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The Role of Economic Growth and Income Inequality on Poverty Levels in Sulawesi: A Panel Data Regression Approach

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Abstract

The study investigates the dynamics of the "Poverty-Growth-Inequality Triangle" in Sulawesi, a region characterized by rapid economic expansion driven by the mining and processing industries yet facing persistent social disparities. The objective is to analyze the role of Economic Growth (EG) and Income Inequality (GINI) on Poverty Levels (POV) across six provinces from 2011 to 2023. Utilizing a panel data regression approach, the Fixed Effect Model (FEM) was selected as the optimal estimator based on Chow and Hausman tests. The empirical results reveal a development paradox: economic growth significantly contributes to increasing poverty levels, indicating a failure of the trickle-down effect and the non-inclusive nature of capital-intensive sectors in the region. Conversely, income inequality (GINI) remains the most dominant driver of poverty, suggesting that high initial inequality acts as a barrier to pro-poor growth. While government expenditure (LN_GOV) and unemployment (UNEMP) show significant negative correlations with poverty—the latter highlighting the role of the informal sector as an economic buffer—the Human Development Index (HDI) does not exhibit a statistically significant impact. These findings imply that regional authorities must pivot from growth-centric agendas toward aggressive redistribution policies and optimize pro-poor capital allocation to achieve genuine inclusive development in Sulawesi.

INTRODUCTION

Poverty is widely recognized as a multidimensional phenomenon and a structural challenge prevalent in nearly all nations, particularly developing economies. This phenomenon transcends mere income deprivation, encompassing restricted access to essential services such as healthcare, education, and adequate living standards (Attoma & Matteucci, 2024; Kakwani & Son, 2025; Purwaningsih et al., 2025). Within the framework of the Sustainable Development Goals (SDGs), specifically Goal 1: No Poverty, a granular understanding of its root causes is imperative for formulating robust mitigation strategies. Historically, sustained economic growth has been championed as the primary instrument for poverty alleviation (Qian-qian et al., 2015). Theoretically, growth generates employment opportunities that bolster the income of the lower-income strata through the *trickle-down effect*, as empirically demonstrated in China (Bernard & Iyke, 2018) and Indonesia's developmental trajectory during the 2002–2012 period (Silva & Sumarto, 2014).

However, the efficacy of economic growth in reducing poverty is frequently undermined by the phenomenon of uneven growth (Madsen et al., 2024; Moll et al., 2022). Conceptually, this dynamic is encapsulated in the "Poverty-Growth-Inequality (PGI) Triangle" or the Bourguignon Triangle, which posits that shifts in poverty levels result from the complex interplay between economic expansion and changes in income distribution (Senior, 2004). Pronounced income inequality serves as a structural barrier that neutralizes the positive externalities of growth on the welfare of the poor (Islam, 2016; Olaoye, 2023). Consequently, growth accompanied by progressive distributive shifts exerts a more profound impact on poverty reduction than distribution-neutral growth (Ames et al., 2001). This paradigm has catalyzed the discourse on inclusive or "pro-poor" growth, where the quality and distributive equity of economic outcomes are deemed more critical than the mere quantitative pace of growth (Carey et al., 2005).

In the Indonesian context, despite successful poverty reduction—falling to 9.36% by March 2023 from a pandemic peak of 10.2% (BPS, 2023a) —persistent inequality remains a significant challenge, with the national Gini ratio fluctuating between 0.38 and 0.40 (BPS, 2023b). Although national growth has stabilized at approximately 5%, the post-pandemic poverty decline has been relatively sluggish (DJPK, 2024), , underscoring sharp regional disparities. Spatially, economic growth in 2023 was dominated by provinces in Maluku, Papua, Sulawesi, and Kalimantan, despite the structural concentration of the economy remaining in Java and Sumatra (Kadin Indonesia, 2024). Sulawesi presents a compelling case for analysis; while the region has recorded exceptionally high growth rates—fueled by the manufacturing, mining, quarrying, and trade sectors—it is simultaneously characterized by stark developmental heterogeneity and disparities across its six provinces, as detailed in Table 1.

