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EDUCATION AND UNEMPLOYMENT EFFECTS ON POVERTY IN SOUTHEAST SULAWESI

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Abstract: *This study analyzes the effects of education and unemployment on poverty in Southeast Sulawesi during 2010–2025. The study uses a quantitative approach with annual time series data obtained from the Central Statistics Agency (BPS). The variables used include the poverty rate, average years of schooling, and the open unemployment rate. The analytical method applied is the Autoregressive Distributed Lag (ARDL) model to examine short-run and long-run relationships among variables. The results indicate the existence of a long-run relationship among education, unemployment, and poverty. Education has a significant negative effect on poverty in the long run, indicating that higher educational attainment contributes to poverty reduction. Meanwhile, unemployment has a positive but statistically insignificant effect on poverty. In the short run, lagged unemployment changes significantly affect poverty dynamics. Diagnostic and stability tests confirm that the ARDL-ECM model is statistically reliable and stable. These findings suggest that poverty reduction in Southeast Sulawesi should prioritize improving educational quality and human capital development, alongside more inclusive labor market policies.*

Abstrak: Penelitian ini menganalisis pengaruh pendidikan dan pengangguran terhadap kemiskinan di Sulawesi Tenggara selama periode 2010–2025. Penelitian ini menggunakan pendekatan kuantitatif dengan data time series tahunan yang diperoleh dari Badan Pusat Statistik (BPS). Variabel yang digunakan meliputi tingkat kemiskinan, rata-rata lama sekolah, dan tingkat pengangguran terbuka. Metode analisis yang digunakan adalah Autoregressive Distributed Lag (ARDL) untuk menganalisis hubungan jangka pendek dan jangka panjang antarvariabel.Hasil penelitian menunjukkan adanya hubungan jangka panjang antara pendidikan, pengangguran, dan kemiskinan. Pendidikan berpengaruh negatif dan signifikan terhadap kemiskinan dalam jangka panjang, sedangkan pengangguran berpengaruh positif namun tidak signifikan. Dalam jangka pendek, perubahan pengangguran yang tertunda berpengaruh signifikan terhadap dinamika kemiskinan. Hasil uji diagnostik dan stabilitas menunjukkan bahwa model ARDL-ECM bersifat reliabel dan stabil secara statistik.Temuan ini menunjukkan bahwa pengurangan kemiskinan di Sulawesi Tenggara perlu memprioritaskan peningkatan kualitas pendidikan dan pembangunan modal manusia serta didukung oleh kebijakan pasar tenaga kerja yang lebih inklusif.

INTRODUCTION

Poverty remains one of the most persistent and multidimensional development challenges, particularly in developing regions such as Southeast Sulawesi. It is not merely a condition of low income, but also reflects limited access to education, employment opportunities, and other essential socio-economic resources (Samsuddin & Fernando, 2025). In the context of economic development, poverty is closely associated with the quality of human capital, where education and labor market dynamics play a crucial role in determining individual welfare and overall societal prosperity.

From a theoretical perspective, human capital theory emphasizes that education is an investment that enhances individuals' productivity and earning capacity. Education and training are considered forms of human capital investment that improve workers' skills and productivity, leading to higher economic returns (Becker, 2011 as cited in Yanti et al., 2020) . Higher levels of education are expected to increase access to better employment opportunities, thereby reducing the likelihood of falling into poverty. Empirical evidence supports this argument, showing that education has a significant negative effect on poverty in Indonesia, indicating that improvements in educational attainment contribute to poverty reduction (Samsuddin & Fernando, 2025). However, the relationship is not always direct, as education often influences poverty through intermediary variables such as employment and human development (Fayza et al., 2025).

In addition to education, labor market conditions—particularly employment and wages—are key determinants of poverty. High unemployment reduces income opportunities and increases vulnerability to poverty, while stable employment can enhance household welfare (Fayza et al., 2025). Studies on poverty alleviation also highlight that employment-based strategies tend to have a more immediate and significant impact on income improvement compared to education, especially in the short term (Saci, 2023). This indicates that the labor market acts as a critical transmission channel through which education affects poverty outcomes.

Empirical evidence from Southeast Sulawesi further confirms the importance of labor market conditions in shaping poverty dynamics. High unemployment significantly increases poverty levels by reducing household income and limiting access to economic resources, while economic growth does not automatically reduce poverty when its benefits are not distributed evenly across income groups (Dewangga et al., 2025). This suggests that without inclusive economic policies, growth may fail to alleviate poverty effectively.

