Fiscal Decentralization, Human Development Index, and Infrastructure Toward Poverty in the East Nusa Tenggara Province

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Abstract—**Poverty in the East Nusa Tenggara Province (NTT) is a serious issue in national development. This study aims to examine the influence of fiscal decentralization, the Human Development Index (HDI), and infrastructure on the poverty level in districts/cities in the NTT Province for the period 2017-2020. Data were processed using Stata14 with the method of analysis being the random effect model (REM) panel data analysis. The data analysis shows that fiscal decentralization and infrastructure do not have a significant impact on the poverty level in NTT. Conversely, the Human Development Index (HDI) has a significant and negative impact on poverty in the NTT community. A higher HDI in districts/cities can contribute to reducing the poverty rate in the NTT community.**

Keywords—fiscal decentralization; human development index; infrastructure; poverty

I. INTRODUCTION

Poverty in the East Nusa Tenggara Province (NTT) remains a significant issue in national development. Based on statistical data, the number of poor people in NTT in 2020 reached 1,153,760 people, or 20.82% of the total population. This places NTT as the third-poorest province in Indonesia after Papua and West Papua. Nationally, the poverty rate in March 2020 was 10.19%, while NTT had a rate of 20.90% during the same period. This situation requires special attention from local governments in addressing the issue of poverty in NTT. The issue of poverty is not only related to the percentage of the population [1], but also to social factors [2], cultural factors [3], geography, central government interventions such as social protection programs [4], and village funds [5], as well as local government policies [6] in accordance with the mandate of Constitutional Law No. 23 of 2014 on decentralization principles.

Implementation of decentralization principles, both the provincial and district/city governments of NTT have more authority in managing local income and expenditures to

reduce poverty rates. This is because local governments are more aware of the needs and characteristics of their respective regions, allowing them to implement appropriate strategies to address existing poverty issues [6]. Looking at the total government spending in the NTT Province in 2020, it amounted to Rp42.70 trillion, with a realization percentage of 89.24% of the budget. The realization percentage of spending was lower compared to the previous year. When examined by district/city, spending realization varied significantly. Some districts experienced budget deficits, while others had surpluses. Figure 1 displays the income and expenditure of the NTT Province in 2020 by district/city.

Based on the figure, on average, districts/cities in NTT experienced deficits. The districts with the most severe deficits were Ende with Rp 469 million, followed by Southwest Sumba and East Sumba with Rp 442 million and Rp 440 million, respectively. Meanwhile, the top three districts/cities with surpluses were Nagekeo with Rp 60 million, Kupang City with Rp 22 million, and East Flores with Rp 13 million. This could be attributed to the suboptimal implementation of budget absorption policies by the NTT Province government in its efforts to accelerate National Economic Recovery (PEN). The provincial government of NTT actively provided various policy packages or stimuli in 2020 that contributed actively to various sectors to boost economic growth. With the growth of the economy, it is expected to reduce poverty rates in each district/city in NTT [7].

Apart from fiscal decentralization, the Human Development Index (HDI) is a crucial variable in measuring poverty in a region. HDI is used to evaluate the well-being of humans in various countries or regions. HDI is designed to provide a more comprehensive picture of the quality of life and human progress than just using a single economic indicator such as Gross National Income (GNI) per capita. HDI refers to three aspects: long and healthy life, knowledge level, and a decent standard of living [4].
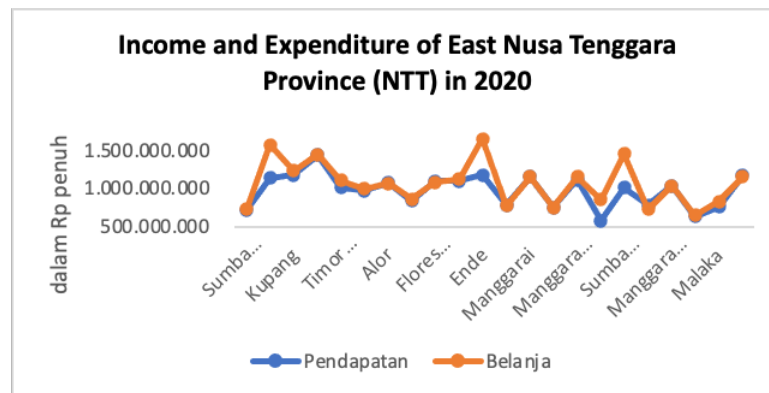
Figure 1. NTT Province Income and Expenditure in 2020
Source: BPS NTT 2020