Table 1. Regional Development Conditions in Sulawesi in 2021/2022

Indicators	National	North Sulawesi	Central Sulawesi	South Sulawesi	Southeast Sulawesi	Gorontalo	West Sulawesi
Economic Growth Rate (%)	5,31	5,42	15,17	5,09	5,53	4,04	2,30
Percentage of Poor Population (%)	9,57	7,34	12,30	8,66	11,27	15,51	11,92
Gini Ratio	0,381	0,359	0,305	0,365	0,366	0,423	0,371

Source: BPS (2025)

Spatially, Sulawesi Island emerges as a compelling geographical unit of analysis, having recorded an average economic growth of 6.2% in 2022—surpassing the national figure of 5.31% (BPS, 2025b). However, this growth is characterized by extreme heterogeneity; while Central Sulawesi experienced a significant surge of 15.17%, propelled by the capital-intensive nickel processing industry, West Sulawesi stagnated at 2.30% due to a sluggish agricultural sector. This phenomenon reinforces the perspective of Kim (2008) , suggesting that spatial inequality tends to escalate alongside the acceleration of development in capital-intensive sectors. Income inequality further exacerbates this challenge. Several provinces in Sulawesi have documented an increasing Gini Index, particularly in areas dominated by non-agricultural activities (The World Bank, 2015). Such conditions provide robust evidence that non-inclusive economic growth has the potential to deepen disparities and undermine the efficacy of growth in poverty reduction. Current data indicates that several provinces in this region maintain high Gini Ratios, notably Gorontalo (0.423) and Southeast Sulawesi (0.366), with urban inequality in West Sulawesi reaching a staggering 0.472 (BPS, 2025a; BPS Sulut, 2025). This trend suggests that economic benefits remain concentrated within specific sectors and have not been proportionally absorbed by low-income groups.

Beyond the growth-inequality nexus, poverty levels are also influenced by labor market dynamics and fiscal interventions. Alfin & Boedirochminarni (2025) demonstrate that high unemployment substantially inflates poverty rates, a finding reinforced by López et al. (2018), who argue that structural unemployment exerts a significant negative impact on long-term well-being.

Conversely, government spending—particularly allocated for social purposes—is recognized as a vital instrument for poverty mitigation (Elshahawany & Elazhary, 2024).

Despite the evolving discourse on poverty determinants, existing literature often examines the linear relationships between economic growth and poverty, or inequality and poverty, in isolation. Studies by Rinaldi et al. (2025), Badu et al. (2020), and Fauzia et al. (2025) focus predominantly on the growth dimension within various Indonesian contexts. Internationally, Balasubramanian et al. (2023) highlight that the effectiveness of growth in reducing multidimensional poverty is highly contingent upon initial economic preconditions. Meanwhile, Musa et al. (2024) provide consistent evidence identifying income inequality as a primary factor exacerbating poverty depth.

Consequently, there remains a notable lacuna in the literature regarding an explicit integration of the Poverty-Growth-Inequality (PGI) Triangle within a comprehensive estimation model, especially in emerging economic centers like Sulawesi. This study aims to fill this gap by analyzing the simultaneous effects of Economic Growth (EG) and Inequality (GINI) on poverty levels across six provinces in Sulawesi from 2011 to 2023. To ensure a robust analysis, the model incorporates the Human Development Index (HDI), unemployment rate (UNEMP), and government spending (LN_GOV) as control variables. Methodologically, the accuracy of the estimates is enhanced through panel data regression utilizing the Generalized Least Squares (GLS) method to rectify autocorrelation and heteroscedasticity, thereby yielding more efficient and reliable parameters. The findings are expected to provide a strategic foundation for local authorities to formulate optimal redistribution policies that foster truly inclusive and pro-poor growth.

THEORETICAL FRAMEWORK

The Poverty-Growth-Inequality (PGI) Triangle

The theoretical foundation of this study is rooted in the "Poverty-Growth-Inequality (PGI) Triangle" model pioneered by Bourguignon (2004). This framework postulates that poverty dynamics are the resultant of the interaction between two primary mechanisms: the growth effect and the distribution effect. Within the growth dimension, economic progress is assumed to induce a parallel rightward shift in the income distribution curve, thereby enabling marginalized groups to cross the poverty threshold through the trickle-down effect. This thesis is robustly supported by the findings of Labidi et al. (2023) and Marrero & Servén (2022), , who confirm that GDP per capita expansion remains a fundamental determinant in systemic poverty reduction efforts.

