhile, the Mean Years of Schooling (MYS) has a coefficient of 0.244184 with a probability value of 0.6766, so it does not have a significant effect on the poverty level because the probability value is greater than the significance level of 5 percent.

Discussion

The Influence of Economic Growth on Poverty

The results of the partial test showed that economic growth had a negative and significant effect on the poverty level in the Horseshoe region, East Java. These findings show that the increase in economic growth during the study period was able to encourage a reduction in poverty rates. Economic growth reflects an increase in production activities that have the potential to expand employment opportunities and increase people's income. This condition provides opportunities for households to better meet basic needs so that the number of people below the poverty line tends to decrease.

The findings support Vicious Circle of Poverty which was put forward by Nurkse (1953), who explained that increasing productivity and income is one way to break the cycle of poverty. The more economic activity in a region develops, the greater the opportunity for people to improve welfare through increased income. The results of this study also strengthen the findings Wau (2022) and Aini & Nugroho (2023) which states that economic growth contributes to poverty reduction. In the context of the Horseshoe region, the results show that the recovery of post-pandemic economic activity has a positive impact on poverty reduction, although the economic characteristics of each district cause the magnitude of the influence of economic growth to be not always the same.

The Effect of the Minimum Wage on Poverty

The Regency/City Minimum Wage (UMK) is one of the government policies that aims to provide protection for workers' income while maintaining people's purchasing power. The results of the study show that the LnUMK variable has a negative and significant effect on the poverty level in the Horseshoe area, East Java. The findings show that the increase in MSEs is able to support the reduction of poverty levels through increasing the income of workers, especially in community groups working in the formal sector. Increasing income will increase the ability of households to meet basic needs so that the risk of being below the poverty line is lower.

The findings reinforce Vicious Circle of Poverty stated by Nurkse (1953), that increasing income is one of the steps to break the cycle of poverty. Higher income not only increases household consumption, but also provides opportunities for people to improve their quality of life and improve welfare. The results of this study support the findings Putri & Putri (2021) which states that the increase in the minimum wage contributes to the reduction of poverty through an increase in the income of workers. On the other hand, Agusalim & Novianti, (2023) emphasizing that the effectiveness of the minimum wage policy is greatly influenced by labor market conditions and labor productivity in each region. This condition shows that the MSE policy in the Horseshoe area still plays a role in supporting poverty reduction, although the magnitude of the influence can vary according to the economic characteristics of each district.

The Effect of Average School Length on Poverty

In contrast to the variables of economic growth and the Regency/City Minimum Wage (MSE), the results of the study show that the average length of school (RLS) does not have a significant effect on the poverty rate in the Horseshoe region of East Java. These findings indicate that the increase in the average length of school has not been directly followed by a decrease in poverty rates during the study period. This condition shows that the increase in formal education alone is not enough to reduce poverty if it is not followed by the availability of job opportunities that are able to absorb the workforce according to their level of education. Thus, the benefits of education for poverty reduction tend to be felt only in the long term and are influenced by various other economic factors.

The findings do not completely contradict Human Capital Theory which was put forward by Schultz (1961) and Becker (1964). The theory explains that education is an investment that is able to improve the quality of human resources, productivity, and income. However, the benefits of such investment do not always appear in a short time because it is highly dependent on the ability of the labor market to absorb workers who have a higher level of education. The results of this study are in line with Utami & Faizin (2025) which found that the average length of school did not have a significant effect on poverty in districts/cities in East Java Province. This condition indicates that improving the quality of education needs to be balanced with the expansion of employment opportunities and increasing productivity in order to make a more tangible contribution to reducing poverty levels.

5. Conclusions

Based on the results of the analysis that has been carried out, it can be concluded that economic growth and the Regency/City Minimum Wage (MSE) have an effect on reducing the poverty rate in the Horseshoe area, East Java, while the average length of schooling has not shown a significant influence. These findings show that the reduction in poverty in the Horseshoe area is still more influenced by economic factors that directly increase people's income than the increase in education whose benefits tend to be felt in the long term. This condition indicates that improving the quality of human resources has not been fully able to reduce poverty if it is not followed by the availability of appropriate employment opportunities. This study provides an empirical contribution that the influence of economic growth, minimum wage policies, and education on poverty is influenced by the characteristics of development in each region. The results of this research are expected to be considered for local governments in formulating poverty alleviation policies through increasing economic activities, strengthening wage policies, and creating job opportunities that are able to optimize the quality of human resources. Further research can develop models by adding other variables that have the potential to affect poverty, such as unemployment rates, income inequality, or investment, as well as expanding the scope of the research area and period so that a more comprehensive understanding of the factors that affect poverty is obtained.

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Data Availability Statement: The data used in this study are secondary data obtained from the official publications of Statistics Indonesia (Badan Pusat Statistik/BPS), including regency/city statistical publications and East Java Province statistical publications, covering the period 2018–2024. The data supporting the findings of this study are publicly available through the official BPS website and related statistical publications. No new primary data were collected or generated in this study.

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