Infrastructure plays a significant role in influencing the poverty rate in a region or country. Good infrastructure can have a significant impact on reducing poverty rates and improving the well-being of the population. Understanding the essential role of infrastructure, having adequate infrastructure conditions is a necessity. Infrastructure development needs to consider comprehensive aspects of quantity and accessibility, especially for economically disadvantaged groups. Access to infrastructure services by less privileged communities has the potential to boost economic activities and improve their quality of life. With the improvement in the quality of life of these marginalized communities, they can gradually escape the cycle of poverty. Therefore, the primary goal of establishing infrastructure facilities is to achieve the objective of reducing poverty [7].

Some previous studies on the relationship between macro variables and poverty in NTT include: Akbar & Arifin examined the influence of regional gross domestic product, Human Development Index (HDI), population size, and Open Unemployment Rate (OUR) on Poverty Rates in Districts/Cities in the NTT Province. This study found that regional gross domestic product had a positive and significant effect; HDI had a negative and significant effect; population size had a positive and significant effect; OUR had a positive and significant effect on poverty [8]. Abel et al. found that economic growth did not significantly affect poverty, but HDI had a negative but not significant effect on poverty. Meanwhile, Nalle, et al., (2022) found that HDI actually had a positive effect on the number of poor people in NTT [4].

Based on previous research, this study aims to: 1) examine the effect of fiscal decentralization on poverty in NTT. 2) Examine the effect of the Human Development Index on poverty rates in the East Nusa Tenggara Province. This research is an applied study that focuses on the influence of fiscal decentralization, the Human Development Index, and infrastructure on poverty levels in the NTT community from 2017 to 2020. The results of this study can serve as a guide or reference for evaluating human resources in implementing fiscal policies that can reduce poverty levels in the East Nusa Tenggara Province and improve public services to achieve significant economic growth that can provide welfare to the people of East Nusa Tenggara.

II. LITERATURE REVIEW

A. Poverty

Poverty refers to the condition in which an individual lacks sufficient economic means to achieve a standard of living considered average in a particular area. This incapacity includes insufficient income to meet basic needs such as food, clothing, and shelter. Additionally, this low income can also impact the ability to attain common living standards, such as adequate levels of health and education [9].

Poverty is a complex and multifactorial phenomenon [10]. Some variables that can be used to analyze the measurement of poverty in a region include income, the level of education in the community, income inequality, health conditions, job availability, infrastructure/access, food security, access to public services, economic instability, and social availability. Some recent variables influencing poverty include provincial minimum wages, Human Development Index (HDI), economic growth, and unemployment [11]. Meanwhile, Pandu found that infrastructure has a negative and significant impact on poverty [12].

B. Fiscal Decentralization

Fiscal decentralization is the process of transferring responsibilities and authorities related to fiscal policies, such as revenue collection, management, and budget expenditure, from the central government to lower levels of government, such as regional or local governments. This means that regional or local governments have greater control over their own financial resources [13]. The emergence of the role of decentralization is an instrument to achieve one of the state's goals, particularly in providing better public services. Therefore, properly implemented fiscal decentralization ensures the promotion of equality among regions [14]. Fiscal decentralization adheres to the principle of money follows function. This means that every transfer or delegation of government authority has budgetary consequences for carrying out those responsibilities. The success of decentralization is not solely a matter of the quantity of funds transferred by the central government to regions [15]. Money follows function is the fundamental key to the functioning of decentralization because every allocated currency is based on the tasks and responsibilities that regional governments must undertake.

The degree of fiscal decentralization is calculated based on the comparison between the total regional own-source revenue and total regional revenue [16]. The equation used to measure the degree of fiscal decentralization is as follows:

$$DDF = PAD/TPD \times 100\% \qquad (1)$$

Where, DDF is degree of fiscal decentralization; PAD is local own-source revenue; TPD is total regional revenues.
The higher the contribution of regional original income to total regional revenues, the greater the ability of the local government to implement decentralization. According to Syamsul, fiscal decentralization has a significant negative impact on the poverty rate in Indonesia [17].
H1. Fiscal decentralization has a significant impact on the poverty rate in the East Nusa Tenggara community.