Nevertheless, the effectiveness of education in reducing poverty is highly dependent on its quality and relevance to labor market needs. In Indonesia, there is evidence of a mismatch between educational outcomes and labor market demands, particularly among secondary education graduates. Despite increased access to education, many graduates still face unemployment and wage disparities, suggesting inefficiencies in the education system (Qurniawan & Jasmina, 2021). This phenomenon reflects structural issues in the labor market, where the supply of educated labor does not always align with industry requirements.

Furthermore, regional disparities in education access and quality remain significant, especially in eastern Indonesia, including Southeast Sulawesi. Limited access to education, unequal distribution of resources, and variations in educational outcomes contribute to differences in human capital development across regions (Rahman et al., 2021). These disparities ultimately affect labor market participation and income distribution, thereby influencing poverty levels.

Recent international evidence also reinforces the importance of education in improving employability and wages. Increased years of schooling are associated with higher employment prospects and better income outcomes, although the type of education and work experience also play important roles (Peng et al., 2024). This suggests that both the quantity and quality of education, as well as its alignment with labor market needs, are essential in addressing poverty effectively.

This study contributes to the existing literature in several ways. First, it addresses an empirical gap by examining the long-term relationship between education, unemployment, and poverty at the provincial level using a 16-year time series dataset for Southeast Sulawesi, whereas previous studies have predominantly relied on cross-sectional or short-panel data. Second, the study contributes to the literature on Human Capital Theory by providing evidence from a region characterized by relatively low educational attainment and a labor market dominated by informal employment. Third, the findings offer policy implications by highlighting the importance of improving educational outcomes and labor market quality as part of poverty reduction strategies. Southeast Sulawesi serves as an important case study because its socioeconomic characteristics reflect challenges commonly faced by many provinces in eastern Indonesia, making the findings relevant beyond the study area.

Based on the above background and research gap, this study aims to analyze the effects of education and labor market variables on poverty in Southeast Sulawesi during the period 2010–2025. By examining both the short-run and long-run relationships among these variables, this study is expected to provide empirical evidence that contributes to a better understanding of regional poverty dynamics and supports the formulation of more effective and sustainable poverty reduction policies.

METHOD

This study employs a quantitative approach using annual time series data covering the period 2010–2025. The data used in this study are secondary data obtained from the Central Statistics Agency (BPS) of Southeast Sulawesi. The dependent variable in this study is the poverty rate, while the independent variables consist of average years of schooling (RLS) as a proxy for education and the open unemployment rate (TPT) as an indicator of labor market conditions. These variables were selected because education and unemployment are widely recognized as important determinants of poverty in developing regions. Spada et al. (2024) emphasized that education contributes significantly to poverty reduction through improvements in human capital, productivity, and income opportunities. (Spada et al., 2024)

This study applies the Autoregressive Distributed Lag (ARDL) model to examine both the short-run and long-run relationships between education, unemployment, and poverty in Southeast Sulawesi. The ARDL approach developed by Pesaran et al., 2001 is considered appropriate for this study because it can be applied to variables integrated at order I(0) and I(1), provided that none of the variables are integrated at order I(2). In addition, ARDL is suitable for relatively small sample sizes and allows simultaneous estimation of short-run dynamics and long-run equilibrium relationships.

The use of ARDL in poverty-related studies has been widely implemented in previous empirical research. Murjani (2019), for example, employed the ARDL approach to analyze the impact of inflation, unemployment, and economic growth on poverty in Indonesia and found significant short-run and long-run relationships among the variables. Similarly, Ngubane et al., (2023) applied the ARDL model to investigate the relationship between economic growth, unemployment, and poverty in South Africa and reported the existence of long-run interactions among macroeconomic variables and poverty. These

previous studies support the relevance of using ARDL in analyzing poverty dynamics within a regional economic context.

