DETERMINANTS OF POVERTY IN EAST NUSA TENGGARA 2010-2024

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Abstract

Poverty remains a persistent development challenge in East Nusa Tenggara (NTT), reflecting structural constraints in an archipelagic region with high inter-district heterogeneity. Most previous studies on poverty determinants in NTT rely on static models and therefore have limited capacity to capture poverty persistence and potential endogeneity between poverty and its determinants. This study aims to analyze the determinants of district- and city-level poverty in NTT from 2010 to 2024 using a dynamic panel approach. The dataset comprises 22 districts and cities observed over 15 years, yielding 330 observations, and is sourced from Statistics Indonesia (BPS). Estimation is conducted using the First Difference Generalized Method of Moments (FD GMM) with one-step robust standard errors to address dynamic panel bias and endogeneity concerns. The results indicate that poverty is persistent, as shown by a positive and significant lagged poverty coefficient. Economic growth, proxied by lnGRDP, significantly reduces poverty, while human capital indicators, such as years of schooling (MYS) and life expectancy (LE), also exert significant poverty-reducing effects. In contrast, the open unemployment rate (OUR) and population size (lnPOP) are not statistically significant. Notably, the minimum wage (lnMW) is positively and significantly associated with poverty, suggesting potential employment or adjustment pressures when wage policy is misaligned with productivity. Policy implications emphasize the need for inclusive growth, strengthened investments in education and health, and a minimum wage design consistent with local productivity and labor-market structure.

Keywords: Poverty Persistence, Dynamic Panel, FD-GMM, Economic Growth, Human Capital, Minimum Wage

INTRODUCTION

Poverty is a structural problem that reflects the shortcomings of development processes. Within the framework of the Sustainable Development Goals (SDGs), poverty reduction is recognized as a central priority in the global sustainable development agenda, with the eradication of poverty positioned as the first of the seventeen SDG targets. (Falah & Rahmawati, 2024). Poverty is considered a fundamental issue because it constrains the fulfillment of basic human needs, including limited access to adequate healthcare services, difficulties in maintaining a decent standard of living, restricted access to quality education, and limited availability of other essential services (Xie, 2023). Consequently, persistently high levels of poverty can significantly reduce the overall quality of life and may impose long-term social and economic burdens on society.

As a developing country, Indonesia continues to face significant challenges in reducing poverty. Although various policies and programs have been implemented to improve public welfare, the poverty rate has not yet declined in line with national development targets. Poverty alleviation, therefore, remains a key national priority, as outlined in the National Medium Term Development Plan (RPJMN). The plan sets an ambitious target to reduce the poverty rate to 4.5-5.0 percent by 2029 and further to 0.5-0.8 percent by 2045 (Summary of RPJMN 2025-2029, 2025).

The number of people living in poverty in Indonesia during the 2010-2024 period has declined over the long term (BPS Indonesia, 2024). At the beginning of the period, the number of poor people was still around 28-29 million. However, it gradually decreased to below 25 million between 2014 and 2019, coinciding with economic stability and improvements in human development, particularly in the education and health sectors. However, this decline has not been evenly distributed across regions, as the benefits of development remain concentrated in certain areas (Wulansari *et al*., 2023). In 2020, poverty increased again as a result of the *covid 19* pandemic, which suppressed economic activity and led to rising unemployment (Triono & Sangaji, 2023). As the pandemic subsided, the number of people living in poverty declined once more, reaching approximately 24.05 million in 2024 (BPS Indonesia, 2024).

The decline in poverty in Indonesia during the 2010–2024 period, which has not always tracked economic growth, indicates the persistence of structural issues such as income inequality, disparities in human development, and limited access to decent employment opportunities (Christiani & Nainupu, 2021). Differences in poverty levels across provinces also reflect regional development disparities, where provinces with higher poverty rates generally exhibit lower human capital quality and labor market structures that are less capable of optimally absorbing the workforce (Abel *et al*., 2023). Moreover, poverty assessments that rely solely on monetary indicators are often insufficient to capture the broader and more complex dimensions of societal welfare at the regional level (Fuady *et al*., 2022).

Spatially, a clear disparity in poverty levels is observed between the western and eastern regions of Indonesia. Provinces in the eastern part of the country, such as Papua, Maluku, and the Nusa Tenggara region, generally exhibit higher poverty rates than provinces in the western regions, including Java, Sumatra, and Kalimantan. Papua and West Papua consistently appear as the provinces with the highest poverty levels. In contrast, several other eastern provinces, including East Nusa Tenggara (NTT) and North Maluku, also remain in the high-poverty category.

Vol. 9. No. 2 (2026)
Page: 16635-16653

East Nusa Tenggara (NTT) is one of the provinces with the highest poverty rates in Indonesia and is characterized by its archipelagic geography. The province consists of 22 districts/cities, dispersed across numerous islands, substantially more than Papua, which has 11 districts/cities. This geographical fragmentation intensifies the challenges of ensuring equitable access to basic services and balanced regional development. The persistently high level of poverty in NTT suggests the presence of persistent poverty, a condition in which poverty endures over a long period and does not easily decline despite broader economic changes (Kuncoro, 1997). Kartasasmita (1996) further emphasizes that chronic poverty commonly occurs in regions characterized by limited resources, relatively isolated geographic conditions, and restricted access to essential services. Under such circumstances, poverty can become intergenerational and embedded within the structural characteristics of a region. The following figure compares poverty rates in East Nusa Tenggara Province with those in Indonesia during the 2010–2024 period.

