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Abstract

The study employs a quantitative approach using panel data regression, covering 34 provinces in Indonesia over the period 2016–2023. The data were obtained from the Statistic Indonesia and the Ministry of Finance. Model selection was conducted through the Chow test, Hausman test, and Lagrange Multiplier test, which indicated that the random effect model was the most appropriate for this study. The results show that economic openness and the human development index have a negative and significant effect on regional inequality. This indicates that greater engagement in international trade and improvements in human capital quality can reduce inequality across regions. Meanwhile, fiscal decentralization and the democracy index do not have a significant effect, suggesting the need to evaluate the effectiveness of fiscal and institutional policies at the regional level. This research highlights the importance of focusing development strategies on enhancing human capital and equitable access to economic opportunities to reduce interregional disparities in Indonesia.

Keywords: Income Inequality; Fiscal Decentralization; Economic Openness; Democracy Index; Human Development Index.

1. Introduction

Indonesia is an archipelagic country with more than 17,000 islands that have very diverse social, economic, and geographical characteristics. This diversity presents a major challenge in creating equitable and just development between regions. The disparity in development between regions, or what is known as regional inequality, is a structural problem that has been going on since the beginning of national development and is still a relevant issue today.

In the context of this study, regional inequality is focused on income inequality between provinces that reflect significant differences in the distribution of development outcomes and community welfare between regions. This income inequality between regions is measured using the Gini Ratio indicator, which shows the level of income imbalance in a region. Based on data from the Statistics Indonesia. Indonesia's Gini Ratio during the period 2016 to 2023 has fluctuated and has not shown a consistent downward trend. In 2023, the Gini Ratio recorded of 0.388 [1], which is still is at in category inequality intermediate to high . This is to signify that equalization welfare Not yet fully achieved , and distribution results development Still concentrated in certain areas , especially in the western region Indonesia like Java and Sumatra.

Regional inequality is not just a statistical difference, but has serious social, economic, and political implications. Its impacts are widespread, such as encouraging mass migration from underdeveloped regions to more developed regions, increasing pressure on infrastructure and socio-economics in large cities, and weakening national integration if inequality is allowed to continue. Inequality can also trigger social tensions, horizontal conflicts, and public distrust of the state if they feel they do not have fair access to resources and development results.

One of the main strategies that the government has taken to reduce inequality is through fiscal decentralization, which has been widely implemented since 2001 after the reformation. This policy is based on the principle that regions have greater authority in managing finances and designing development policies. In the theory of fiscal decentralization put forward [2], decentralization is considered capable of increasing the efficiency of resource allocation because local governments are considered to better understand the needs and preferences of the people in their respective regions. However, the effectiveness of decentralization in reducing inequality is still being debated. [3] argues that without adequate fiscal capacity and good governance, decentralization can actually strengthen elite capture and widen the gap between regions. In Indonesia, regions with high Regional Original Income

(PAD) such as DKI Jakarta, East Kalimantan, or Riau are much more able to finance development compared to regions with low PAD, thus creating high fiscal asymmetry.

In addition to fiscal factors, economic openness is an external factor that also influences regional inequality patterns. Economic openness, whether in the form of international trade, foreign direct investment (FDI), or capital and labor mobility, can encourage economic growth in regions that have strategic positions in the global network. However, in practice, regions that are closer to major ports, industrial centers, or large cities find it easier to enjoy the benefits of economic openness. This causes the gap between regions to widen [4]. [5] do emphasize that openness can encourage economic growth through efficiency and technology diffusion. However, [6] warns that in the context of developing countries, openness without equal distribution of infrastructure and education can deepen inequality because only certain regions are able to absorb these benefits. In Indonesia, this phenomenon is evident from the dominance of regions such as West Java, DKI Jakarta, and Banten in exports and foreign investment receipts, while many other regions lag behind.