The analytical procedure in this study consists of several stages. First, descriptive statistical analysis is conducted to describe the characteristics and distribution of each research variable. Second, stationarity tests are carried out using the Augmented Dickey–Fuller (ADF) unit root test to determine the order of integration of each variable. The ADF test is important because the ARDL model requires that variables must not be integrated at order I(2). Third, the optimal lag length of the ARDL model is selected based on the Akaike Information Criterion (AIC). Fourth, the Bounds Test approach proposed by (Pesaran et al., 2001) is employed to examine the existence of cointegration or long-run relationships among variables

To ensure the reliability and validity of the model, several diagnostic tests are also conducted. These tests include the Breusch–Godfrey Serial Correlation LM Test for autocorrelation, the Breusch–Pagan–Godfrey test for heteroskedasticity, and the Jarque–Bera test for residual normality. In addition, model stability is evaluated using the CUSUM and CUSUM of Squares (CUSUMSQ) tests. These stability tests are necessary to determine whether the estimated coefficients remain stable throughout the observation period.

Based on the estimation results, the optimal model selected using the Akaike Information Criterion (AIC) is ARDL(2,0,2). Therefore, the econometric specification used in this study can be written as follows:

$$POV_t = \alpha_0 + \alpha_1 POV_{t-1} + \alpha_2 POV_{t-2} + \beta_0 RLS_t + \gamma_0 TPT_t + \gamma_1 TPT_{t-1} + \gamma_2 TPT_{t-2} + \varepsilon_t$$

Where:

POV_t	= Poverty rate
POV_{t-1}, POV_{t-2}	= Lagged poverty rate
RLS_t	= Average years of schooling
TPT_t	= Open unemployment rate
TPT_{t-1}, TPT_{t-2}	= Lagged unemployment

The data used in this study are secondary time series data covering the period 2010–2025, obtained from official publications of the Central Statistics Agency (BPS). The use of secondary data enables systematic and continuous analysis, as the data are well-documented and suitable for identifying patterns in economic relationships (Rahim et al., 2024). The variables employed include the poverty rate as the dependent variable, and

average years of schooling as an indicator of education, along with the open unemployment rate. The analytical method used in this study is the Autoregressive Distributed Lag (ARDL) model, estimated using EViews 13. This approach is widely applied in economic research because it allows researchers to simultaneously examine short-run adjustments and long-run relationships among variables and remains robust for small-sample time series analysis (Nkoro & Uko, 2016)

Despite its advantages, this study has several limitations that should be acknowledged. First, the study uses annual time series data with a relatively limited number of observations, which may reduce the statistical power and generalizability of the findings. Although the ARDL model is considered appropriate for small samples, the limited observations may still affect estimation precision. Second, the model only includes education and unemployment as explanatory variables, whereas poverty is a multidimensional issue also influenced by other factors such as economic growth, income inequality, inflation, government social assistance, and regional development disparities. Therefore, omitted variable bias may still exist in the model.

Third, the education variable measured by average years of schooling mainly reflects the quantity of education rather than the quality of education. As a result, the model may not fully capture differences in educational outcomes, skills, or labor market competitiveness that potentially influence poverty reduction. Fourth, the unemployment variable may not entirely represent labor market vulnerability in Southeast Sulawesi because a large proportion of the population works in the informal sector. Consequently, individuals categorized as employed may still experience low income and economic insecurity, meaning that the open unemployment rate alone may not adequately explain poverty conditions in the region.

Finally, this study focuses specifically on Southeast Sulawesi, meaning that the findings may reflect regional socioeconomic characteristics unique to the province and may not necessarily be generalized to other regions in Indonesia.

RESULTS AND DISCUSSION

Results

Descriptive Statistics

Table 1. Descriptive Statistics of Research Variables

	Poverty Rate (Y)	Average Years of Schooling (X1)	Open Unemployment Rate (X2)
Mean	12.38438	8.576250	3.880000

Median	12.21500	8.575000	3.755000
Maximum	15.69000	9.560000	5.550000
Minimum	10.54000	7.570000	2.720000
Std. Dev	1.421848	0.672378	0.774270
Skewness	0.831102	-0.0606668	0.445506
Kurtosis	2.959470	1.577882	2.339137
Jarque-Bera	1.843044	1.358094	0.820427
Probability	0.397913	0.507100	0.663509
Sum	198.1500	137.2200	62.08000
Sum Sq. Dev.	30.32479	6.781375	8.992400
Observations	16	16	16

