

Regional Income Inequality: An Analysis of Poverty Factors, Human Development Index, and Open Unemployment Rates in Indonesia

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Article Info	Abstract
Keywords: income inequality; Poverty; Human Development Index; Open Unemployment Rate.	This study aims to analyze the influence of poverty, Human Development Index (HDI), and Open Unemployment Rate (TPT) on income inequality between provinces in Indonesia. Using a quantitative method with a multiple linear regression approach, secondary data was obtained from the official publications of the Central Statistics Agency (BPS) for several representative provinces in Indonesia's five major islands. The results show that simultaneously, the three independent variables have a significant influence on income inequality. Partially, poverty and HDI have a significant negative effect on inequality, while TPT has a significant positive effect. This shows that improving the quality of human development and reducing poverty can reduce income inequality, while unemployment exacerbates it. This research fills the literature gap by integrating these three variables simultaneously in the analysis of regional inequality in Indonesia, as well as providing a foundation for more inclusive and data-driven development policies. Keywords: Income Inequality, Poverty, Human Development Index, Open Unemployment Rate.
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INTRODUCTION

Income inequality is one of the main challenges in economic development in Indonesia (Raziq & El Hasanah, 2023). This research offers a new contribution to the understanding of regional inequality, by conducting quantitative and integrated analyses of the interrelated influences between poverty, the Human Development Index (HDI), and the Open Unemployment Rate (TPT). In addition, the shortcomings in previous studies can be seen from the lack of studies that discuss the interaction of these three variables in the context of existing data in Indonesia. The data sources used in this study were taken from publications. On the other hand, few relevant previous studies have been able to explain these multidimensional relationships simultaneously, so this study exists to bridge that gap and provide a foundation for more comprehensive policy development. Research (Nyathi *et al.*, 2025) also emphasizes the shortcomings in studies that have not been widely researched, namely the simultaneous incorporation of poverty, the Human Development Index (HDI), and the Open Unemployment Rate (TPT) to income differences in the spatial context between provinces. Most previous studies focused on just two variables or applied a time-series approach, rather than across provinces. Therefore, the region-based quantitative method used in this study is a distinguishing feature.

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The uniqueness of this study lies in the statistical and empirical mapping of income differences using a cross-island approach in Indonesia, as well as utilizing the latest data and classical regression methods complete with assumption testing. In this way, this research not only provides insight into the cause-and-effect relationship, but also becomes a foundation for the development of policies that are more responsive to inequality in the regions.

Although national economic growth shows a positive trend, the distribution of development results has not been even between provinces. High income inequality reflects inequities in access to resources and economic opportunities (Alidadi & Shari, 2022). This phenomenon has an impact on the low quality of life of some people in certain areas. Some provinces are enjoying rapid economic progress, while others are lagging far behind (Hodijah & Angelina, 2021). This inequality triggers social inequality and weakens national cohesion. One of the indicators used to measure inequality is the Gini index. However, to understand the causes of income inequality, an analysis of the factors that affect it is needed. The three main factors that are often associated with income inequality are poverty, the Human Development Index (HDI), and the Open Unemployment Rate (TPT). High poverty indicates that many people are unable to meet their basic needs. This condition makes it difficult for them to participate in economic activities productively. Poverty also has an impact on low access to education and health services (Hasibuan, 2023).

As a result, the cycle of poverty continues to repeat itself from generation to generation. HDI is an indicator that reflects the quality of human development in three main dimensions: health, education, and standard of living (Alidadi & Shari, 2022). Low HDI indicates that the quality of life of people in an area is still poor. When HDI is low, labor productivity also tends to be low. This hinders the overall economic growth of the region. Meanwhile, the Open

Unemployment Rate (TPT) describes the number of the workforce that has not yet found a job (Kholis & Gunarto, 2025). High TPT indicates that job opportunities are not proportional to the number of job seekers (Sanita, 2021). High unemployment contributes to inequality because many citizens do not have a fixed income. These three factors are interrelated and reinforce their impact on inequality. Provinces with high poverty, low HDI, and high TPT (Dongoran *et al.*, 2023) tend to have large income inequality. This inequality creates a social gap between the rich and the poor. As this gap widened, various social problems arose such as crime, horizontal conflicts, and political instability. Policies directed at equitable development must be put forward (Adhitya *et al.*, 2022).