Another aspect that also influences the distribution of development is the quality of institutions, especially those related to democracy. Healthy democracy is believed to encourage more inclusive and accountable governance. In the institutional economic theory [7], it is said that democratic governance tends to produce redistribution policies that are more in favor of the wider community. In the context of Indonesia, the Indonesian Democracy Index (IDI) released by Ststistic Indonesia shows inequality in democratic practices between regions. Some regions show increased participation and civil liberties, while other regions still face challenges in terms of press freedom, government accountability, and civil society empowerment. Although democracy has formally been running in all regions, [8] show that the implementation of democracy is not always followed by equal prosperity, because the quality of democracy is still uneven and often trapped in local politics that are patronage in nature.

Furthermore, the Human Development Index (HDI) as an indicator that measures the quality of human resources, plays a central role in determining the competitiveness and economic potential of a region. The three dimensions of the HDI education, health, and standard of living—greatly determine the long-term productivity of a region. [9] human capital theory, investment in education and health is a major factor in increasing labor productivity and inclusive economic growth. However, in the context of Indonesia, there is a large disparity in the HDI between regions. Statistic Indonesia data shows that the HDI [10] in provinces in Eastern Indonesia such as Papua and Nusa Tenggara is far behind compared to provinces in Java. [11] remind us that without equality in access to basic services, development tends to be exclusive and results in increasingly structural inequality.

Although the four variables of fiscal decentralization, economic openness, democracy index, and human development index have been widely studied partially in relation to regional inequality, studies that test their influence simultaneously and integratively are still very limited, especially those using the latest inter-provincial panel data in the 2016–2023 period

2. Literature Review

2.1 Income Inequality and Regional Inequality

In the context of Indonesia as a vast archipelagic country, regional disparities are clearly visible between the more developed western regions such as Java and Sumatra, compared to the eastern regions such as Papua, Maluku, and Nusa Tenggara. This disparity includes not only differences in per capita income, but also in access to public services, infrastructure, economic opportunities, and the quality of human resources. Kuznets explained that in the early stages of economic development, inequality increases due to the transition from the traditional sector to the modern sector. After reaching a certain point, the distribution of income will improve as the benefits of development spread. This is known as the "inverted U-curve". inequality arises from differences in ownership and access to factors of production such as capital, land, and skilled labor. Areas with greater human and capital resources will generate higher incomes. Explains [12] that economic development tends to be concentrated in certain regions and encourages uneven growth. This process reinforces inequality as developed regions attract more resources and investment.

2,2 Measuring Inequality

There are various criteria or benchmarks for assessing the intended distribution equality, including:

1. Lorenz Curve
    The Lorenz curve describes the cumulative distribution of national income among the population layers cumulatively.
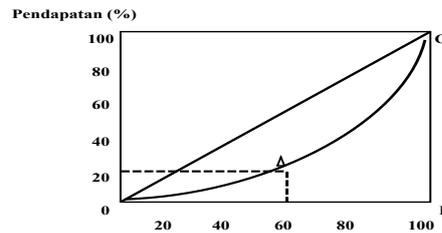
Figure 1. Lorenz Curve

Description: point A reflects 60% of the population with the lowest income earning or only having 20% of the national income.

2. Gini Index

The more curved the Lorenz curve, the wider the Gini ratio will be, implying a more unequal distribution of income. The Gini coefficient can also be calculated mathematically with the formula:

$$G = 1 - \sum_{i}^{n} (X_{i+1} - X_i)(Y_i + Y_{i+1})$$

Where :
G	= Gini Coefficient
Xi	= Cumulative proportion of households in class –i
Yi	= cumulative proportion of income in class-i

2.3 Fiscal Decentraliation and Regional Inequalty

Decentralization allows local governments to allocate resources more efficiently according to local needs. Fiscal decentralization in Indonesia has been implemented since Law No. 22/1999 and Law No. 25/1999 [13]. There are various types of fiscal decentralization.

1. Political Decentralization is the delegation of authority from the central government to local governments in the political decision-making process, such as the election of regional heads and the formation of local legislative institutions. The main objective of this decentralization is to strengthen the political participation of the community and increase the accountability of regional leaders.
2. Administrative Decentralization involves the division of authority in the management of government functions such as education, health, and infrastructure, so that public services can be tailored to the needs of the local community.
3. Fiscal Decentralization is the form of decentralization that is most widely analyzed in economic and public policy studies. This type includes the transfer of authority in financial management, including the collection of regional revenues (such as Regional Original Income/PAD), as well as regional expenditures or spending. The central government also provides fiscal transfers through the General Allocation Fund (DAU), Special Allocation Fund (DAK), and Regional Incentive Fund (DID) to help regions carry out their functions. These three forms of decentralization are interrelated and are key to realizing equitable and effective regional development.