C. Human Development Index

The Human Development Index (HDI), calculated by the Central Statistics Agency (BPS), follows three main aspects: long and healthy life expectancy, knowledge level, and decent standard of living. This calculation has been ongoing since 2015 and adopts the updated method introduced by the United Nations Development Programme (UNDP) in 2014 (Akbar and Arifin, 2023). HDI combines these three aspects into a single number that reflects the overall well-being of the human population in a region. In this way, HDI provides a more holistic view of the social and economic conditions of the population, rather than relying solely on a single economic measure such as Gross National Income (GNI) per capita.

Life expectancy estimates the average age that the population of a region can expect to reach. The higher the life expectancy, the better the quality of healthcare and the environment available. The health aspect includes the population's access to basic healthcare services such as vaccination, maternal and child healthcare, general medical care, and efforts to control infectious diseases. Additionally, the presence of a clean and safe environment also contributes positively to longer life expectancy. Disease prevention, adequate sanitation, and access to clean water can all increase the life expectancy of the population. The knowledge level reflects the population's access to education and information that enables them to enhance their skills, knowledge, and individual capabilities. This includes participation in both formal and non-formal education, such as primary education, secondary education, higher education, job training, and literacy rates. Higher levels of education can open up better job opportunities and increase an individual's participation in social and economic development. A decent standard of living encompasses the population's ability to meet their basic needs, such as food, access to clean water, suitable housing, and access to other essential services. This also includes economic aspects such as per capita income, the availability of decent jobs, and access to a stable job market. A high standard of living also involves access to public facilities such as electricity, transportation, sanitation, and adequate social infrastructure [18].

Previous research indicates that HDI has a negative and significant impact on the poverty rate in the NTT community [8], [1], while HDI has a negative but not significant impact on poverty in NTT [4].
H2. The Human Development Index has a significant impact on the poverty rate of the NTT community.

D. Infrastructure

Infrastructure refers to various types of physical facilities, systems, and structures that are built and operated to support the functions of society and the economy. It encompasses various aspects of daily life that are essential for the development and well-being of a region. Infrastructure plays a crucial role in addressing poverty-related issues such as facilitating access to employment, education, healthcare services [19], markets, the development of remote areas, and the empowerment of the local economy [20]. Infrastructure development has contributed to Indonesia's economic growth by increasing the overall real per capita income [21].

The infrastructure used in this study is the increase in the condition of good and fair roads in all districts/cities in NTT. Road infrastructure plays a role in reducing production costs, advancing labor productivity, and creating job opportunities. As a result, this can stimulate and drive economic activities within communities and thus have the potential to reduce the number of poor people and improve the well-being of the population [22].
H3. Infrastructure significantly influences the poverty rate of the people of NTT.

III. RESEARCH METHODS

This research utilized secondary data from the NTT Central Bureau of Statistics (BPS NTT), consisting of panel data from 2017 to 2022. The BPS data was processed and integrated with other supporting data and documents. The data used includes poverty data for NTT, fiscal decentralization, Human Development Index, and infrastructure data. The infrastructure data specifically covers the length of roads in good and fair condition. The obtained data will be transformed into panel data, which combines time series and cross-sectional data. Table 1 presents the types of data and their sources used in this study.

Table 1. Types and Sources of Data

Variable	Description	Unit	Source
LnKSN (Y)	Total Poor Population	thousand people	BPS
DFL (X1)	Fiscal Decentralization	%	BPS
IPM (X2)	Human Development Index	%	BPS
LnIFT (X3)	Infrastructure	km	BPS

The model for this research is as follows:

$$LnKSN_{it} = \beta_0 + \beta_1 DFL_{it} + \beta_2 IPM_{it} + LnIFTX_{3it} + \varepsilon_{it} \quad (2)$$

Where, Ln is the natural logarithm; KSN is the number of poor population (in thousand people); DFL is fiscal decentralization (%); IPM is the Human Development Index (%); LnIFT is road infrastructure (Km); β_0 is the constant; β_1 and β_2 are regression coefficients; i represents cross-sectional data (22 districts/cities in NTT Province); t represents time series data for the years 2017-2020; and ε is the residual.