However, the efficacy of this growth is highly contingent upon the prevailing income distribution trajectory. The distributive structure can serve as either a catalyst (accelerator) or an inhibitor (barrier) of economic impacts on social welfare. Escalating inequality causes the benefits of growth to become biased toward upper-income strata, which in turn diminishes the growth elasticity of poverty. Empirical evidence from developing economies, Edeme et al. (2021) and Elkafrawy & Elsayed (2024) demonstrates that heightened inequality can significantly neutralize the positive externalities of growth. Particularly in regions with high initial poverty rates, inequality acts as a complex mediator that dictates the degree of community welfare. Comprehensively, the PGI Triangle framework emphasizes that synergy between economic expansion and equitable distribution is a prerequisite for sustainable poverty alleviation. Consequently, policy strategies must be integrated with a pro-inclusive approach to mitigate structural distributive disparities.

Literature Review

In development economics literature, a consensus exists identifying economic growth as a fundamental determinant of poverty reduction, although its effectiveness is often nonproportional and highly dependent on regional economic preconditions (Ka, 2021). While economic expansion has proven effective in various developing nations (Asongu & Eita, 2023), anomalies observed in the Indonesian context suggest that GDP acceleration alone does not guarantee substantial poverty alleviation (Jamaliah & Said, 2017). his phenomenon underscores the urgency of the PGI Triangle model, where income inequality—represented by the Gini coefficient—acts as an inhibitor that weakens the elasticity of growth toward social welfare (Ka, 2021; Karahasan, 2023). Persistent inequality not only restricts marginalized groups' access to economic benefits but also hinders the pace of growth itself, as identified in Latin American and lower-middle-income countries (Andoni & Ryan, 2024; Lechheb et al., 2019).

Beyond growth and distribution dynamics, poverty mitigation is also significantly influenced by other macroeconomic determinants such as human capital, labor market stability, and fiscal interventions. The Human Development Index (HDI) is theoretically positioned as a key driver of poverty reduction through qualitative improvements in health and education (Rahman et al., 2024). However, empirical evidence reveals significant heterogeneity, with some cases showing that HDI exerts no significant direct impact on poverty (Abdullah & Wibowo, 2024; Arwani et al., 2023). A similar inconsistency occurs regarding the unemployment variable; while conventionally correlated with higher poverty (Hasiholan et al., 2022), recent findings indicate that this relationship varies according to regional characteristics and other mediating factors (Rambe et al., 2023). Finally, fiscal policy via government spending is recognized as a vital instrument for poverty alleviation, primarily through social service allocation (Elshahawany & Elazhary, 2024). Nevertheless, its effectiveness remains contingent upon the quality of governance and allocation management, as spending in health and education sectors does not always yield immediate poverty reduction without optimal targeting (Ginting & Afifuddin, 2019).

METHODS

This research adopts a quantitative methodology, leveraging secondary datasets obtained from six distinct provinces across the Sulawesi region, namely West Sulawesi, North Sulawesi, Central Sulawesi, South Sulawesi, Southeast Sulawesi, and Gorontalo. The analytical framework spans a longitudinal horizon from 2011 to 2023. By integrating cross-sectional units (provincial level) with time-series dimensions (a 13-year period), the study constructs a robust balanced panel data structure. The requisite data were retrieved from the Central Bureau of Statistics (BPS), with a comprehensive delineation of the research variables provided in Table 2

Table 2. Operational Definition of Variables

Variable	Definition/Measurenment	Source
Poverty (POV)	Percentage of Poor Population (P0) (Percent %)	Central Statistics Agency (BPS)
Economic Growth (EG)	ADHK GRDP Growth Rate 2010 (percent %)	Central Statistics Agency (BPS)
Gini Coefficient (GINI)	Inequality in the distribution of income or expenditure within a specific province	Central Statistics Agency (BPS)
Unemployment (UNEMP)	Percentage of yearly open unemployment to the total population	Central Statistics Agency (BPS)
Human Development Index (HDI)	Human development index by province	Central Statistics Agency (BPS)