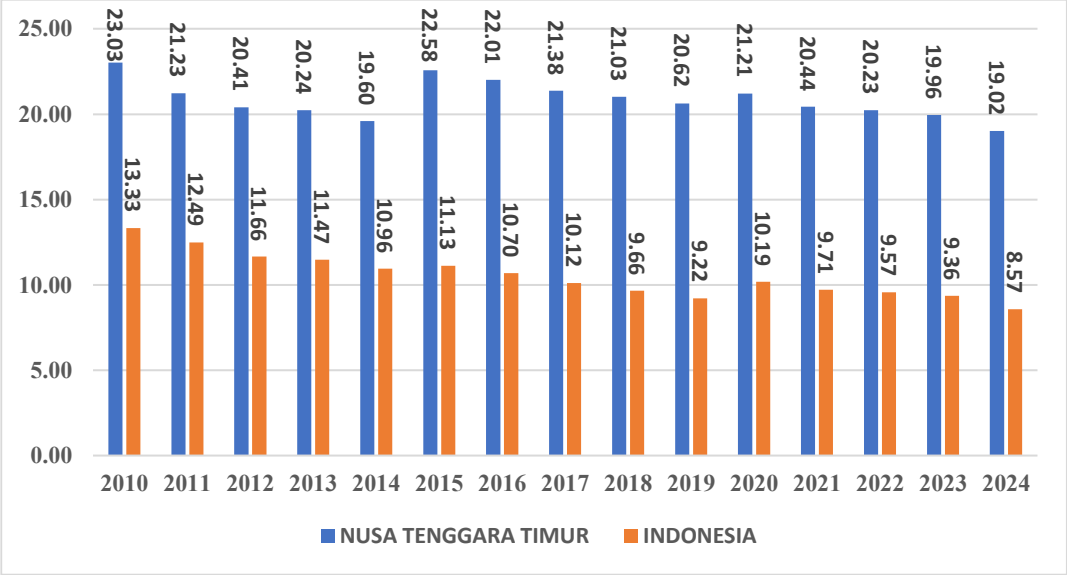


Figure 1.
Comparison of Poverty Rates in Indonesia and East Nusa Tenggara, 2010-2024
Source: Statistics Indonesia (BPS), 2025, processed by the author

East Nusa Tenggara (NTT) is among the provinces with the highest poverty rates in Indonesia (BPS Indonesia, 2025). As illustrated in the figure above, the poverty rates in NTT and Indonesia during the 2010-2024 period reveal a persistent, relatively wide gap between NTT and the national average. Throughout the period, the poverty rate in NTT consistently remained significantly higher than the national rate, though both showed a general downward trend. At the beginning of the period, the poverty rate in NTT exceeded 23 percent, while the national rate was around 13 percent. On average, poverty in NTT reached 20.87 percent, whereas the national average was 10.54 percent, and this disparity persisted in the following years. These findings indicate that poverty reduction in NTT has progressed more slowly compared to national achievements. In theory and within the framework of national development policy, poverty reduction is expected to occur more evenly across provinces;

however, the data show that NTT has consistently remained well above the national average throughout the 2010-2024 period.

In East Nusa Tenggara Province, the primary issue is not merely the high level of poverty but rather the systematic and persistent lag of NTT compared to the national average. Although NTT ranks fourth among provinces with the highest poverty rate in Indonesia, available data indicate that poverty in the region is chronic and relatively stable over the long term, reflecting a structural problem rather than a temporary condition. This pattern is supported by the findings of Bebo & Priyono, (2025), who argue that poverty in NTT is closely associated with low economic productivity and limited diversification of employment opportunities.

Poverty in East Nusa Tenggara (NTT) is characterized by the dominance of subsistence agriculture, a high proportion of informal employment, and relatively low human capital quality. find that economic growth in NTT has not significantly reduced poverty because improvements in educational attainment or the expansion of adequate employment opportunities have not accompanied it. As a result, income increases tend to be concentrated among a small segment of the population, while poorer groups remain trapped in vulnerable economic conditions.

To understand the mechanisms underlying the relationships among the variables examined in this study, the analysis draws upon several key theoretical frameworks. The vicious circle of poverty theory proposed by Ragnar Nurkse (1953) explains that poverty arises from a self-reinforcing economic cycle characterized by low productivity and low income. This cycle perpetuates poverty in the long term, making productivity a crucial factor in determining a region's capacity to escape poverty. In explaining the determinants of productivity, Todaro (2013) emphasizes that education and health are fundamental components in improving the quality of the labor force. Low levels of education and poor health conditions limit individuals' working capacity and income potential, thereby reinforcing poverty. In addition, inadequate wage levels can further suppress household purchasing power and perpetuate low-income conditions. From a demographic perspective, Malthusian population theory (Malthus, 2010) suggests that population growth that exceeds production growth can reduce per capita income. When economic growth and job creation fail to keep pace with population growth, pressure on economic resources increases, thereby raising the risk of poverty.

Based on this theoretical framework, the relationships among the variables examined in this study are assumed to be systematic and interrelated, with poverty influenced by low productivity and income, and these factors mutually reinforce each other. Gross Regional Domestic Product (GRDP), as an indicator of economic activity, is expected to reduce poverty, as increases in output and income can improve overall welfare. Conversely, the Open Unemployment Rate (OUR) is hypothesized to have a positive effect, since higher unemployment reduces household income. From a human development perspective, Mean Years of Schooling (MYS) and Life Expectancy (LE) reflect better human capital quality and are therefore expected to reduce poverty. From a demographic standpoint, increases in population without corresponding economic growth may contribute to higher poverty levels. Meanwhile, the Minimum Wage is presumed to be negatively related to poverty, as higher wages can increase purchasing power and improve household welfare.

