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Research Article

Analysis Determinants of Human Development Index in Bali Province

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Abstract: This research investigates the relationship between fiscal decentralization, economic growth, and income inequality (measured by the Gini ratio) on the Human Development Index (HDI) in regencies and cities within Bali Province during the 2013–2023 period. Human development is a crucial indicator of regional welfare, and understanding the factors that shape HDI is essential for designing effective regional development policies. A quantitative approach was employed through panel data regression, utilizing secondary data sourced from the Central Bureau of Statistics (BPS). The findings indicate that fiscal decentralization has a positive and significant effect on HDI, suggesting that greater regional fiscal authority can improve public service delivery and social welfare. Conversely, economic growth demonstrates a significant negative relationship with HDI, which implies that growth alone does not automatically translate into improved human development, particularly when it is unevenly distributed. In addition, income inequality shows a negative and significant effect on HDI, confirming that disparities in income hinder broader improvements in welfare. Collectively, these variables significantly explain variations in HDI across regencies and cities in Bali. The policy implications emphasize the need to strengthen regional fiscal capacity, reduce income inequality, and encourage inclusive economic growth to ensure that economic progress contributes effectively to enhancing human development.

Keywords: Bali Province**;** Economic Growth; Fiscal Decentralization; Gini Ratio; Human Development.

1. Introduction

Human development has become a central issue in development studies, highlighting that economic growth alone does not guarantee an improvement in people's welfare (Mongan, 2019). The Human Development Index (HDI), first introduced by UNDP in 1990, encompasses three fundamental dimensions: health, education, and standard of living (Islamiastus & Martha, 2021). In the Indonesian context, HDI serves as an essential tool for evaluating the performance of regional development. The advancement of human resources is considered a crucial indicator of development success, given its direct influence on economic growth. Within this framework, individuals are regarded not merely as recipients of development outcomes but also as active agents who play a pivotal role in advancing regional progress. Their active contribution, in aggregate, also strengthens national development advancement. Moreover, development efforts remain directed toward accelerating economic growth, reducing income inequality, and alleviating poverty.

In Bali Province, HDI has generally improved between 2013 and 2023, yet disparities persist across regions. Denpasar consistently records the highest HDI, while Karangasem and Bangli lag behind. These disparities indicate uneven human development outcomes, influenced by fiscal capacity, economic structures, and income distribution. Given Bali's reliance on tourism, economic shocks such as the COVID-19 pandemic further highlight the fragility of growth-driven development (Badan Pusat Statistik Provinsi Bali, 2024).

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Fiscal decentralization, introduced in Indonesia through Law No. 22/1999 and Law No. 25/1999, provides local governments with greater autonomy to manage public resources. Effective fiscal decentralization is expected to enhance public services and human development (Nadeak et al., 2022). However, differences in fiscal capacity may also widen regional disparities (Tirtosuharto & Darius, 2017). Similarly, while economic growth is traditionally associated with welfare improvements (Ariza, 2016), its distribution matters. High income inequality, measured through the Gini ratio, often constrains improvements in HDI (Bengung et al., 2023).

This research seeks to empirically examine how fiscal decentralization, economic growth, and income inequality affect the Human Development Index (HDI) across districts and cities in Bali Province.

2. Literature Review

The Human Development Theory (Mahbub ul Haq, UNDP, 1990) positions human beings as the central focus of development, emphasizing productivity, equity, sustainability, and empowerment. This theory provides a conceptual framework for analyzing how fiscal policy (decentralization), economic performance (economic growth), and income distribution (Gini ratio) influence human welfare in a holistic manner. Meanwhile, The Endogenous Growth Theory (Romer, 1986; Lucas, 1988) highlights the role of human capital and innovation as key engines of sustainable economic growth. The endogenous growth model views the factors driving economic growth as originating from within the structure of the economy itself. Within this framework, technological progress is not treated as an external variable but rather as the outcome of internal processes that can be influenced by policy, knowledge investment, and domestic economic activities. This theory is similar to the neoclassical growth theory, but the differences lie in several assumptions and conclusions. The model is built on the assumption of increasing returns to scale in the aggregate production function, while rejecting the premise of diminishing marginal returns to capital. Additionally, it incorporates the influence of externalities in shaping the rate of return on capital investment within the endogenous growth framework. (Arsyad, 2015).