The quantitative analysis method in this research is panel data regression using Stata14 software. The analysis of the panel data equation employs three models: the common effect model (CEM) with the Chow test, the fixed effect model (FEM) with the Hausman test, and the random effect model (REM) with the Lagrange Multiplier to find the best model. First, the Chow test is conducted. If the probability value is > 0.05, then the CEM model is used; conversely, if the probability is < 0.05, the FEM is used. The Hausman test is performed if the model selected in the Chow test is FEM. If the Chow test results in CEM, then the Lagrange Multiplier test is conducted. For the Lagrange Multiplier test results where the probability is > 0.05, the decision is to use the CEM model, whereas if the probability is < 0.05, the REM model is used. This result determines the subsequent analysis. If the best model is CEM, it is followed by testing classical assumptions, while if the selected model is REM, it is not required.

IV. RESULTS AND DISCUSSION

A. Descriptive Analysis

The descriptive statistics in table 2 depict the data on fiscal decentralization, HDI, and infrastructure in NTT concerning the issue of poverty. The mean and median values for fiscal decentralization are 9.745 and 6.64, respectively. This indicates that half of the districts/cities in NTT for the period 2017-2020 have fiscal decentralization levels below the average. Meanwhile, the mean and median values for HDI are relatively symmetric at 8.010 and 8.053. This means that the majority of areas in NTT exhibit similar levels of progress in terms of the Human Development Index. Regarding infrastructure, the mean and median values are 1.964 and 1.5, indicating that most districts/cities in NTT have below-average increases in the length of roads in good and fair condition.

Table 2. Descriptive Statistics

Variable	Obs.	Std. Dev.	Mean	Median	Min	Max
nKSN(Y)	88	7.209	21.986	22.84	8.96	36.01
DFL(X1)	88	14.445	9.745	6.64	1.163	124.28
IPM(X2)	88	0.731	8.010	8.053	6.608	10.098
LnIFT(X3)	88	1.656	1.964	1.5	-0.71	5.16

B. Panel Data Regression

Before conducting regression, the research model was tested using the Chow test. Based on the Chow test, the probability value is 0.8625 > 0.05. This means that the selected model is the common effect model (CEM). Next, the Lagrange Multiplier test was conducted, and the resulting probability value is 0.0021 < 0.05. Therefore, the selected model is the random effect model (REM). The coefficient of determination (R^2) test result for the REM model is 0.2701. This indicates that the variables of fiscal decentralization, HDI, and infrastructure can explain 27.01% of the variability in the poverty rate in NTT, while the remaining 72.99% is explained by other variables not included in this research model. The low R-squared value in some cases explains that the measured phenomenon, namely poverty, is influenced by other factors that are difficult to predict. Table 3 presents the regression result.

Table 3. Results of panel data regression using Stata14.

VARIABLES	(1) LnKSN(Y)
DFL(X1)	0,000335
	(0,00405)
IPM(X2)	-0,523***
	(0,144)
LnIFT(X3)	-0,0361
	(0,0414)
Constant	26,25***
	(1,697)
Observations	88
Number of KabKota	22

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The panel data regression equation can be written as follows:

$$LnKSN(Y) = 26,25 + 0,000335DFL(X1) - 0,523IPM(X2)$$
$$- 0,0361LnIFT(X3) + \varepsilon it \qquad (3)$$

1) The influence of fiscal decentralization on the poverty in NTT

The fiscal decentralization variable has a coefficient value of 0.000335 and does not have a significant effect on the poverty rate in NTT. This means that hypothesis H1 is rejected, where every 1% increase in fiscal decentralization will result in a 0.0335% increase in the poverty rate of the NTT population. This result contradicts some previous studies that stated fiscal decentralization has a negative and significant impact, such as in Bali [23] and East Java [24]. This could be due to regional and time differences.