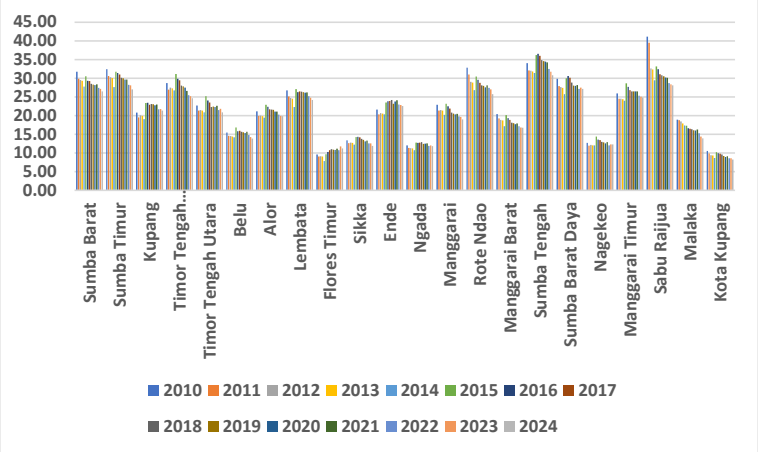


Figure 2.
Poverty Rates in East Nusa Tenggara by Districts and Municipalities, 2010-2024
Source: Statistics Indonesia (BPS), 2025, processed by the author

Based on the graph of poverty rates across districts and municipalities in East Nusa Tenggara (NTT) during the 2010-2024 period, it can be observed that poverty levels remain relatively high and tend to persist over the long term. Although most districts and municipalities show a gradual decline in poverty, the reduction has been slow and uneven across regions. The graph also indicates noticeable disparities in poverty levels among districts and municipalities. Districts located on Sumba Island, namely West Sumba, East Sumba, Central Sumba, and Southwest Sumba, consistently record the highest poverty rates compared with other areas throughout the observation period. Despite a gradual decline by 2024, poverty levels in these regions remain significantly higher than the average across other districts and municipalities in NTT.

In contrast, urban areas such as Kupang City exhibit the lowest poverty rates and remain relatively stable throughout the 2010-2024 period. The poverty rate in Kupang City is substantially lower than that of most other districts, indicating a clear disparity between urban and rural areas in East Nusa Tenggara Province. Over time, most districts and municipalities experienced a decline in poverty levels during the 2010-2019 period. However, after this period, the pace of reduction slowed, and in several regions, poverty levels appeared to stagnate.

Previous studies indicate that poverty in East Nusa Tenggara is influenced by economic conditions, labor market dynamics, human development, demographic factors, and wage policies. Gross Regional Domestic Product (GRDP) per capita plays an important role in reducing poverty because it reflects the level of income and purchasing power within society and is considered an effective instrument for supporting poverty alleviation (Saputri & Imaningsih, 2025). Conversely, a high Open Unemployment Rate increases household vulnerability, although in regions dominated by informal economic activities, the relationship is not always linear due to the phenomenon of the working poor (Bebo & Priyono, 2025). Education and health have also been shown to play a significant role in reducing poverty by improving productivity and overall quality of life (Violita, 2024). Meanwhile, population size may function either as an economic potential or as a burden, depending on the quality of human resources and the economy's capacity to absorb labor (Mukharohmah & Fadhilah,

2025). Minimum wage policies may also contribute to poverty reduction by increasing purchasing power; however, their effectiveness tends to be limited in regions where the informal sector dominates, such as East Nusa Tenggara (Berliana *et al*., 2025).

Although numerous studies on poverty have been conducted, several research gaps remain. Most previous studies employ static approaches and analyze determinants in a partial manner, which limits their ability to capture the dynamic nature and endogeneity of poverty. Empirical evidence suggests that poverty exhibits intertemporal dependence, commonly referred to as persistent poverty, which requires the use of dynamic panel approaches such as the Generalized Method of Moments (GMM) (Xie, 2023). Xie (2023)A study published in the journal Sustainability (Scopus Q2) demonstrates that the GMM approach can reveal the dynamic characteristics of poverty and produce more reliable estimates. However, the study was conducted in China and does not examine regions with archipelagic characteristics and structural underdevelopment, such as East Nusa Tenggara (NTT).

This study provides several important contributions from methodological, empirical, and policy perspectives. First, from a methodological standpoint, the study employs a dynamic panel model using the First-Difference Generalized Method of Moments (FD-GMM) one-step approach to address endogeneity and dynamic bias in the analysis of poverty at the district and municipal levels in East Nusa Tenggara Province. Second, in terms of context, the study emphasizes the characteristics of an archipelagic region with high spatial heterogeneity, thereby offering empirical evidence more relevant to underdeveloped areas characterized by limited accessibility and persistent regional disparities. Third, from an empirical perspective, the research distinguishes between short-run effects and long-run multipliers of poverty determinants and validates the consistency of the estimators through diagnostic model testing. Fourth, from a policy perspective, the findings highlight the importance of human development interventions, including improvements in education and health, while underscoring the need for minimum wage policies aligned with regional productivity levels to avoid potential contractionary effects on the welfare of vulnerable groups.

This study aims to examine the effects of Gross Regional Domestic Product, the Open Unemployment Rate, Mean Years of Schooling, Life Expectancy, population size, and the minimum wage on poverty levels in East Nusa Tenggara Province during the 2010-2024 period using a dynamic panel approach based on the Generalized Method of Moments (GMM). The study seeks to identify the persistence of poverty and to provide empirical evidence to support the formulation of more effective, evidence-based poverty alleviation policies.

REVIEW OF LITERATURE

Poverty refers to the condition in which individuals or households are unable to meet basic needs required to achieve a decent standard of living. In Indonesia, poverty is commonly measured using the basic needs approach, which defines minimum consumption standards based on both food and non-food requirements (Rinaldi, 2025). However, poverty is not solely associated with low income; it is also influenced by various factors such as employment opportunities, the quality of human capital, and the demographic characteristics of a region (Kamil *et al*., 2025).