Source : Processed data using EViews 13

Table 1 presents the descriptive statistics for all variables used in this study, covering 16 annual observations from 2010 to 2025. The poverty rate in Southeast Sulawesi averaged 12.38%, ranging from a minimum value of 10.54% to a maximum value of 15.69%, with a standard deviation of 1.42 percentage points. This indicates that poverty levels in the province remained relatively high during the study period, although gradual improvements were observed over time. Average years of schooling (RLS) recorded a mean value of 8.58 years, approximately equivalent to lower secondary education completion, with relatively low variation across years. Meanwhile, the open unemployment rate (TPT) averaged 3.88%, fluctuating between 2.72% and 5.55%, partly reflecting labor market disruptions during the COVID-19 pandemic period. The Jarque–Bera test results for all variables produce probability values above 0.05, indicating that the variables are approximately normally distributed and suitable for further econometric analysis.

Stationarity Test (Augmented Dickey–Fuller)

Prior to model estimation, stationarity tests were conducted using the Augmented Dickey–Fuller (ADF) unit root test to determine the order of integration of each variable.

Table 2. Augmented Dickey–Fuller (ADF) Unit Root Test Results

Variable	Spesification	ADF Statistic	Probability	Integration Order
Poverty (Y)	First Difference	-3.7801	0.0176**	I(1)
Average Years of Schooling (X1)	First Difference (Trend & Intercept)	-2.5548	0.3018	Not I(2)
Open Unemployment Rate (X2)	First Difference	-5.4201	0.0009***	I(1)

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively. The ARDL approach requires variables to be integrated at I(0) or I(1), but not at I(2).

Source : Processed data using EViews 13

The Augmented Dickey–Fuller (ADF) test results indicate that the variables exhibit mixed orders of integration. The poverty variable becomes stationary at first difference with a probability value of 0.0176, while the open unemployment rate variable is also stationary at first difference with a probability value of 0.0009. Meanwhile, the average years of schooling variable does not exhibit integration at order I(2), thereby satisfying the ARDL requirement that variables must be integrated at order I(0) or I(1). Therefore, the ARDL approach is considered appropriate for estimating both the short-run and long-run relationships among variables in this study.

Bounds Test for Cointegration

Table 3. ARDL Bounds Test Results

Test Statistic		Value
F-Statistic		5.0877
Critical Values Bonds		
Significance Level	I(0)	I(1)
10%	2.915	3.695
5%	3.538	4.428
1%	5.155	6.265

Notes: I(0) and I(1) represent the lower and upper critical bounds, respectively.
Source : Processed data using EViews 13

After confirming the integration properties of the variables, the ARDL Bounds Test was applied to examine the existence of a long-run relationship among poverty, education, and unemployment. Based on the Akaike Information Criterion (AIC), the optimal lag specification selected in this study is ARDL (2,0,2). The Bounds Test results show that the calculated F-statistic value of 5.0877 exceeds the upper critical bound value of 4.428 at the 5% significance level. Therefore, the null hypothesis of no levels relationship is rejected, confirming the existence of cointegration among the variables. This finding indicates that poverty, education, and unemployment move together in the long run and maintain a stable equilibrium relationship over time. The existence of cointegration further suggests that short-run deviations among the variables will gradually adjust toward long-run equilibrium. Hence, the ARDL framework is considered appropriate for estimating both the short-run dynamics and long-run relationships among the variables in this study.

Estimated ARDL Model

Based on the Akaike Information Criterion (AIC), the optimal model selected in this study is ARDL(2,0,2). The estimated ARDL model can be expressed as follows:

$$POV_t = 21.755 + 0.251POV_{t-1} - 0.290POV_{t-2} - 1.285RLS_t + 0.196TPT_t - 0.053TPT_{t-1} + 0.370TPT_{t-2} + \varepsilon_t$$

The estimated model indicates that poverty dynamics in Southeast Sulawesi are influenced by both current and past values of poverty, education, and unemployment. The positive coefficient of the first lag of poverty suggests that poverty persistence exists over time, meaning that previous poverty conditions continue to influence current poverty levels. Meanwhile, the negative coefficient of the second lag of poverty indicates a gradual adjustment process toward long-run equilibrium.

The education variable exhibits a negative coefficient, implying that improvements in educational attainment contribute to reducing poverty levels. Specifically, increases in average years of schooling tend to enhance human capital quality, labor productivity, and access to better employment opportunities, thereby lowering poverty vulnerability. On the other hand, the unemployment variable generally shows a positive relationship with poverty, indicating that higher unemployment tends to increase poverty levels. However, the varying signs across lagged unemployment variables suggest that labor market effects on poverty may occur gradually and dynamically over time.