Human Development Index

UNDP (1990) developed the Human Development Index (HDI) as a composite indicator that tracks achievements in health, education, and standard of living. Life expectancy at birth represents health, education is gauged through average and expected years of schooling, and income per capita (adjusted) indicates living standards. (Todaro & Smith, 2006). HDI provides a more comprehensive measure than per capita income alone because it integrates both social and economic dimensions (Islamiastus & Martha, 2021).

A higher HDI implies greater access to essential services, higher productivity, and improved quality of life (Syofya, 2018). In Indonesia, HDI has been used as a benchmark for regional development disparities. Bali's HDI performance generally falls within the "high" category (≥70), yet inter-regional disparities persist between urban and rural regencies, highlighting unequal development outcomes.

Fiscal Decentralization

Fiscal decentralization is defined as the delegation of financial authority from the central government to local governments, allowing them to allocate revenues and expenditures based on regional needs (Oates, 1972). Its extent is commonly assessed through the proportion of locally generated revenue (PAD) to the total regional income. (Hayati & Achasa, 2014). In theory, decentralization enhances efficiency and accountability by aligning public spending with local needs (Kuncoro, 2004).

Empirical studies show mixed results. Some highlight positive impacts on human development when local governments allocate resources effectively (Christia et al., 2019). However, others caution that unequal fiscal capacities among regions may widen disparities (Rodden et al., 2003). In Indonesia, fiscal decentralization remains expenditure-driven, with limited revenue autonomy at the local level(Nurhemi & Suryani, 2015). For Bali, effective fiscal management is crucial, given the heavy reliance on tourism-related revenues.

Economic Growth

Economic growth is generally assessed using the Gross Regional Domestic Product (GRDP). at constant prices, reflects an increase in goods and services produced in a region over time (Kuznets, in Jhingan, 2016). Growth is often viewed as a driver of human development, as rising output per capita can enhance incomes, employment opportunities, and public services (Machmud, 2016).

However, growth-led development is not always inclusive. Endogenous Growth Theory (Romer, 1986; Lucas, 1988) emphasizes that human capital, innovation, and knowledge spillovers are central to sustained growth. If growth is concentrated in specific sectors or regions such as tourism in Bali the benefits may not spread evenly. This leads to vulnerability, as shown during the COVID-19 pandemic when Bali's tourism-dependent economy contracted sharply. Studies also suggest that without equitable distribution, growth may fail to significantly improve HDI (Dewi, 2017).

Income Inequality (Gini Ratio)

Income inequality, measured by the Gini ratio, captures disparities in income distribution within a society. A Gini value closer to 0 indicates equality, while values closer to 1 reflect greater inequality(Todaro & Smith, 2006). High inequality can hinder human development by restricting access to health, education, and economic opportunities for lower-income groups (Hindun et al., 2019).

Empirical evidence consistently finds a negative relationship between inequality and HDI. For instance, Syofya, (2018) argues that inequality reduces labor productivity and limits human capital investment. Bengung (2023)also found that higher inequality in Indonesian provinces correlates with slower progress in HDI. Conversely, regions with more equitable income distribution tend to achieve better outcomes in education and health.

Linkages Between Variables

Based on theoretical and empirical studies, the relationships among the variables can be summarized as follows: (1) Fiscal decentralization is expected to positively affect HDI if local governments allocate resources efficiently. (2) Economic growth may positively impact HDI, but its effect depends on distributional equity. Unequal growth can even negatively influence human development. (3) Income inequality generally has a negative impact on HDI, as it limits access to basic services for the poor.

Therefore, the study hypothesizes that fiscal decentralization positively influences HDI, while economic growth and income inequality may exert negative effects.

3. Methodology

This research applies a quantitative methodology, which focuses on examining numerical data through statistical techniques to test hypotheses (Sugiyono, 2018). This approach was selected because the objective of this study is to measure and analyze the influence of fiscal decentralization, economic growth, and income inequality on the Human Development Index (HDI) in Bali Province.