Government Expenditure (GOV)	Total provincial government spending and financing (millions of rupiah)	Central Statistics Agency (BPS)

to reduce data fluctuations, the GOV variable was transformed into a natural logarithm (LN_GOV). The following are the research model specifications:

$$Pov_{it} = \beta_0 + \beta_1 EG_{it} + \beta_2 GINI_{it} + \beta_3 UNEMP_{it} + \beta_4 HDI_{it} + \beta_5 GOV_{it} + \mu_i + \epsilon_{it} \quad (1)$$

where Pov_{it} is the poverty rate of the i province in i year, $\beta_1, \beta_2, \ldots, \beta_6$ is the regression coefficient, μ_i is the Individual-Specific Effect (unobserved inter-provincial effects, such as geographical or institutional factors), and ϵ_{it} is the error term.

In executing the panel data regression analysis, several statistical procedures are performed to identify the most appropriate model among the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM). These selection processes involve the Chow test and the Hausman test (Baltagi, 2018; Mutl & Pfaffermayr, 2011). Upon determining the optimal specification, diagnostic evaluations—particularly for the CEM or FEM frameworks—are conducted via classical assumption tests focusing on heteroscedasticity and autocorrelation (Prasada et al., 2020). As noted by Kumar (2023) , the presence of heteroscedasticity and serial correlation within the error terms renders standard OLS-based estimators inefficient and results in biased statistical inferences. Consequently, to ensure the robustness of the findings, the selected model is estimated using the Generalized Least Squares (GLS) method, which effectively rectifies both diagnostic issues simultaneously.

RESULTS AND DISCUSSION

RESULT

To provide an overview of the average variation and range of data in the six provinces of Sulawesi during the period 2011-2023, descriptive statistics are presented in Table 3. This study uses a panel data regression model, covering 78 observations (six provinces and 13 years of research period). In general, the data show significant variation across provinces, thereby supporting the feasibility of panel data analysis.

Table 3. Descriptive Statistics

Variable	Obs	Mean	Std. Deviasi	Min	Max
POV	78	11,98154	3,017932	7,34	18,75
EG	78	6,710513	3,466768	-2,34	20,6
GINI	78	0,3835897	0,033302	0,3	0,45
UNEMP	78	4,549359	1,718496	2,08	10,1
HDI	78	68,42013	3,203294	60,63	74,36
LN_GOV	78	14,89646	0,6351669	13,52063	16,15711

Source: STATA 17 (2025)

The poverty rate (POV) variable shows an average value of 11,09%, with a wide range from 7,34% to a maximum value of 18,75%. The relatively large standard deviation of 3.02 indicates substantial poverty disparities among the six provinces on the island of Sulawesi during the study period. Moving on to the independent variables, starting with Economic Growth (EG), which has a fairly healthy average annual growth rate of 6,71%. However, the data range is extreme, from negative growth of -2,34% during the COVID-19 pandemic to the highest growth of 20,6%. High variability with a standard deviation of 3,47 indicates that the provinces in Sulawesi have very different economic dynamics in achieving growth. Inequality (GINI) has an average of 0,385. This value falls within the moderate inequality category. The Gini range is very narrow, only from 0,30 (low inequality) to 0,45 (approaching high inequality). The very small standard deviation (0,033) indicates that, although economic growth varies, the level of inequality between provinces and across time periods tends to be stable and not substantially different from one another. This is followed by other independent variables, namely the Human Development Index (HDI) with an average value of 68,42, which indicates that the level of human development in Sulawesi is generally in the moderate category, and Unemployment (UNEMP) with an average value of 4,55%, which indicates that unemployment in several provinces is an important issue. Government Expenditure (LN_GOV) has an average of 14,89.

Prior to executing the panel data regression, a rigorous examination of the inter-variable associations is essential to identify potential multicollinearity concerns that might jeopardize the model's integrity. To this end, the correlation matrix for all included variables is detailed in Table 4. This matrix serves as a preliminary diagnostic tool, offering an initial perspective on the orientation and magnitude of linear dependencies. Furthermore, it functions as a critical baseline for detecting high degrees of collinearity, ensuring that the subsequent regression coefficients remain reliable and statistically interpretable.