One of the key theories explaining the persistence of poverty is the vicious circle of poverty, which posits that poverty is sustained through a cycle involving low income, limited savings, insufficient investment, and low productivity. This condition makes it difficult for poor communities to escape poverty without improvements in economic capacity or adequate policy interventions (Nasirudin & Haviz, 2025). In addition, human capital theory emphasizes that education is an important form of investment that enhances the quality of human resources by improving skills and labor productivity, thereby increasing employment opportunities and higher incomes (Tarigan & Arka, 2025). From a demographic perspective, population theory suggests that rapid population growth can place pressure on resources and employment opportunities when it is not accompanied by sufficient economic growth (Angelia & Anitasari, 2025).

In the context of economic development, economic growth is often associated with poverty reduction, as increased economic activity can expand employment opportunities and raise household incomes. Several studies have found that higher Gross Regional Domestic Product (GRDP) is negatively associated with poverty levels (Hapsari *et al*., 2025). However, in some regions, economic growth does not necessarily lead to a reduction in poverty due to unequal income distribution (R & Sukartini, 2025).

Unemployment is also closely associated with poverty, as individuals without employment generally lack a stable source of income to meet their basic needs. Consequently, higher unemployment rates have the potential to increase poverty levels (Tarigan & Arka, 2025). However, several studies indicate that unemployment does not always have a statistically significant impact on poverty, particularly in economies where the informal sector dominates and provides alternative sources of livelihood (Kamil *et al*., 2025).

Education is a crucial factor in poverty reduction, as improvements in educational attainment can enhance the quality of human capital and expand employment opportunities. Numerous studies have demonstrated that education has a negative relationship with poverty, as higher levels of education contribute to greater productivity and increased income (Muna, 2025). In addition, health also plays an important role in improving labor productivity and overall quality of life, thereby contributing to poverty reduction (Mukharohmah & Fadhilah, 2025).

Population size has a complex relationship with poverty. Rapid population growth can increase pressure on employment opportunities and economic resources. However, in certain regions, an increase in population has been associated with poverty reduction due to expanded economic activities and greater employment opportunities (Qomarina *et al*., 2025). In addition, minimum wage policies may also influence poverty levels, as higher wages can enhance workers' purchasing power and overall welfare. Several studies indicate that increases in the minimum wage are correlated with reductions in poverty (Wulandari *et al*., 2025).

In general, previous studies indicate that poverty is influenced by a range of economic, social, and demographic factors. Education and the quality of human capital are widely recognized as key determinants of poverty reduction. At the same time, economic growth can contribute to poverty alleviation when it is inclusive and accompanied by equitable opportunities. Meanwhile, unemployment, population size, and minimum wage policies may influence poverty in different directions, depending on the economic conditions and the structure of the labor market in each region.

RESEARCH METHOD

This study examines poverty in East Nusa Tenggara Province using a quantitative approach, drawing on secondary data from several official and reliable sources, including Statistics Indonesia (BPS) for East Nusa Tenggara Province, as well as relevant academic journals. The dataset covers variables related to poverty, Gross Regional Domestic Product (GRDP), the Open Unemployment Rate (OUR), Mean Years of Schooling (MYS), population size, and the minimum wage within the administrative areas of East Nusa Tenggara Province. The sample comprises 330 observations, representing panel data from 22 districts/municipalities over the 15 years from 2010 to 2024. This study employs the Generalized Method of Moments (GMM) approach, which combines cross-sectional data from the 22 districts/municipalities in East Nusa Tenggara with time-series data collected during the 2010-2024 period. The operational definitions of the variables used in this study are presented in the following table.

This study employs a dynamic panel data model using the First Difference Generalized Method of Moments (FD-GMM) with a one-step estimation procedure. The selection of the FD-GMM method is motivated by the inclusion of a lagged dependent variable, namely the previous period's poverty rate, which theoretically may lead to endogeneity problems if estimated using conventional methods such as Ordinary Least Squares (OLS) or the Fixed Effect Model (FEM). The presence of a lagged dependent variable may generate correlation between the explanatory variables and the error term, causing conventional estimators to become biased and inconsistent (Anozi & Novianda, 2023).

The one-step GMM approach is an estimation technique in dynamic panel models in which the regression parameters are obtained through a single weighting procedure. In this method, the initial weighting matrix is assumed to satisfy the homoskedasticity condition. It is not updated based on the residuals from the first-stage estimation, thereby maintaining a relatively simple estimation structure while remaining consistent within a dynamic panel framework. The one-step estimator is preferred because it is relatively stable for panels with limited time dimensions and can produce more robust standard errors than the two-step approach when no additional corrections are applied (Roodman, 2009).

The dynamic panel data model can be expressed by the following equation:

$$y_{i,t} = \delta y_{i,t-1} + x'_{i,t}\beta + u_{i,t}$$
$$i = 1,2,\dots,N$$
$$t = 1,2,\dots,T$$

In this equation, δ is a scalar parameter representing the effect of the lagged dependent variable from the previous period. The term $x'_{i,t}$ denotes a $1 \times K$ vector of independent variables, while β is a $K \times 1$. vector of parameters to be estimated. The error term $u_{i,t}$ is assumed to represent a one-way disturbance component. Furthermore, it is assumed that $e_i \sim IIDN(0, \sigma_e^2)$ and $v_{i,t} \sim IIDN(0, \sigma_v^2)$, indicating that the error components are independently and identically distributed with a normal distribution, zero mean, and constant variance.

Roodman (2009) explains that in a dynamic panel regression model, the coefficient β represents the short-run effect of changes in $x_{i,t}$, commonly referred to as the short-run multiplier. In contrast, the long-run effect of changes in $x_{i,t}$ known as the long-run multiplier,

is given by $\left(\frac{\beta}{1-\delta}\right)$. Within a dynamic panel framework, the coefficient β captures the immediate impact of changes in the independent variables on the poverty rate. Meanwhile, the long-run effect is derived from the steady-state implications of the dynamic model. It is calculated as $\left(\frac{\beta}{1-\delta}\right)$. Where δ represents the estimated coefficient of the lagged dependent variable obtained through the FD-GMM approach. This calculation follows the partial adjustment model framework described by (Roodman, 2009). Because the estimated value of δ in this study is less than one ($|\ \delta\ | < 1$) The model satisfies the stability condition, allowing the long-run effects to be interpreted in an economically meaningful way.