Overall, the estimated ARDL model confirms that both education and labor market conditions play important roles in shaping poverty dynamics in Southeast Sulawesi, although the effects differ between the short run and the long run.

Long-Run Estimation Results

Table 4. Long-Run Coefficient Estimates

Variable	Coefficient	Std. Error	t-Statistic	Probability
Average Years of Schooling (X1)	-1.2358	0.4648	-2.6587	0.0222**
Open Unemployment Rate (X2)	0.4932	0.5195	0.9493	0.3628
Constant	20.9294	5.9996	3.4885	0.0051***

Notes: ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.
Source : Processed data using EViews 13

The long-run estimation results reveal that average years of schooling (RLS) has a statistically significant and negative effect on poverty. The coefficient value of -1.2358 indicates that a one-year increase in average years of schooling is associated with a reduction in the poverty rate of approximately 1.24 percentage points, holding other

variables constant. This result supports human capital theory, which argues that education improves labor productivity, skills, and access to better employment opportunities, thereby reducing vulnerability to poverty. The finding is also consistent with previous studies emphasizing the important role of education in long-run poverty reduction.

In contrast, the open unemployment rate exhibits a positive but statistically insignificant long-run effect on poverty, with a coefficient value of 0.4932 and a probability value of 0.3628. Although the positive direction of the relationship is theoretically expected, the insignificant result suggests that unemployment alone does not fully explain long-run poverty dynamics in Southeast Sulawesi. One possible explanation is the dominance of informal sector employment within the provincial economy. Many individuals classified as employed may still experience low income and economic insecurity, causing the open unemployment rate to inadequately capture broader labor market vulnerability. This interpretation is supported by BPS Provinsi Sulawesi Tenggara (2025) , which indicates that only 38.08 percent of workers were employed in the formal sector, implying that approximately 61.92 percent remained engaged in informal employment. The agricultural sector, which absorbs a large share of the provincial workforce, is also predominantly characterized by informal and low-productivity activities. As a result, many individuals classified as employed may still experience low and unstable incomes, limiting the ability of employment growth to improve household welfare.

Short-Run Dynamics and Error Correction Model (ECM)

Table 5. Short-Run ARDL-ECM Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Probability
ECT(-1) / COINTEQ*	-1.0394	0.1928	-5.3919	0.0003***
D(POV(-1))	0.2904	0.1478	1.9650	0.0778*
D(TPT)	0.1956	0.1284	1.5238	0.1585
D(TPT(-1))	-0.3703	0.1348	-2.7475	0.0206**
Model Statistics				
Statistic				Value
R-squared				0.7876
Adjusted R-squared				0.7238
F-statistic				12.3579
Prob(F-statistic)				0.0011
Durbin-Watson Stat				2.6900

Source : Processed data using EViews 13

The Error Correction Model (ECM) results show that the error correction term (ECT) is negative and statistically significant, with a coefficient value of -1.0394 and a probability value of 0.0003. This finding confirms the validity of the long-run cointegrating relationship among variables. The negative ECT coefficient indicates that short-run disequilibrium adjusts toward long-run equilibrium over time. Specifically, approximately 103.9% of disequilibrium from the previous period is corrected within one period. The magnitude exceeding unity suggests an oscillatory adjustment process before convergence toward equilibrium, which may occur in small-sample ARDL estimation (Pesaran et al., 2001).

In the short run, the lagged change in poverty exhibits a positive and marginally significant effect, indicating persistence in poverty dynamics over time. The contemporaneous change in unemployment does not significantly affect poverty in the short run. However, the lagged unemployment variable shows a negative and statistically significant coefficient, suggesting that improvements in labor market conditions require time before generating measurable poverty reduction effects. This finding implies that the impact of employment improvements on household welfare is not immediate but occurs gradually as income stability improves.

The short-run model explains approximately 78.8% of the variation in poverty changes, as indicated by the R-squared value of 0.7876, while the overall model is statistically significant with a probability value of 0.001.