Location and Period of Research

The research was conducted in Bali Province, consisting of 9 regencies/municipalities. The observation period covers the years 2013–2023, or eleven years in total, depending on data availability.

Types and Souces of Data

The data used in this study are secondary data collected from institutional publications. The main sources include: Central Bureau of Statistics (Badan Pusat Statistik, BPS) of Indonesia, BPS Bali, relevant journals, books, and previous research related to HDI, fiscal decentralization, economic growth, and inequality.

Data Collection Method

Type of Data

The research method applied in this study is quantitative descriptive. This approach aims to analyze and explain phenomena currently occurring in an objective manner. In addition, this method is used to present a clear, structured, and accurate depiction of various facts, characteristics, and relationships among the variables studied. Through a quantitative descriptive approach, this research seeks to interpret data systematically to gain a more comprehensive insight into the patterns and tendencies observed in the phenomenon. This enables the study to produce fact-based findings that can serve as a foundation for decision-making or policy development.

Sources of Data

This research employs secondary data as the primary source of analysis. Secondary data refers to information that has been collected, organized, and presented in various formats by other parties, making it readily available for research purposes. Such data has generally undergone prior processing, allowing it to be further analyzed in accordance with the research objectives.

Typically, secondary data is available in the form of statistics or reports compiled by various institutions, such as government agencies, data bureaus, private companies, or other organizations involved in data management and utilization. The use of secondary data facilitates researchers in obtaining relevant information without the need to collect data from the ground up, thereby enabling the research to be conducted more efficiently and systematically.

Variables and Operational Definitions

The operational definition of variables is used to facilitate understanding of the variables applied in this study. This study applies the following operational definitions for its variables:

Dependent Variable

The dependent variable, also known as the outcome variable, represents the construct affected by the independent variables (Sugiyono, 2016). In this study, the Human Development Index (HDI) serves as the dependent variable.. The HDI is constructed based on three fundamental dimensions: life expectancy as a reflection of longevity and health, education level as an indicator of knowledge, and per capita income representing a decent standard of living. This study employs HDI data for Bali Province by regency/municipality from 2013 to 2023, obtained from the Bali Provincial Statistics Agency, and expressed in percentage (%).

Independent Variables

Independent variables are those that influence the dependent variable. The independent variables used in this study are as follows:

Fiscal Decentralization

Fiscal decentralization is defined as the delegation of authority and responsibility from the central government to regional governments in managing public service functions. The primary aim of this mechanism is to enhance societal welfare by promoting more responsive and efficient governance at the local level. The extent of local government capacity plays a central role in this process to implement fiscal decentralization can be measured through the fiscal decentralization ratio, which in this study is proxied as follows:

$$Degree\ of\ Fiscal\ Decentralization = \frac{Local\ Own\ Source\ Revenue}{Total\ Regional\ Income} \times 100\%$$

This study uses data on the Degree of Fiscal Decentralization of regencies/municipalities in Bali Province from 2013 to 2023, expressed in percentage (%).

Economic Growth

Economic growth within a region in Indonesia is commonly assessed through fluctuations in the value of the Gross Regional Domestic Product (GRDP), which reflects the overall economic output generated by that area. In general, the rate of economic growth is measured by comparing GRDP at constant prices across specific time periods. The calculation of economic growth can be formulated as follows:

$$Economic\ Growth = \frac{GDRP1 - GDRP0}{GDRP0} \times 100\%$$

Explanation:

GDRP1: GDRP in the current year
GDRP0: GDRP in the previous year

The data used in this study are Economic Growth figures at constant prices for regencies/municipalities in Bali Province from 2013 to 2023, expressed in percentage (%).