If $y_{i,t}$ is a function of $u_{i,t}$, then $y_{i,t-1}$is also a function of $u_{i,t}$. In other words, the regressor on the right-hand side of the equation, $y_{i,t-1}$, becomes endogenous because it is correlated with the error term $u_{i,t}$. Consequently, applying static panel estimation methods, such as Ordinary Least Squares (OLS), to a dynamic panel equation will yield biased and inconsistent estimates. (Baltagi, 2005).

The estimations in this study were conducted using Stata 17. To capture the persistence of poverty over time (persistent poverty), the empirical model is specified as a dynamic panel model by incorporating a lagged dependent variable, as follows:

$$PR_{it} = \alpha PR_{it-1} + \beta_1 ln\, GRDP_{it} + \beta_2 OUR_{it} + \beta_3 MYS_{it} + \beta_4 LE_{it} + \beta_5 ln\, POP_{it} + \beta_6 ln\, MW_{it} + \mu_i + \varepsilon_{it}$$

Where:
PR_{it} : Poverty Rate
αPR_{it-1} : Lagged Poverty Rate
ln $GRDP_{it}$: Logarithm of Gross Regional Product
OUR_{it} : Open Unemployment Rate
MYS_{it} : Mean Years of Schooling
LE_{it} : Life Expectancy
$ln\ POP_{it}$: Logarithm of Population Size
$ln\ MW_{it}$: Logarithm of the Minimum Wage
$\beta_{\{1,2,3,4,5,6\}}$: Regression coefficients for each independent variable
μ_i : Unobserved individual-specific effects
ε_{it} : Error Term

To address the problems of endogeneity and dynamic bias (Nickell bias), this study employs the First Difference Generalized Method of Moments (FD-GMM) approach developed by Arellano and Bond (1991). In this method, the model is transformed using a first-difference transformation to eliminate unobserved individual-specific effects (μ_i):

$$\Delta PR_{it} = \alpha \Delta PR_{it-1} + \beta_1 \Delta ln\, GRDP_{it} + \beta_2 \Delta OUR_{it} + \beta_3 \Delta MYS_{it} + \beta_4 \Delta LE_{it} + \beta_5 \Delta ln\, POP_{it} + \beta_6 \Delta ln\, MW_{it} + \Delta \varepsilon_{it}$$

The estimation is conducted using the one-step GMM estimator with robust standard errors. The one-step GMM approach is selected because it tends to be more stable in samples with relatively short time dimensions and helps minimize bias in the estimated standard errors. Model specification tests follow the procedure proposed by Arellano and Bond (1991), which includes tests for serial autocorrelation and the validity of instruments.

In the First Difference GMM framework, the consistency of the estimator depends on the absence of second-order serial correlation in the residuals of the first-differenced

equation, expressed as $E(\Delta\varepsilon_{it}, \Delta\varepsilon_{i,t-2}) = 0$. Therefore, the AR(2) test becomes the primary criterion for assessing the validity of the model. Furthermore, because the estimation employs robust standard errors, the validity of the instruments is evaluated using the Hansen test of overidentifying restrictions. The lagged dependent variable is treated as predetermined and instrumented using valid lag structures in the differenced equation. In addition, the collapse option is applied to limit the number of instruments and prevent potential overfitting in the GMM estimation.

The Hansen test is used to assess the validity of the instruments under overidentifying restrictions. The null hypothesis states that the instruments are not correlated with the error term, implying that the instruments used in the estimation are valid.
The Hansen test statistic (J-statistic) can be expressed as follows:

$$J = \hat{v}'Z\left(Z'\hat{\Omega}Z\right)^{-1}Z'\hat{v} \quad \sim \quad \chi^2_{(L-k)}$$

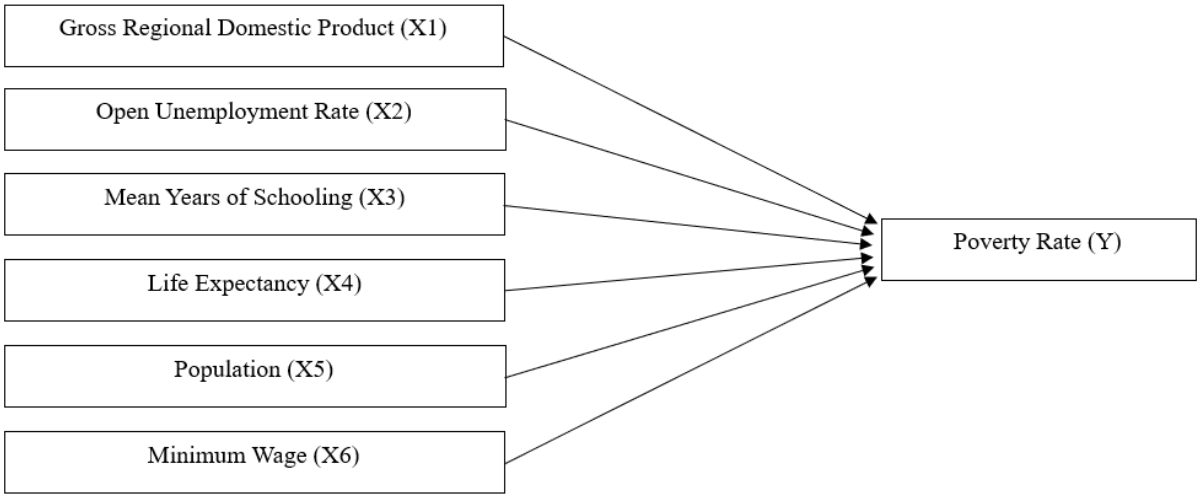
Research Hypothesis

Based on previous studies, the hypotheses proposed in this study are formulated as follows:

- H1: Gross Regional Domestic Product (GRDP) has a negative effect on the poverty rate.
- H2: The Open Unemployment Rate (OUR) has a positive effect on the poverty rate.
- H3: Mean Years of Schooling (MYS) has a negative effect on the poverty rate.
- H4: Life Expectancy (LE) has a negative effect on the poverty rate.
- H5: Population size has a positive effect on the poverty rate.
- H6: The Minimum Wage (MW) has a negative effect on the poverty rate.