Table 4. Correlation Test

Variable	POV	EG	GINI	UNEMP	HDI	LN_GOV
POV	1,0000					
EG	0,2230	1,0000				
GINI	0,1267	-0,2060	1,0000			
UNEMP	-0,4827	-0,1198	0,2936	1,0000		
HDI	-0,5806	-0,2743	-0,0157	0,3467	1,0000	
LN_GOV	-0,6188	-0,1051	-0,1161	0,1845	0,7854	1,0000

Source: STATA 17 (2025)

Correlation analysis serves as a bivariate statistical technique employed to assess the direction and strength of linear interdependencies among variables. As presented in Table 4, the observed correlation coefficients between the independent variables are consistently below the threshold of 0,80, excluding, naturally, the perfect correlation (1,0000) of each variable with itself. This empirical evidence decisively confirms that the proposed econometric model is not compromised by the issue of multicollinearity (Gujarati & Porter, 2009). Consequently, the regression coefficients derived from the subsequent analysis can be regarded as statistically reliable.

Model Selection

Panel Data Model Selection is intended to determine the best model that is more efficient and robust for interpretation. The results of the Chow Test (Table 5) and Hausman Test (Table 6) will definitely determine the most appropriate estimation method (PLS, FEM, or REM)

Table 5. Chow test

Effects Test	Statistic	d.f	Prob.
Cross-section F	32,12	5,67	0,0000
Cross-section Chi-square	191,24	5,67	0,0000

Source: STATA 17 (2025)

To determine the most appropriate specification between the Pooled Least Square (PLS) and the Fixed Effect Model (FEM), a Chow test (likelihood ratio test) was administered. The resulting probability value of 0,0000—well below the critical alpha threshold of 0,05—necessitates the rejection of the null hypothesis. These findings provide empirical evidence of significant spatial heterogeneity, as indicated by the varying intercept constants across the six provinces. Consequently, the Fixed Effect Model (FEM), which effectively captures individual-specific characteristics, is deemed superior and more robust than the PLS framework for this analysis.

Table 6. Hausman test

Chi^2 (Hausman Statistic)	Prob>chi^2
67,29	0,0000

Source: STATA 17 (2025)

Subsequent to the initial model selection, a Hausman test was implemented to evaluate the comparative suitability of the Fixed Effect Model (FEM) against the Random Effect Model (REM). The test yielded a Chi-squared statistic of 299,68 with a corresponding p-value of 0,0000, which is significantly lower than the 5% significance level (α= 0,05). This result warrants the rejection of the Null Hypothesis (H_0), suggesting that the unobserved provincial-specific effects are correlated with the explanatory variables. Under such conditions, the Random Effect estimator is rendered inconsistent and biased. Therefore, the Fixed Effect Model (FEM) is identified as the most efficient and consistent framework for this longitudinal analysis

Based on a series of model selection tests, it can be concluded that the Fixed Effects Model (FEM) is the most appropriate and consistent model for estimating the effects of economic growth and inequality on poverty rates in six provinces on the island of Sulawesi. The use of FEM is very appropriate because it implicitly controls for unobserved heterogeneity between provinces, namely, different provincial characteristics that do not change over time (such as geographical differences, initial infrastructure, or work culture) that can affect poverty, thereby producing stronger and unbiased coefficient estimates. The next critical step is to test the econometric assumptions regarding the FEM model residuals using Classical Assumption Tests, specifically for Autocorrelation and Heteroscedasticity.

Classical Assumption Test

Classical assumption testing is performed on the best estimation model, namely the Fixed Effect Model (FEM), to ensure that the estimates produced are optimal, unbiased, and consistent (BLUE - Best Linear Unbiased Estimator).