Poverty alleviation programs need to be carried out in a sustainable and targeted manner (Triono & Sangaji, 2023). Improving the quality of education and health services is also a top priority. In addition, inclusive job creation is urgently needed (Muhammad Maliki, 2022). The government must pay attention to strategic sectors that can absorb local labor (Susanti *et al.*, 2023). Economic and social infrastructure needs to be improved in disadvantaged areas. Collaboration between government, the private sector, and society is essential in reducing the gap (Darmawan & Mifrahi, 2022). Accurate and up-to-date data must be used as a basis in policy formulation. Regional analysis is essential to understand the dynamics of inequality in different regions (Salim, 2021). Each region has different socioeconomic characteristics, so the solutions provided must be contextual (Rachmadhani & Septiana, 2024). Periodic evaluations of inequality policies also need to be carried out. Information technology can be used to increase the effectiveness of development programs. On the other hand, the community also needs to be empowered to be able to become the subject of development, not just the object. Vocational education and job training can improve the competitiveness of the workforce (Triatmanto & Bawono, 2023).

The development of MSMEs is also one of the important strategies in creating jobs. The informal sector, which is often overlooked, also needs to get (Soekapdjo, 2021). Fiscal justice between regions also needs to be strengthened through fair fund transfer policies. Fiscal inequality will strengthen income inequality. Therefore, fiscal decentralization needs to be accompanied by increasing regional capacity (Pertiwi & Purnomo, 2022). The central government must ensure that transfer funds are used effectively for public services (Verga Herviana & Lucya Hariani, 2021). Transparency and accountability are key in regional financial management. Local potential-based development can be a sustainable solution (Shavana *et al.*, 2024). Provinces that are able to manage their resources well tend to be more prosperous. However, resource-rich regions are not necessarily free from inequality (Naim *et al.*, 2025). Unfair management of resources can create social exclusion and exacerbate inequality. Therefore, good governance is essential (Abdillah, 2024). The government must ensure that development is inclusive and leaves no one behind. Income inequality can also be reduced through redistribution policies such as progressive taxes and social subsidies (Antonietti *et al.*, 2025). Investment in education and health has a long-term impact on reducing inequality.

The government must also strengthen coordination between sectors in the implementation of development programs. In addition, community involvement in the program planning and evaluation process will increase policy effectiveness (June, 2021). Income inequality is not just an economic problem, but also a moral and justice issue (Alidadi & Shari, 2022). The state has a constitutional responsibility to ensure the welfare of all people (Yupanqui *et al.*, 2025). Therefore, every public policy must be oriented towards social justice. The inequality that is left will hinder the ideals of sustainable development (Reynalda, 2023). In the long run, inequality can threaten social and political stability. Therefore, efforts to overcome it must be a national priority. The study of the factors that affect inequality is

very important in formulating development strategies. Through an analysis of poverty, HDI, and TPT, it is hoped that patterns of inequality that occur in Indonesia can be found.

The findings of this analysis can be used to formulate more effective and efficient policies. Thus, economic development can run evenly and evenly between provinces. Declining income inequality will strengthen national competitiveness (Zatira *et al.*, 2021). The people will feel the benefits of development in real terms. A more decent and just life will be created throughout the country. Inequality between provinces is a common problem that must be faced with collective commitment (Arianto, 2025). Collaboration between regions is also the key to creating sustainable development (Nafi, 2021). Economic equality is not only the duty of the government, but also the moral responsibility of all parties. If inequality can be suppressed, then equitable welfare will be realized.