Diagnostic and Stability Tests

Table 6. Summary of Diagnostic Tests

Diagnostic Test	Test Statistic / Probability	Decision
Breusch–Godfrey Serial Correlation LM Test	Prob. Chi-Square = 0.1403	No autocorrelation
Breusch–Pagan–Godfrey Heteroskedasticity Test	Prob. Obs*R-squared = 0.0797	No strong evidence of heteroskedasticity
Jarque–Bera Normality Test	Probability = 0.8460	Residuals are normally distributed
CUSUM Stability Test	Within 5% critical bounds	Stable
CUSUMSQ Stability Test	Within 5% critical bounds	Stable

Notes: The model satisfies the classical assumptions when the probability values exceed the 5% significance level and the CUSUM/CUSUMSQ plots remain within the critical bounds.

Source : Processed data using EViews 13

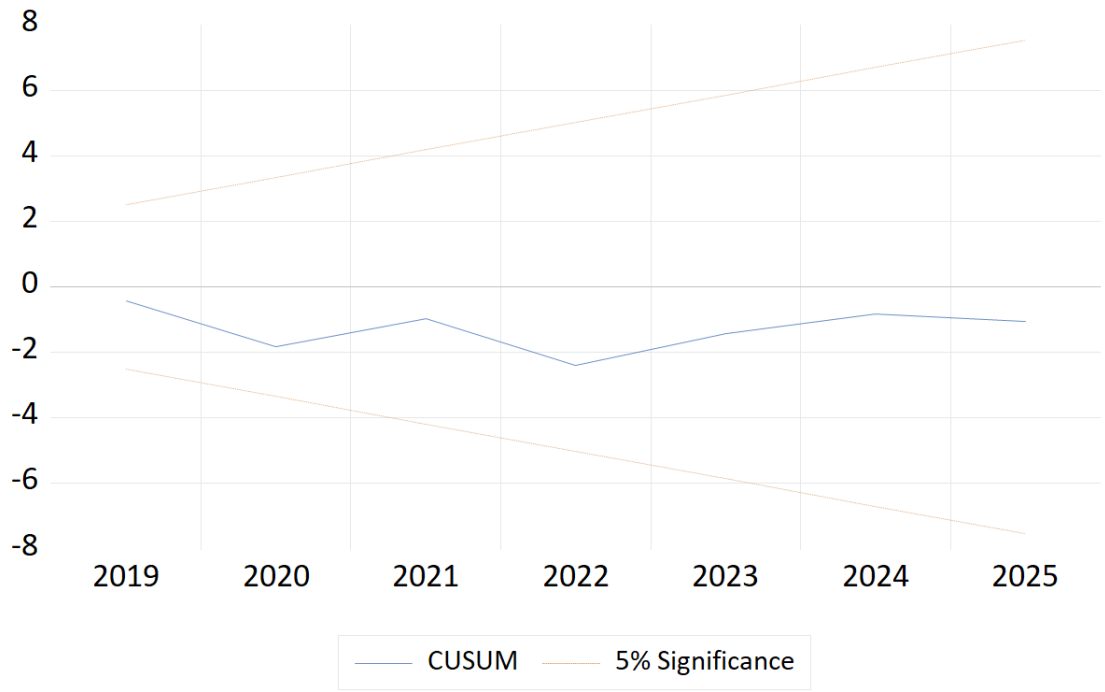
To ensure the reliability and robustness of the ARDL-ECM model, several diagnostic tests were conducted. The Breusch–Godfrey Serial Correlation LM Test produces a probability value above 0.05, indicating that the model residuals do not suffer

from autocorrelation problems. Furthermore, the Breusch–Pagan–Godfrey heteroskedasticity test yields an Obs*R-squared probability value of 0.0797, suggesting that there is no strong evidence of heteroskedasticity in the model.

The Jarque–Bera normality test produces a probability value of 0.846, indicating that the residuals are normally distributed. In addition, the CUSUM and CUSUM of Squares (CUSUMSQ) tests show that the recursive residual plots remain within the 5% critical boundaries throughout the observation period, confirming that the estimated coefficients are structurally stable over time. Collectively, these results confirm that the estimated ARDL model satisfies the classical assumptions necessary for reliable econometric estimation and statistical inference.

Stability Test

To further evaluate the robustness of the estimated ARDL-ECM model, stability tests were conducted using the CUSUM and CUSUM of Squares (CUSUMSQ) procedures. These tests are important to determine whether the estimated coefficients remain stable throughout the observation period and to identify potential structural instability within the model.