Research Model

The research model describes the relationship between several independent variables, namely Gross Regional Domestic Product, the Open Unemployment Rate, Mean Years of Schooling, Life Expectancy, population size, and the minimum wage, and the dependent variable, which is the poverty rate. These relationships are illustrated in the following conceptual framework of the study.



The research model illustrates the relationship between several independent variables, namely Gross Regional Domestic Product (GRDP), the Open Unemployment Rate (OUR),

Mean Years of Schooling (MYS), Life Expectancy (LE), population size, and the minimum wage, and the dependent variable, which is the poverty rate. Conceptually, GRDP, education, and health are expected to be negatively related to poverty, whereas unemployment and population growth may increase poverty levels. Meanwhile, the minimum wage is expected to influence poverty through changes in purchasing power and labor market conditions. The relationships among these variables are analyzed using a dynamic panel approach with the First Difference Generalized Method of Moments (FD-GMM) to identify the effects of each determinant on poverty levels across districts and municipalities in East Nusa Tenggara Province during the 20102024 period.

RESULTS AND DISCUSSION

This section presents the empirical findings on the determinants of poverty in East Nusa Tenggara Province during the 2010-2024 period, using a dynamic panel approach based on the First-Difference Generalized Method of Moments (FD-GMM). The analysis examines the persistence of poverty and the influence of economic, labor-market, human-development, demographic, and wage-policy variables on the dynamics of poverty across districts and municipalities.

The dynamic approach is employed to capture the cumulative nature of poverty, in which the poverty rate in the previous period is assumed to influence the current period's poverty rate. Furthermore, the model allows for the identification of both short-run and long-run effects of each determinant, thereby providing a more comprehensive understanding of the structural mechanisms that shape poverty in archipelagic regions characterized by high spatial heterogeneity, such as East Nusa Tenggara.

Descriptive Statistics

The analysis begins with descriptive statistics to illustrate the distribution patterns and variation in the data. This is followed by an evaluation of model adequacy through GMM diagnostic tests, and subsequently by the interpretation of the estimated coefficients within a theoretical framework and their policy implications. The results of the descriptive statistical analysis are presented in Table 1 below.

Table 1.
Descriptive Statistics Results

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
PR it	330	21.646	7.329	7.830	41.160
lnGRDP it	330	7.683	0.674	6.173	9.836
OUR it	330	3.261	2.055	0.250	14.250
MYS it	330	6.923	1.252	4.620	11.760
LE it	330	65.229	2.435	57.140	70.040
lnPOP it	330	12.277	0.471	11.048	13.072
lnMW it	330	14.167	0.337	13.653	14.627

Source: Processed data 2010-2024 (Output Stata 17)

The descriptive statistics presented in Table 1 indicate that the average poverty rate across districts and municipalities in East Nusa Tenggara Province during the 2010-2024 period reached 21.646 percent. This value implies that, on average, more than one-fifth of

the population remains below the poverty line, suggesting that poverty levels in NTT remain relatively high. The minimum value of 7.830 percent and the maximum value of 41.160 percent reveal substantial disparities in poverty levels across districts and municipalities, reflecting significant socioeconomic heterogeneity across regions. This variation is further supported by a standard deviation of 7.329, indicating that the distribution of poverty across regions is far from homogeneous.

From the perspective of economic and human development determinants, the average logarithm of GRDP is 7.683, suggesting differences in economic capacity among regions. Meanwhile, the average Open Unemployment Rate is 3.261 percent, with a maximum value reaching 14.250 percent, indicating that labor market pressures vary considerably across districts and municipalities. Human development indicators also remain relatively limited, as reflected by an average Mean Years of Schooling of 6.923 years and an average Life Expectancy of 65.229 years. These conditions suggest that limitations in human capital quality, together with disparities in regional economic capacity, may contribute to the dynamics of poverty in NTT. Therefore, the variation among these variables provides an important empirical basis for further analysis using a dynamic panel model in order to better understand the determinants of poverty.

Model Unbiasedness Test

Table 2.
Results of the Unbiasedness Test

Models	Coefficient
Fixed Effect Model	0.464
Generalized Method of Moments	0.114
Common Effect Model	0.957

Source: Processed data 2010-2024 (Output Stata 17)

Table 2 presents a comparison of the estimated coefficients of the lagged dependent variable obtained using three different estimation approaches: the Common Effect Model (OLS), the Fixed Effect Model (FEM), and the Generalized Method of Moments (GMM). This comparison is conducted to identify the presence of dynamic panel bias, which commonly arises in dynamic panel models that include a lagged dependent variable.

The estimation results indicate that the coefficient of the lagged poverty variable is 0.957 in the OLS model, 0.464 in the FEM model, and 0.114 in the GMM model. This pattern reveals substantial differences among the estimators. Theoretically, the OLS estimator tends to produce an upward bias because the lagged dependent variable is correlated with the error component, causing the estimated coefficient to approach unity and leading to an overestimation of poverty persistence (Baltagi, 2005). In contrast, the Fixed Effects estimator tends to produce a downward bias in panels with limited time dimensions due to the correlation between the lagged dependent variable and unobserved individual effects (Kripfganz & Breitung, 2022).