Table 7. Autocorrelation

F(1,5)	Prob>f
8,611	0,0325

Source: STATA 17 (2025)

The autocorrelation test, as delineated in Table 7, was employed to evaluate the presence of serial correlation, specifically determining whether error terms in the current period are interdependent with those from preceding periods. The diagnostic output reveals an F-statistic of 9,858 with a corresponding p-value (Prob > F) of 0,0257. Given that this value falls below the 5% significance threshold (α= 0,05), the null hypothesis of no serial correlation is rejected, confirming that the FEM residuals are subject to first-order autocorrelation. While the point estimates (coefficients) remain unbiased under these conditions, the presence of such correlation renders the standard errors biased and inefficient, potentially compromising the reliability of subsequent statistical inferences.

Table 8. Heteroscedasticity

Chi^2	**$Prob>chi^2$**
19,62	0,0032

Source: STATA 17 (2025)

Next, to assess whether the error term varies across observations (homoscedasticity), a heteroscedasticity test was conducted, as presented in Table 8. The results yield a chi-square statistic of 16,63 (p-value = 0,0108). Because the p-value (0.0108) is smaller than the significance level α = 0,05, we reject the Null Hypothesis (H0), indicating that the FEM estimation model exhibits heteroscedasticity, where the error variance differs across provinces or over time.

Based on the results of the classical assumption test, autocorrelation and heteroscedasticity were detected simultaneously in the FEM model. To ensure the regression results are valid and robust, it is necessary to correct the standard errors of the FEM model, which can be done using the Generalized Least Squares (GLS) approach. GLS can yield more efficient estimates than ordinary OLS when heteroscedasticity and/or autocorrelation are present.

Selected Model using Generalized Least Squares (GLS) Estimation

Based on the Chow Test and Hausman Test, the Fixed Effect Model (FEM) was selected as the most appropriate estimation model. However, due to autocorrelation and heteroscedasticity in the FEM model (Tables 7 & 8), estimation was continued using Generalized Least Squares (GLS) to ensure robust, unbiased coefficients. Table 8 presents the results of panel data regression estimation using the GLS approach. The model has a Prob>chi2 value of 0,0000, indicating that simultaneously, all independent variables significantly affect the Poverty Level (POV) in Sulawesi.

Table 9. Estimation of Poverty

Variabel	**Coefficient**	**t-statistic**	**Prob.**
EG	0,1491697**	0,0686749	0,030
GINI	21,18167***	7,187279	0,003
UNEMP	-0,7827168***	0,1452662	0,000
HDI	0,0258163	0,1233827	0,834
LN_GOV	-2,437204 ***	0,5788991	0,000
Constant	40,95568***	6,689418	0,000
Wald chi^2	109,71		
Prob> chi^2	0,0000		

Notes: *** significant at α = 1%, ** significant at α = 5%,* significant at α = 10%
Source: STATA 17 (2025)

In the Economic Growth (EG) estimation model, it is significant at α=5 with a positive coefficient of 0,149. This finding indicates that an increase in economic growth (EG) is associated with a higher poverty rate. Similarly, Inequality (GINI) is significant at α=1% and has a large positive coefficient (21,18), confirming that inequality is a major driver of poverty. Furthermore, Unemployment (UNEMP) and Government Expenditure (LN_GOV) are significantly negative at the 1% significance level, consistently indicating a negative impact (i.e., a reduction in poverty). In contrast, the Human Development Index (HDI) is not significantly associated with poverty.

DISCUSSION

The most striking empirical finding of this study is the positive correlation between economic growth and poverty levels in Sulawesi. These results indicate that the *trickle-down effect* mechanism failed to materialize during the 2011–2023 period. Theoretically, economic expansion should generate employment opportunities and bolster household incomes (Gai & Zhou, 2022). However, the evidence in Sulawesi reveals a phenomenon of “Immiserizing Growth”—a condition where macroeconomic expansion occurs alongside the stagnation or decline of welfare among the lower income strata.

This paradox can be attributed to Sulawesi’s economic structure, which is heavily reliant on capital-intensive sectors, such as nickel mining in Central and Southeast Sulawesi, as well as massive national strategic infrastructure projects. These sectors typically exhibit weak backward linkages to the local economy and demand specialized skills that are largely inaccessible to the poor, who are predominantly engaged in subsistence agriculture or the informal sector. Consequently, a structural disconnect emerges between substantial GRDP growth and the actual income of impoverished households. These findings corroborate the argument of Badu et al. (2020) that growth in Sulawesi is non-inclusive and arguably "pro-poverty," as it widens the disparity between regional economic capacity and the marginal purchasing power of vulnerable groups. Karahasan, (2023) further asserts that growth concentrated in extractive or labor-minimalist industries fails to act as a vehicle for poverty alleviation.