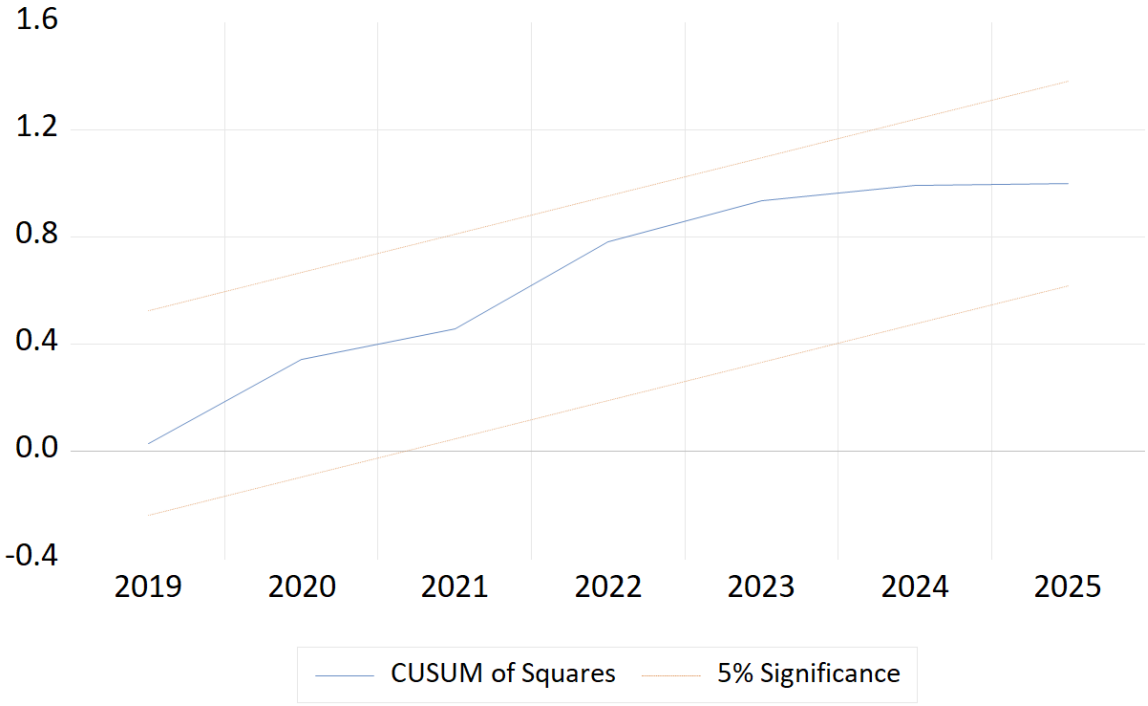


Source : Processed data using EViews 13

Figure 1. CUSUM Stability Test

The CUSUM test evaluates the stability of recursive residuals over time. As presented in Figure 1, the cumulative recursive residuals remain within the 5% critical

boundaries during the entire observation period, indicating that the estimated model does not experience significant structural instability.



Source : Processed data using EViews 13

Figure 2. CUSUM of Squares (CUSUMSQ) Stability Test

Furthermore, the CUSUM of Squares (CUSUMSQ) test shown in Figure 2 also demonstrates that the recursive residual plots remain within the 5% critical bounds. This result reinforces the evidence that the variance of the residuals remains stable over time and that the estimated coefficients are structurally consistent throughout the study period.

Overall, the results of the CUSUM and CUSUMSQ tests confirm that the ARDL-ECM model used in this study is stable and reliable for explaining the relationship between education, unemployment, and poverty in Southeast Sulawesi.

Discussion

The empirical findings of this study provide important insights into the determinants of poverty in Southeast Sulawesi during the period 2010–2025. The results confirm that education, measured by average years of schooling, is a significant long-run driver of poverty reduction, while unemployment does not exhibit a statistically significant long-run effect on poverty, although its lagged changes carry important short-run implications.