The GMM estimator yields a coefficient of 0.114, which is relatively small and more moderate, indicating a more realistic level of poverty persistence after addressing endogeneity issues through the use of internal instruments developed in the Arellano Bond

framework (Roodman, 2009). The observed coefficient pattern OLS > FEM > GMM is consistent with the dynamic panel econometrics literature, which suggests that OLS tends to overestimate, FEM tends to underestimate, and GMM generally provides more consistent estimates. Therefore, the results of this unbiasedness test strengthen the methodological justification for employing the FD-GMM approach in this study to analyze the determinants of poverty in East Nusa Tenggara Province.

Model Diagnostics Tests

Before interpreting the model estimation results substantively, it is necessary to assess the model's adequacy through diagnostic testing. These tests include the Arellano Bond serial autocorrelation test and the Hansen test for instrument validity, which are conducted to ensure that the model satisfies the fundamental assumptions required for dynamic panel estimation. The results of these diagnostic tests are presented in Table 3 below.

Table 3.
Results of Model Validity and Diagnostics Tests

Test	Statistic	p-value
Wald chi2(7)	155.86	0.000
AR(1)	z = -3.33	0.001
AR(2)	z = -0.92	0.359
Hansen Test	$\chi^2(12) = 18.47$	0.102

Source: Processed data 2010-2024 (Output Stata 17)

Table 3 presents the results of the validity and diagnostic tests for the dynamic panel model estimated using the FD-GMM approach. The Wald test yields a $\chi^2(7) = 155.86$ with a p-value of 0.000, indicating that the independent variables jointly explain variation in the poverty rate. This finding suggests that the model has strong explanatory power and is appropriate for further analysis.

The Arellano Bond test shows that AR(1) is significant with a z-value of -3.33 (p = 0.001), which is an expected outcome in the First Difference GMM framework because the first-differencing process mechanically generates first-order autocorrelation. In contrast, the AR(2) result is not statistically significant, with a z-value of -0.92 (p = 0.359), indicating no second-order autocorrelation in the residuals. This condition implies that the instruments used in the model are uncorrelated with the error term, so the model is consistent.

Furthermore, the Hansen test of overidentifying restrictions yields a $\chi^2(12) = 18.47$ with a p-value of 0.102, indicating that the null hypothesis cannot be rejected. This result implies that the instruments used in the model are valid. Overall, the combination of a significant Wald test, the absence of second-order autocorrelation, and a non-significant Hansen test suggests that the FD-GMM model satisfies the required econometric validity criteria and can therefore be used to interpret the dynamic relationships between the explanatory variables and the poverty rate in East Nusa Tenggara Province.

Estimation Results of the FD-GMM Model

After confirming that the model satisfies the required econometric validity criteria, the next step is to interpret the estimated coefficients within a dynamic framework. Since the model employed in this study is a dynamic panel model based on the FD-GMM approach, the interpretation focuses not only on the short-run effects but also on the long-run multipliers, which reflect the adjustment process toward a new equilibrium (steady state). The estimation results are presented in Table 5.

Table 4.
Results of First Difference Generalized Method of Moments (FD-GMM)

TK	Estimated Coefficients	Standard Error	Z	P-Value	Short-run Multiplier	Long-run Multiplier
PRt-1	0.1143	0.0547	2.09	0.037**		
lnGRDP	-23.0400	3.0207	-7.63	0.000***	-23.0400	-26.0133
OUR	-0.0838	0.0561	-1.49	0.136	-0.0838	-0.0946
MYS	-1.2790	0.2754	-4.64	0.000***	-1.2790	-1.4440
LE	-0.4206	0.1092	-3.85	0.000***	-0.4206	-0.4749
lnPOP	-2.7265	1.6148	-1.69	0.091*	-2.7265	-03.0784
lnMW	14.0646	1.5557	9.04	0.000***	14.0646	15.8789

Source: Processed data 2010-2024 (Output Stata 17)

Poverty Persistence

Based on Table 4, the estimation results indicate that the model captures both the short-run and long-run dynamics of the variables influencing the poverty rate during the 2010-2024 period. Using a 5 percent significance level and assuming *ceteris paribus*, the coefficient of the lagged poverty variable $PR_{t-1}$is 0.1143 with a p-value of 0.037, indicating a positive and statistically significant effect at the 5 percent level. This result implies that a 1 percentage point increase in the previous period's poverty rate leads to an increase of approximately 0.1143 percentage points in the current poverty rate, holding other factors constant.

In other words, poverty conditions in the previous period contribute to poverty levels in the current period. This finding indicates the persistence of poverty, suggesting that poverty tends to be structural and recurrent over time. This phenomenon is consistent with the poverty trap concept described by Todaro, which argues that poverty can become a self-reinforcing cycle that is difficult to break without strong and effective policy interventions.

Economic Growth and Poverty

The variable lnGRDP has a coefficient of -23.0400 and is statistically significant at the 5 percent level. Because this variable is transformed into its natural logarithm, the model specification follows a semi-log (level-log) form. Accordingly, the interpretation indicates that a 1 percentage point increase in GRDP leads to a decrease in the poverty rate of approximately 0.23 percentage points in the short run, holding other variables constant (ceteris paribus). In the long run, the effect increases to approximately 0.26 percent, assuming other factors remain unchanged. These findings suggest that economic growth plays a significant role in reducing poverty. Theoretically, an increase in economic output expands employment opportunities and raises household incomes, thereby reducing the proportion of the population living in poverty (Handani & Suharianto, 2025). This result is also consistent with economic growth theory, which emphasizes that sustained economic expansion can improve welfare distribution when accompanied by equitable access to economic opportunities (Aini & Islamy, 2021).

Unemployment and Poverty

The variable OUR (Open Unemployment Rate) has a coefficient of -0.0838 with a probability value of 0.136, indicating that it is not statistically significant at the 5 percent level. This finding suggests that, during the study period, unemployment does not exert a sufficiently strong influence on poverty levels. The lack of statistical significance may be

due to the possibility that some unemployed individuals belong to households with alternative sources of income or are engaged in informal-sector activities that are not fully captured in official labor statistics. Similar findings have been reported in previous studies, which indicate that unemployment does not always have a direct effect on poverty when household-level coping mechanisms or income buffers are present(Aini & Islamy, 2021).