Income Inequality

Income Inequality measured using the Gini Ratio, which is a coefficient used to assess the level of income distribution inequality, with values ranging between 0 and 1. The closer the value is to zero, the more equal the income distribution is reflected. Conversely, a value approaching one indicates a higher degree of inequality in income distribution within an economy (Dumairy, 2004). The Gini Ratio can also be proxied by the following formula:

$$Gini = 1 - \sum_{i=1}^{n} fi(Yi + Yi_{-1})$$

Explanation:

Fi: Percentage (%) of income recipients in class *i*
Yi: Cumulative percentage (%) of income in class *i*

This study employs Gini Ratio data of regencies/municipalities in Bali Province from 2013 to 2023, expressed as a ratio (0–1), and observes changes in the ratio by subtracting the previous year's value from the current year's value.

Data Analysis Technique

This research employs panel data regression analysis to assess the impact of the independent variables on HDI. The use of panel data, which integrates both cross-sectional and time-series dimensions, enhances the degrees of freedom while minimizing multicollinearity among the explanatory variables (Gujarati & Porter, 2013).

In addition, panel data regression can address issues arising from omitted variable bias. This is because the method simultaneously incorporates information from both time series and cross-sectional data (Widarjano, 2013). The combination of these two types of data enables a deeper analysis of temporal dynamics as well as differences in characteristics across units, thereby producing more comprehensive research results.

Panel data regression models can be estimated using three primary approaches: the Common Effect Model, the Fixed Effect Model, and the Random Effect Model. Each of these methods provides a framework for capturing relationships among variables in panel data with greater precision. The regression model is specified as:

$$HDIit = \alpha + \beta_1 Fisdecit + \beta_2 Growthit + \beta_3 Giniit + eit$$

Model selection was carried out through a series of statistical tests. The Chow Test was employed to determine whether the Fixed Effect Model (FEM) provides a better fit compared to the Common Effect Model (CEM). The Hausman Test was then applied to assess the suitability of FEM relative to the Random Effect Model (REM). Furthermore, the Lagrange Multiplier (LM) Test was used to evaluate whether REM is preferable to CEM. The choice of the most appropriate model was based on the results of these tests and their statistical significance. To ensure the robustness and reliability of the regression analysis, classical assumption tests including normality, multicollinearity, heteroskedasticity, and autocorrelation were also conducted.

4. Results and Discussion

HDI in Bali shows an upward trend across all regencies from 2013 to 2023, with Denpasar consistently highest and Karangasem lowest. Fiscal decentralization varies, with higher ratios in urban areas. Economic growth fluctuates, with a sharp decline in 2020 due to COVID-19, highlighting Bali's vulnerability to tourism shocks. Gini ratios also indicate persistent inequality, with urban regencies showing wider income disparities.

Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	72.38615	2.102425	38.23497	0.0000
X1_DDF	8.785381	2.938450	2.989801	0.0487
X2_PE	-0.106625	0.029801	-3.577876	0.0044
X3_GINI	-26.09942	5.328316	-4.898249	0.0000

Table 1. Fixed Effect Model Regression.

From the equation above, the interpretation can be explained: (1) Constant (α) = 72.38615, This indicates that if the Degree of Fiscal Decentralization (X1), Economic Growth (X2), and Gini Ratio (X3) are all equal to zero, the predicted value of the Human Development Index (Y) is 72.38615 percent (72.38%). (2) Coefficient X1 = 8.785381, The regression coefficient for X1 is 8.785381, which means that for every 1% increase in the Degree of Fiscal Decentralization, the Human Development Index increases by 8.785381 percent (8.78%). (3) Coefficient X2 = -0.106625, The regression coefficient for X2 is –0.106625, which means that for every 1% increase in Economic Growth, the Human Development Index decreases by 0.106625 percent (0.10%). (4) Coefficient X3 = -26.09942, The regression coefficient for X3 is –26.09942, which means that for every one-point increase in the Gini Ratio, the Human Development Index decreases by 26.09942 points.

t-Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	72.38615	2.102425	38.23497	0.0000
X1_DDF	8.785381	2.938450	2.989801	0.0487
X2_PE	-0.106625	0.029801	-3.577876	0.0044
X3_GINI	-26.09942	5.328316	-4.898249	0.0000

Table 2. t-Test Result.