The significant negative long-run effect of education on poverty supports the human capital perspective, which emphasizes that education improves individuals' productivity, skills, and income-generating capacity. Higher educational attainment broadens access to productive employment opportunities and increases the ability of individuals to participate more effectively in economic activities. In the context of Southeast Sulawesi, where the average years of schooling remained relatively low during the observation period, improving educational outcomes represents one of the most important mechanisms for sustainable poverty alleviation. This finding is consistent with Peng et al., (2024) , who demonstrated that increased years of schooling are associated with better employment opportunities and improved income outcomes. Furthermore, Rahman et al., (2021) argued that regional disparities in educational access and quality in eastern Indonesia contribute to unequal human capital development, which subsequently affects labor market participation and household welfare.

The positive but statistically insignificant long-run effect of unemployment on poverty reflects the structural complexity of the labor market in Southeast Sulawesi. The regional economy is still dominated by informal, agricultural, and low-productivity employment, where a large proportion of workers operate outside formal labor arrangements. Consequently, the open unemployment rate may not fully capture labor market vulnerability in the province. Many individuals categorized as employed may still experience low wages, unstable income, and underemployment, preventing them from escaping poverty. This structural condition aligns with Dewangga et al., (2025), who found that the benefits of economic growth and employment expansion in Southeast Sulawesi have not been evenly distributed, thereby limiting their effectiveness in reducing poverty.

The significant short-run lagged effect of unemployment changes on poverty reduction suggests that labor market improvements contribute to poverty alleviation gradually rather than immediately. The effect of improving employment conditions on poverty reduction is not instantaneous, as households require time to stabilize income and accumulate sufficient economic resources to move above the poverty threshold. This finding is consistent with Saci (2023), who argued that employment-based poverty reduction strategies tend to generate stronger impacts over the medium term rather than in the immediate short run. From a policy perspective, this finding highlights the importance of maintaining consistent and sustainable labor market interventions rather than relying solely on temporary employment programs.

Overall, the findings suggest that poverty reduction in Southeast Sulawesi is predominantly driven by long-run human capital accumulation through education, while short-run poverty dynamics are also influenced by labor market adjustments. Therefore, policymakers should prioritize improving educational quality and accessibility, particularly at the secondary and tertiary levels, to strengthen regional human capital development. At the same time, labor market policies should focus not only on reducing unemployment rates but also on improving job quality, productivity, and inclusiveness, especially within the informal sector. A comprehensive development strategy combining educational investment and inclusive economic policies is therefore essential for achieving sustainable poverty reduction in Southeast Sulawesi.

CONCLUSION

This study examines the effects of education and unemployment on poverty in Southeast Sulawesi during the period 2010–2025 using the Autoregressive Distributed Lag (ARDL) approach. The empirical findings confirm the existence of a long-run equilibrium relationship among education, unemployment, and poverty. The results indicate that education, proxied by average years of schooling, has a significant negative effect on poverty in the long run. This finding suggests that improvements in educational attainment contribute to poverty reduction by strengthening human capital, increasing productivity, and expanding access to better employment and income opportunities.

In contrast, unemployment exhibits a positive but statistically insignificant long-run effect on poverty. This result indicates that labor market conditions in Southeast Sulawesi are structurally complex, particularly due to the dominance of informal and low-productivity employment, where employment status does not necessarily guarantee adequate welfare. Nevertheless, the short-run estimation results reveal that lagged changes in unemployment still influence poverty dynamics over time, implying that labor market improvements contribute to poverty reduction gradually rather than instantaneously.

The diagnostic and stability test results further confirm that the estimated ARDL-ECM model is statistically reliable, free from major econometric problems, and structurally stable throughout the observation period. Therefore, the findings of this study provide robust empirical evidence regarding the importance of education and labor market conditions in shaping poverty dynamics in Southeast Sulawesi.

From a policy perspective, this study emphasizes that sustainable poverty reduction should prioritize long-term human capital development through improving educational quality, accessibility, and attainment. At the same time, labor market policies should focus not only on reducing unemployment rates but also on improving job quality, productivity, and inclusiveness, particularly within the informal sector. A comprehensive policy approach combining educational development and inclusive economic policies is therefore essential to achieve sustainable poverty reduction in Southeast Sulawesi.

This study has several limitations. First, the relatively small number of observations may limit the statistical power of the analysis. Second, the model only incorporates education and unemployment variables, while poverty is also influenced by other socioeconomic factors such as economic growth, income inequality, inflation, and social protection policies. Future studies are therefore encouraged to include additional explanatory variables and utilize panel data at the district or municipal level to provide a more comprehensive understanding of poverty determinants in Southeast Sulawesi.

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