Education and Poverty

The variable MYS (Mean Years of Schooling) has a coefficient of -1.2790 and is statistically significant at the 5 percent level. This result implies that a one-year increase in the average years of schooling reduces the poverty rate by approximately 1.279 percentage points in the short run and by approximately 1.444 percentage points in the long run, holding other factors constant (ceteris paribus). In other words, improvements in educational attainment significantly contribute to poverty reduction. From a theoretical perspective, Becker's human capital theory (1964) posits that education represents an investment in human capital that enhances individual productivity and income. Furthermore, according to Todaro, improvements in human capital through education expand access to formal employment and strengthen labor market competitiveness, thereby reducing the likelihood that individuals are trapped in poverty. These findings reinforce the view that education serves as a strategic instrument for poverty alleviation.

Health and Poverty

The variable LE (Life Expectancy) has a coefficient of -0.4206 and is statistically significant at the 5 percent level. This result indicates that a one-year increase in life expectancy reduces the poverty rate by approximately 0.4206 percentage points in the short run and by approximately 0.4749 percentage points in the long run, holding other factors constant (ceteris paribus). This finding suggests that improvements in public health conditions contribute to poverty reduction. Better health increases labor productivity and reduces the financial burden of healthcare expenditures on households (Kartasasmita & (Indonesia), 1996). Therefore, investment in the health sector plays an important role in improving overall social welfare.

Population and Poverty

The variable lnPOP shows a negative coefficient of -2.7265, but it is not statistically significant at the 5 percent significance level (p-value = 0.091). Although the direction of the coefficient suggests that an increase in population may reduce poverty, the statistical evidence is not sufficiently strong at the 5 percent level. This result indicates that the relationship between population size and poverty may be indirect or influenced by other variables included in the model

Minimum Wage and Poverty

In contrast, the variable lnMW has a positive coefficient of 14.0646 and is statistically significant at the 5 percent level. Because this variable is expressed in natural logarithmic form, the model is specified in semi-log form. The results indicate that a 1 percentage point increase in the minimum wage is associated with a short-run increase in the poverty rate of approximately 0.14 percentage points and a long-run increase of approximately 0.16 percentage points, holding other factors constant (ceteris paribus). This finding suggests that increases in the minimum wage may, under certain conditions, lead to higher poverty levels. If lnMW represents the minimum wage, the result may indicate that wage increases not accompanied by productivity gains can put pressure on businesses, particularly small

enterprises, potentially leading to reductions in labor demand and higher poverty levels. This phenomenon is consistent with Mankiw's perspective, which argues that wage policies that are not supported by increased production capacity may generate contractionary effects on employment absorption.

Policy Implications

Overall, the estimation results indicate that economic growth, education, and health are key factors that consistently contribute to poverty reduction in both the short and long runs. Meanwhile, structural factors such as poverty persistence and wage policy also exhibit significant effects that require careful policy management. These findings are consistent with Todaro's development perspective, which argues that poverty alleviation cannot rely solely on economic growth but must also be supported by sustained investment in education and health as fundamental pillars of human development. Based on the overall findings, several policy implications can be drawn. First, poverty alleviation strategies should adopt a multidimensional approach. The government needs to ensure inclusive economic growth by strengthening labor-intensive sectors and promoting the development of micro, small, and medium-sized enterprises (MSMEs) so that the benefits of economic growth reach low-income groups directly. Second, investment in education should focus on improving the quality and relevance of the curriculum to better align with labor market demands, thereby maximizing its long-term benefits. Third, minimum wage policies should be accompanied by productivity-enhancing programs and appropriate incentives for businesses to avoid potential contractions in employment opportunities. Finally, strengthening the health sector should remain a priority, as improvements in health outcomes have been shown to reduce poverty by enhancing labor productivity and overall societal welfare.

CONCLUSION

This study examines the determinants of poverty across districts and municipalities in East Nusa Tenggara Province (NTT) during the 2010-2024 period using a dynamic panel approach based on the one-step First Difference Generalized Method of Moments (FD-GMM). The estimation results indicate that poverty in NTT exhibits persistence, as reflected by the coefficient of the lagged poverty variable of 0.1143 with a p-value of 0.037, which is statistically significant at the 5 percent level. This finding suggests that an increase in poverty in the previous period tends to raise the poverty level in the current period, indicating intertemporal dependence in the dynamics of poverty. From an economic determinants perspective, GRDP has a coefficient of -23.0400 with a p-value of 0.000, indicating a negative, statistically significant effect on poverty. The short-run effect shows that a 1 percent increase in GRDP reduces the poverty rate by approximately 0.23 percent, while the long-run effect increases to approximately -26.0133. In terms of human development, Mean Years of Schooling (MYS) has a coefficient of -1.2790 with a p-value of 0.000, and a long-run effect of -1.4440, indicating that improvements in educational attainment significantly reduce poverty. Similarly, Life Expectancy (LE) has a coefficient of -0.4206, p-value 0.000, and long-run effect of -0.4749, suggesting that improvements in health conditions contribute to poverty reduction. Meanwhile, the Open Unemployment Rate (OUR) has a coefficient of -0.0838 with a p-value of 0.136, indicating that it is not statistically significant at the 5 percent level. The population variable is also statistically insignificant, with a coefficient of -2.7265 and a p-value of 0.091, although the direction of the relationship suggests a negative

association with poverty. In contrast, the minimum wage (MW) has a positive coefficient of 14.0646 with a p-value of 0.000 and a long-run effect of 15.8789, indicating that increases in the minimum wage that are not accompanied by productivity improvements may put pressure on labor absorption and potentially lead to higher poverty levels.

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