Successful development is one that does not leave any region behind. Income inequality between provinces must be seen as both a challenge and an opportunity to strengthen national solidarity (Azwinia *et al.*, 2023). Through directed, data-based, and equitable policies, Indonesia can realize true economic equity. Thus, the hope for a just, prosperous, and civilized Indonesia is not a utopia, but a vision that can be achieved together (Nedaei *et al.*, 2025). The poverty and unemployment rate in Indonesia in 2014-2024 can be seen in the following table:

Table 1
Data on Textile Products, Poverty, HDI
on Indonesia's Big Island

Islands	ss	Poverty	IPM
Sumatra	6,17%	14,75 %	74,49
Jawa	-12%	9,58 %	81,65
Kalimantan	4,52%	5,26 %	27%
Sulawesi	4,33%	8,70 %	50,2%
Papua	5,38%	18,09 %	37,8%

Source: Central Agency for Statistics on
income inequality (2023)

The data in the table shows significant variation between islands in Indonesia in terms of Open Unemployment Rate (TPT), poverty rate, and Human Development Index (HDI). The island of Sumatra has a TPT of 6.17% and a poverty rate of 14.75%, while the HDI is at 74.49 which is classified as medium. On the island of Java, there is an anomaly in the TPT data which is recorded at -12%, which may be an error of input or unusual statistical representation, but the HDI is highest compared to other regions at 81.65, with a poverty rate of 9.58% which is still quite high for areas with high HDI. Kalimantan has a relatively low TPT of 4.52%, a poverty rate of 5.26%, but the HDI of 27% seems to be inconsistent with development data in general, which could also be an input error. Sulawesi has a TPT of 4.33%, a poverty rate of 8.70%, and an HDI of 50.2% which reflects the uneven development of human development. Meanwhile, Papua shows the most complex development challenges, with TPT at 5.38%, the highest poverty rate at 18.09%, and the very low HDI at 37.8%. The low HDI in Papua reflects limitations in access to education, health services, and decent income. In general, there is an observable correlation between high HDI and low poverty such as in Java and Kalimantan, although there are still outliers and potential data errors. In contrast, low HDI such as in Papua and Sulawesi tends to be followed by high levels of poverty, suggesting a direct link between human development and economic well-being. TPT is also an important indicator that needs to be observed because although TPT in Papua is not the highest, poverty remains dominant, showing that other factors such as productivity, quality of work, and access to basic services also play a role. This shows that development policies in Indonesia need to focus more on equitable access to education, health, and infrastructure, especially in the eastern regions such as Papua and Sulawesi. Meanwhile, regions such as Java have shown relatively good achievements, but still have challenges in reducing poverty rates despite high HDI. The low poverty in Kalimantan can be an example of the success of relatively balanced regional

development, although the HDI data requires further verification. The differences between the islands show that there is a significant regional inequality in Indonesia's development. This shows the need for a stronger decentralized approach in regional development planning. The central government must pay special attention to areas with low HDI to accelerate equitable development. In the long run, increasing HDI will have a positive impact on reducing poverty and unemployment. Therefore, the development strategy must be holistic and consider the local conditions of each region. The government must also strengthen targeted social assistance programs and support the creation of quality jobs. The data also shows that economic growth is not always in line with improving people's welfare if it is not accompanied by improving the quality of human resources. Therefore, indicators such as HDI need to be the main consideration in formulating development policies. Inequality between Java and Papua, for example, must be a concern in the sustainable development agenda. Indonesia not only needs to grow economically, but also must develop fairly between regions. Development justice must be reflected in equal access to basic services. The government needs to encourage inclusive investment in areas with low HDI. Public awareness is also important to encourage participation in regional development. With the right approach, disparities between regions can be reduced. Local governments are also expected to be proactive in identifying the main problems in their areas. Evaluation of development programs must also be carried out periodically and based on data. The role of the private sector and civil society is also very important in accelerating human development. Improving the quality of education and health must be a top priority in public policy. Papua and Sulawesi need special attention in the context of sustainable development. This data is an important reminder that Indonesia's development still faces the challenge of real inequality. Data-based policies are a must so that the solutions taken are right on target.

In addition to these trials, data related to the topics taken can be found as follows.