The objectives of Fiscal Decentralization include: 1) Increasing the efficiency and effectiveness of public services through decision-making that is closer to the community. 2) Strengthening the accountability of regional governments, because the community can more easily monitor policies and budget management. 3) Encouraging equitable development between regions, by providing opportunities for regions to develop their own potential and priorities. The factors that influence fiscal decentralization include: 1) Regional Original Income (PAD) 2) General Allocation Fund (DAU) 3) Special Allocation Fund (DAK) 4) Regional financial management capacity

2.4 Economic Openness and Regional Inequality

Economic openness can drive growth, but it can also increase inequality if it is only enjoyed by more developed regions. Economic openness is crucial in the context of Indonesia being increasingly integrated with international trade through exports, imports, and foreign investment Economic openness refers to the extent [12] to which a region or country engages in cross-border economic activities, such as trade and investment. Types of economic openness can generally be divided into three main forms.

1) Trade openness, 2) Financial openness, 3) Openness to investment. The Objectives of Economic Openness 1) Increase economic growth through international trade, foreign investment, and global market integration. 2) Increase the efficiency of resource allocation, because each region/country will focus on its comparative advantages. 3) Support the development of technology and innovation, because there is a transfer of technology and knowledge from developed countries. Economic openness does not happen automatically [15], but is influenced by a number of structural factors and policies that apply in a region. 1) Export and import volume to GRDP 2) Trade infrastructure 3) Trade and investment policies 3) Macroeconomic stability and regional security 4) Availability of skilled labor.

2.5 Democracy Index and Regional Inequality

Aspinall & Fealy's (2010) and Mietzner's (2013) studies show that local democracy in Indonesia is still often trapped in political patronage. This unequal democracy can increase inequality if it is not accompanied by increased regional capacity. The Indonesian Democracy Index (IDI) [16] issued by the Statistic Indonesia measures the quality of democracy at the provincial level through three main dimensions. 1) Civil liberties 2) Political rights 3) Functions of democratic institutions. The objectives of the Democracy Index are: 1) To measure the quality of democracy at the provincial level, especially the implementation of civil liberties, political rights, and the role of democratic institutions. 2) To be an evaluation tool for local governments in improving democratic governance. 3) To assess community participation and transparency of local governments in decision-making.

The Indonesian Democracy Index (IDI) is influenced by various elements related to the government system, community participation, and local governance. 1) Community political participation, 2) Civil liberties 3) Role and performance of democratic institutions 4) Transparency and accountability of local governments 5) Law enforcement and protection of human rights. IPM or Human Development Index (HDI) is a composite indicator that measures human development achievements in three basic dimensions of life. 1) Health 2) Education 3) Standard of Livin are : 1) To describe the achievement of human development as a whole, not only based on economic income. 2) To be an indicator of the quality of human resources in a region, which is related to the era of productivity and welfare. 3) As a basis for formulating human-oriented development policies. HDI is influenced by multidimensional factors related to the quality of life of the population in terms of education, health, and economy. 1) Access and quality of education 2) Health services 3) Community income 4) Government policies in social development 5) Health Gender and community empowerment [17].

3. Research Method

This study uses a quantitative approach with a panel data regression method, covering 34 provinces in Indonesia during the period 2016–2023. The data used comes from the Statistic Indonesia and the Ministry of Finance. The selection of the regression model is based on the Chow test, the Hausman test, and the Lagrange Multiplier test, which shows that the random effect model is the most appropriate model.