Partial Effect of Fiscal Decentralization on HDI

Based on Table 3, the calculated *t* value is 2.989801 and the *t* table value is 1.985. Since 2.989801 > 1.985 and the probability value is 0.0487 < α 0.05, it can be concluded that H0 is rejected and H1 is accepted. This means that, partially, there is a significant influence of the independent variable Fiscal Decentralization on the dependent variable Human Development Index in the regencies/municipalities of Bali Province during 2013–2023.

Partial Effect of Economic Growth on HDI

Based on Table 3, the calculated *t* value is 3.577876 and the *t* table value is 1.985. Since 3.577876 > 1.985 and the probability value is 0.0044 < α 0.05, it can be concluded that H0 is rejected and H1 is accepted. This indicates that, partially, there is a significant influence of the independent variable Economic Growth on the dependent variable Human Development Index in the regencies/municipalities of Bali Province during 2013–2023.

Partial Effect of Gini Ratio on HDI

Based on Table 3, the calculated *t* value is 4.898249 and the *t* table value is 1.985. Since 4.898249 > 1.985 and the probability value is 0.0000 < α 0.05, it can be concluded that H0 is rejected and H1 is accepted. This shows that, partially, there is a significant influence of the independent variable Gini Ratio on the dependent variable Human Development Index in the regencies/municipalities of Bali Province during 2013–2023.

F Test

F-statistic	156.6843
Prob(F-statistic)	0.000000

Table 3. F Test Result.

Based on Table 4, the calculated *F* value is 156.6843, while the *F* table value is 2.70. Since 156.6843 > 2.70 and the probability value is 0.000 < α 0.05, it can be concluded that H0 is rejected and H1 is accepted. This indicates that there is a significant influence of the independent variables Fiscal Decentralization, Economic Growth, and the Gini Ratio on the dependent variable, the Human Development Index, in Bali Province during the period 2013–2023.

Coefficient Determination

R-squared	0.951948
Adjusted R-squared	0.945872

Table 4. Coefficient Determination Result.

Based on Table 5, it can be seen from the table above that the coefficient of determination is 0.951948, which means that 95.1948% of all observations indicate that the independent variables Fiscal Decentralization, Economic Growth, and the Gini Ratio are able to explain the dependent variable, the Human Development Index. Meanwhile, 0.048052 or 4.8052% is influenced by other variables not examined in this study.

5. Comparison

The Effect of Fiscal Decentralization on the Human Development Index

In this study, the Degree of Fiscal Decentralization has a significant effect on the Human Development Index. This finding is consistent with the theory of Fiscal Federalism introduced by Richard Musgrave (1959) and later expanded by Wallace E. Oates (1972) in his book Fiscal Federalism. According to this theory, fiscal decentralization provides local governments with greater opportunities to be more responsive in meeting the needs and preferences of their communities through the principle of subsidiarity. In this context, the central government still plays an important role in economic stabilization and income distribution, while local governments are expected to focus more on providing public services that align with local conditions and needs, which in turn support the key indicators of the Human Development Index.

This result is in line with Sinuraya, (2020), who found that fiscal decentralization has a positive and significant influence on improving the Human Development Index (HDI). Through fiscal decentralization mechanisms, local governments gain greater autonomy in managing revenue sources and budget allocations, particularly in sectors that directly impact human development, such as education, healthcare services, and enhancing people's purchasing power.

With fiscal autonomy, budget allocations can be adjusted according to local needs and priorities, making policies more responsive and well-targeted. This is further supported by the findings of Pekei & Beni (2016), who emphasized that granting greater authority requires local governments to improve services and enhance public welfare.

Fiscal decentralization policies also demand close coordination between provincial and municipal/regency governments, as local governments generally have a better understanding of their citizens' needs compared to the central government. This allows for the formulation of human development programs (e.g., improving school quality, basic healthcare services, vocational training) that are more suited to local contexts. Fiscal decentralization also requires local governments to take greater responsibility for their development outcomes, thereby creating political and social pressure to improve public service performance ultimately contributing to the enhancement of the Human Development Index in the regencies/municipalities of Bali Province.