The level of fiscal decentralization in NTT from 2017-2020 has actually played a role in the increasing poverty rate. There are several reasons why fiscal decentralization actually increases poverty in NTT. First, the powerlessness of poor regions. The income of NTT local governments still depends on funds from the central government. These regions have limited resources and capacity to efficiently manage funds or to develop effective development projects. Therefore, fiscal decentralization does not produce significant benefits for the poor regions in NTT. This can lead to high or even increasing poverty rates. Second, the lack of supervision and accountability. Fiscal decentralization without adequate supervision and accountability can lead to the misuse of public funds by local governments, corruption, and uncertainty in resource allocation. This can reduce the expected positive impact of fiscal decentralization on poverty reduction. Third, political issues. Political issues also affect local government management. People occupying key and strategic positions are those who share the same political direction as the elected regional head, rather than being based on competence. Fourth, structural issues. Structural issues in regional economies, such as a lack of job opportunities or inequality in resource distribution, may be the main factors causing poverty. Fiscal decentralization may not be effective in addressing these structural issues without more comprehensive actions and policies.

2) The Influence of the Human Development Index on Poverty in NTT

The Human Development Index (HDI) variable has a coefficient value of -0.523*** and has a significant effect on poverty in NTT. This means that hypothesis H2 is accepted. The coefficient value being negative indicates a positive relationship between HDI and the poverty rate in NTT. This means that every 1% increase in the Human Development Index will result in a 52.30% decrease in the poverty rate among the NTT population. This result is consistent with some previous studies indicating that HDI has a negative and significant impact on the poverty rate in NTT [8], [1].

According to Akbar and Arifin, HDI comprises three main aspects: long and healthy life expectancy, knowledge level, and a decent standard of living [8]. When people have a long and healthy life expectancy, they tend to be more economically productive. They can continue to work or contribute to the economy for a longer period. Good health also means they are better able to perform their jobs well, avoid absences due to illness, and have higher productivity. Knowledge levels can play a role in poverty alleviation as they shape behavior patterns related to accessing resources, business skills, and better job opportunities. A decent standard of living ensures that individuals and families have access to basic needs such as food, clean water, clothing, adequate housing, and healthcare services. By having access to all of these, absolute poverty levels can decrease as individuals and families have their basic needs met.

3) The Influence of Infrastructure on the Poverty in NTT

The infrastructure variable has a coefficient value of -0.0361 and is not statistically significant in explaining the poverty rate in NTT. This means that hypothesis H3 is rejected. The negative coefficient indicates a negative relationship between infrastructure and poverty in NTT. This means that every 1% increase in infrastructure will result in a 3.61% decrease in the poverty rate among the NTT population. The availability of good road networks can reduce the isolation of communities and improve accessibility to trade activities that connect farmers with markets and customers. This can stimulate and create greater economic opportunities throughout the NTT region. Moreover, roads can also improve access to education, making it easier for children to attend school and access quality education [7]. Ultimately, well-maintained road infrastructure can attract investment and tourism to an area. This can, of course, create job opportunities and additional income [25].

However, most districts/cities had an increase in roads in good and fair condition during the period 2017-2020 that was below average. The lack of significant impact of road infrastructure could be due to the strong economic connectivity between the regions connected by these roads [26]. Additionally, issues of corruption or poor management in road infrastructure projects can hinder the ability of infrastructure to provide benefits. Funds that should be used for road construction and maintenance can be diverted or misused, ultimately harming the poor. This reality can lead to infrastructure not having a significant impact on poverty in NTT.

V. CONCLUSION

Poverty in the East Nusa Tenggara (NTT) Province remains a significant issue in national development. In 2020, approximately 20.82% of the total population of NTT, or around 1,153,760 people, were living in poverty. This makes NTT the third-poorest province in Indonesia after Papua and West Papua. The poverty rate in NTT during the same period (March 2020) was higher than the national poverty rate, which stood at 10.19%. This indicates that NTT faces significant challenges in addressing the issue of poverty.

This research identified factors influencing the poverty rate in NTT, such as fiscal decentralization, the Human Development Index (HDI), and infrastructure. The analysis results show that the HDI has a significant negative impact on the poverty rate in NTT. In other words, an increase in the HDI can help reduce the poverty rate. However, fiscal decentralization and road infrastructure did not have a significant impact on the poverty rate in NTT. Although good road infrastructure can enhance accessibility and economic opportunities, the analysis results indicate that the state of infrastructure has not yet had a significant impact on the poverty rate in NTT.

To reduce the poverty rate in NTT, government efforts should focus on improving the Human Development Index (HDI) and ensuring that fiscal decentralization and infrastructure development operate efficiently and effectively. Local and central governments need to collaborate in designing appropriate policies to address this complex issue of poverty in NTT.

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