4. Results and Discussion

Based n the results after the Chow test, Hausman test,and Lagrange Multiplier (LM) test, the mos appropriate model used in this study is the Random Effect Model (REM). The results obtained from the regression estimation in this study are as follows:

Table 1. Random Effect Model (REM) Estimation Results

Variable	coefficient	Std. Error	T-Statistik	Prob.
C	0.454700	0.028404	16.00853	0.0000
Fiscal Decentralization	-1.491233	2.379277	-0.626759	0.5314
Economic Distress	-2.084483	6.351551	-3.281849	0.0012
Democracy Index	-2.039358	1.978521	-1.030749	0.3036
Human Development Index	-1.183622	4.117683	-2.874487	0.0044

Source: Processed By Researcher, 2025

Based on the results above in table 1. the panel data regression equation can be obtained as follows:

Log KR= 0.4567 - 1.4912DF – 2.0844KE – 2.0393ID – 1.1836IPM

The following is an explanation of the panel data regression model:

a. The constant value of 0.4547 indicates that if all independent variables (fiscal decentralization, economic openness, democracy index, and human development index) are zero , then the regional inequality value (Gini ratio) is estimated to be 0.4547 .

b. The regression coefficient of fiscal decentralization of -1.4912 indicates that fiscal decentralization has a negative effect on regional inequality. This means that if fiscal decentralization increases by 1 unit, regional inequality is expected to decrease by 1.4912 Gini points , assuming other variables remain constant. However, because the value the probability is 0.5314 (greater than 0.05), then this influence **is** not statistically significant**,** so empirically there is not enough evidence that fiscal decentralization affects regional inequality.

c. The regression coefficient of economic openness of -2.0844 indicates that economic openness has a negative effect on regional inequality. This means that if economic openness increases by 1 unit, regional inequality will decrease by 2.0844 Gini points , assuming other variables remain constant. The probability value of 0.0012 (less than 0.05) indicates that this effect **is** statistically significant, so it can be concluded that economic openness significantly contributes to reducing inequality between regions in Indonesia.

d. The regression coefficient of the democracy index of -2.0393 indicates that the democracy index has a negative effect on regional inequality. This means that if the democracy index increases by 1 point, regional inequality will decrease by 2.0393 Gini points , assuming other variables remain constant. However, the probability value of 0.3036 (greater than 0.05) indicates that this effect **is** not statistically significant , so there is insufficient evidence that improving the quality of democracy has a direct impact on reducing regional inequality.

e. coefficient of the human development index of -1.1836 indicates that the human development index has a negative effect on regional inequality. This means that if the HDI increases by 1 point, regional inequality is expected to decrease by 1.1836 Gini points , assuming other variables are constant. The probability value is 0.0044 (less than 0.05) shows that this influence **is** statistically significant **,** so it can be concluded that increasing the HDI is significantly able to reduce the level of inequality between provinces in Indonesia.

Table 2. F Test Results

Information	Probability
Prob(f-statistic)	0.000019

Source: Processed By Researcher, 2025

Based on the results of the F-test (simultaneous test) in Table 4.7 above, the F-statistic Probability value is 0.000019. Because the significant value of 0.000019 <0.05, it can be concluded that the independent variables, namely fiscal decentralization, economic openness, democracy index, and human development index have a significant effect simultaneously (together) on the dependent variable, namely regional inequality.

Tabel 3. Determination Coefficient Test Results

R-square	0.097010
Adjusted R-squared	0.083379

Source: Processed By Researcher, 2025

Based on the results of the determination coefficient test in Table 3. above, the Adjusted R-squared value is 0.083379 or 8.3379%. The determination coefficient value shows that the independent variables consisting of fiscal decentralization, economic openness, democracy index, and human development index are able to explain the dependent variable, namely regional inequality, by 8.3379%, while the remaining 91.6621% (100% - 8.3379% = 91.6621%) is explained by other variables outside this study.

5. Conclusions

1. Fiscal decentralization has a negative and insignificant effect on regional inequality. This shows that increasing fiscal decentralization is not necessarily able to reduce regional inequality levels significantly.
2. Economic openness has a negative and significant effect on regional inequality. This means that the higher the level of economic openness of a region, the inequality between regions tends to decrease.
3. The democracy index has a negative and insignificant effect on regional inequality. In other words, increasing the democracy index has not had a real impact on reducing regional inequality.

4. The human development index (HDI) has a negative and significant effect on regional inequality. This shows that the higher the HDI of a region, the inequality between regions tends to decrease significantly.

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