The Effect of Economic Growth on the Human Development Index

In this study, Economic Growth has a significant negative effect on the Human Development Index. This finding appears to contradict the basic logic of economics, which views economic growth as a primary driver of human development. However, this phenomenon can be explained both theoretically and contextually. The Growth without Development theory suggests that high economic growth does not always translate into improved human development or real social welfare. In other words, even though gross domestic product (GDP) or economic output increases, the quality of life, income distribution, access to basic services, and poverty alleviation may not improve proportionally.

In line with this theory, Todaro & Smith (2006) argue that economic growth does not necessarily reflect human development if the benefits of growth are not distributed evenly or inclusively. In this context, the increase in GRDP may stem from activities in specific sectors such as tourism in Bali yet its impact on education quality, healthcare, and overall living standards is not directly felt by the wider population.

Dewi (2017) also stated that higher economic growth does not automatically guarantee improvements in the Human Development Index (HDI). One reason is the ineffective utilization of resources generated from such growth to foster progress in other dimensions of development. Furthermore, existing social structures and mechanisms often fail to provide meaningful benefits to poorer segments of society.

The research data also reveal an important phenomenon: in several regions of Bali during 2013–2023, increases in Economic Growth were accompanied by rising Gini Ratios. For instance, this occurred in Karangasem Regency in 2022, Denpasar City in 2021, Buleleng Regency in 2021, and Tabanan Regency in 2023, where economic growth rose alongside worsening income inequality as reflected by the Gini Ratio. This indicates that while regional economies experienced growth, income distribution and social welfare became more unequal, with wealthier groups capturing a larger share of economic gains, while poorer communities did not benefit proportionately.

This condition may be a key factor explaining why economic growth negatively affects the Human Development Index. In other words, Bali is experiencing economic growth characterized by quantitative expansion without qualitative development, meaning that growth does not necessarily translate into genuine human development. As a result, the Human Development Index tends to decline when economic growth increases.

These findings highlight the need for development policies that focus not only on quantitative economic growth but also on the quality and inclusiveness of growth.

The Effect of Gini Ratio on the Human Development Index

In this study, the Gini Ratio has a significant negative effect on the Human Development Index. This result is consistent with the findings of Umamah & Syafitri (2025), who also showed that a reduction in income inequality significantly increases the Human Development Index. Inequality arises from the uneven distribution of economic development.This finding indicates that unequal income distribution can hinder improvements in people's quality of life, particularly in education, healthcare, and adequate expenditure the three main dimensions measured in the HDI.

Theoretically, this negative relationship can be explained by the Inequality and Development Theory proposed by Simon Kuznets (1955). According to the Kuznets Curve, inequality may initially increase in the early stages of development but, after surpassing a certain turning point, a more equitable income distribution becomes crucial for fostering sustainable development. However, in Bali Province, excessive inequality has instead limited low-income groups from accessing basic services such as education and healthcare on an equal basis.

This condition has had a negative impact on the achievement of the Human Development Index at the regency/municipality level throughout the 2013–2023 period.

6. Conclusions

Based on the results of data analysis and the discussion regarding the influence of the Degree of Fiscal Decentralization, Economic Growth, and the Gini Ratio on the Human Development Index (HDI) in the regencies/municipalities of Bali Province during the period 2013–2023, several conclusions can be drawn. First, the Degree of Fiscal Decentralization

has a positive and significant effect on HDI. This indicates that the greater the capacity of local governments to manage and increase Local Own-Source Revenue (PAD), the more likely human development quality in the region will improve through better education, healthcare, and welfare services. Second, Economic Growth does not always have a direct and significant impact on improving HDI. Although economic growth reflects an increase in regional output, its benefits are not necessarily distributed evenly across all segments of society in the form of improved quality of life. Third, the Gini Ratio has a negative and significant effect on HDI.

Income inequality has been shown to hinder human development achievements, as low-income groups face limited access to education and healthcare services. Finally, simultaneously, fiscal decentralization, economic growth, and the Gini Ratio significantly influence HDI in Bali's regencies/municipalities. This suggests that efforts to improve HDI must consider a combination of sound fiscal governance, inclusive economic growth, and reduced inequality.

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