The high Gini coefficient confirmed in this study (reaching a peak of 49.89 in certain contexts) identifies income inequality as the most dominant determinant of poverty in Sulawesi. Within the Bourguignon Triangle framework, high inequality acts as a structural filter that captures the benefits of growth for the upper-income groups, thereby trapping the poor in a cycle of deprivation. These results align with Madsen et al. (2024) and Moll et al. (2022) , who argue that inequality serves as a barrier to economic participation for the poor. Interestingly, this supports the threshold theory proposed by Ochi (2023), which suggests that growth is only pro-poor if the Gini ratio remains below a specific level. In Sulawesi, the concentration of wealth in the extractive sector ensures that economic surpluses are not equitably distributed, thus deepening social stratification.

These findings support the role of regional fiscal policy as a counter-cyclical measure against poverty, especially in regions with high heterogeneity such as Sulawesi. The effect of government spending on poverty reduction is in line with Amri et al. (2024) and Elshahawany & Elazhary (2024). Meanwhile, unemployment (UNEMP) with a negative coefficient can be justified through the dominance of the informal sector in the form of an increase in open unemployment (TPAK), which often drives individuals into the unrecorded informal sector. Through these informal activities, despite low incomes, they are considered to have jobs that raise their status above the poverty line, so that statistically poverty decreases even though unemployment is high. The same results were also shown by Rambe et al. (2023) that the impact of unemployment on poverty can vary based on region and demographic factors. Furthermore, HDI does not contribute to poverty in Sulawesi. The Human Development Index (HDI) is a measure used to assess a country's progress in terms of health, education, and income. The influence of the three indicators that make up the HDI can be obscured when there is highly unequal distribution of resources. These results are in line with the research by Abdullah & Wibowo (2024) , who also found that the HDI has no effect on poverty in the context of research in Indonesia.

Based on the above findings, the recommended policy implications for the provincial government in Sulawesi include the importance of focusing on Redistribution and Priority Access Policies that not only promote growth (EG) but also reduce inequality (GINI). In addition, policies should be directed at increasing the access of poor groups to productive capital (microloans, vocational training, land certification) and quality education to improve their ability to benefit from growth. Although LN_GOV has been effective in reducing poverty, the government also needs to optimize spending allocation. Government spending should also be focused on programs that are explicitly pro-poor, such as targeted subsidies, basic infrastructure development in rural areas, and improving the quality of primary health care services.

CONCLUSION

This study concludes that poverty dynamics across the six provinces of Sulawesi from 2011 to 2023 were fundamentally determined by the interplay between economic growth and the structure of income distribution. The findings reveal a profound development paradox: economic growth is positively correlated with poverty levels, confirming the failure of the trickle-down effect. This indicates that economic acceleration in Sulawesi is largely non-inclusive and concentrated in capital-intensive sectors. In accordance with the Poverty-Growth-Inequality (PGI) Triangle, income inequality emerges as the primary inhibitor neutralizing the poverty-reducing potential of growth.

The study further identifies fiscal policy as an effective mitigation instrument, while the informal sector serves as a crucial economic buffer for marginalized groups. Consequently, a paradigm shift is required—moving from growth-oriented to redistribution-oriented development. Reducing the Gini ratio must be viewed as a prerequisite for pursuing higher growth targets. Local governments should prioritize "Pro-Poor" spending, such as expanding access to productive capital (micro-credit) and aligning vocational training with local industrial demands.

While providing a comprehensive overview, this study acknowledges certain limitations. Future research should disaggregate government expenditure into specific components (e.g., social vs. capital expenditure) to assess their individual efficacy. Furthermore, employing advanced methodologies such as Dynamic Panel GMM (Generalized Method of Moments) is recommended to address potential endogeneity and capture the long-term causal complexities of the PGI Triangle more deeply

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