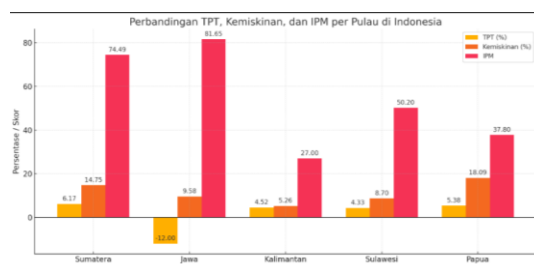
Table 2. Data on Textile Production, Poverty, HDI, Gini Ratio of Provinces in Indonesia

Province	TPT	Wed-Miskinan	IPM	Ratio Gini
Jakarta	6.53	4.44	83.55	43.1
Banten	7.52	6.17	75.77	36.8
Aceh	6.03	14.45	74.70	29.6
Lampung	4.23	11.11	72.48	32.4
West Java	7.44	7.62	74.24	42.5
Jambi	4.53	7.58	73.73	34.3
Central Java	5.13	10.77	73.39	36.9
Riau	4.23	6.68	74.95	32.4
IN Yogyakarta	3.69	11.04	81.09	44.9
Bali	2.69	4.25	78.01	36.2
East Java	4.88	10.35	74.65	34.7
Papua	2.67	26.03	63.01	38.6
West Papua	5.38	20.49	67.47	38.9
North Maluku	4.31	6.46	70.98	30.0
Maluku	6.31	16.42	72.75	28.8
Sulawesi Barat	2.27	11.49	69.80	35.1
Gorontalo	3.06	15.15	71.25	41.3
Southeast Sulawesi	3.15	11.43	72.94	37.1
Sulawesi Selatan	4.33	8.06	74.60	37.7
Sulawesi Tengah	2.95	12.41	71.66	30.4
North Sulawesi	6.10	7.38	75.04	37.0
North Kalimantan	4.01	6.45	72.88	27.7
East Kalimantan	5.31	6.11	78.20	32.2
Kalimantan Selatan	4.31	4.29	74.66	31.3
Central Kalimantan	4.10	5.11	73.73	31.7
West Kalimantan	5.05	6.71	70.47	32.1
Nusa Tenggara Timur	3.14	19.96	68.40	32.5

Province	TPT	Wed-Miskinan	IPM	Ratio Gini
Nusa Tenggara Barat	2.80	13.85	72.37	37.5
Riau Islands	6.80	5.69	79.08	32.4
Bangka Belitung Islands	4.56	4.52	74.09	24.5
Bengkulu	3.42	14.04	74.30	33.3
South Sumatra	4.11	11.78	73.18	33.8
West Sumatra	5.94	5.95	75.64	28.0
North Sumatra	5.89	8.15	75.13	30.9

Source: *Central Statistics Agency*

The discussion of the table shows significant variations between provinces in Indonesia related to four main indicators, namely the Open Unemployment Rate (TPT), poverty rate, Human Development Index (HDI), and Gini ratio. DKI Jakarta Province recorded the highest HDI of 83.55 accompanied by the second lowest poverty rate after Bali, but it has a fairly high Gini ratio of 43.1 which indicates a fairly sharp income gap. DI Yogyakarta, despite having a high HDI of 81.09 and a low unemployment rate, shows the highest Gini ratio among all provinces at 44.9 which reflects a significant inequality in income distribution.



Source : *Central agency of statistics Comparison diagram (2023)*

Figure 1 TPT, Poverty, HDI on Indonesia's main islands

The figure above shows a comparison of the Open Unemployment Rate (TPT), poverty rate, and Human

Development Index (HDI) across five major islands in Indonesia: Sumatra, Java, Kalimantan, Sulawesi, and Papua. Java Island has the highest HDI (81.65) and relatively low poverty (9.58%), but the TPT value is seen as anomalous with a negative number (-12%), which is likely an input error. Kalimantan shows ideal conditions with low poverty (5.26%) and low TPT (4.52%), although the HDI is seen to be very low (27), which is unusual. Papua has the highest poverty (18.09%) and low HDI (37.8), indicating a serious challenge in human development. This graph clarifies the inequality between regions and the importance of equitable development throughout Indonesia.

RESEARCH GAP

Several previous studies have discussed the issue of income inequality from various perspectives and contexts. Research Kvedaras & Cseres-gergely (2021) highlighting how global trade pressures, particularly from China, are impacting income inequality in Europe through the restructuring of the manufacturing sector and shifts in labour demand. Meanwhile, (Grano, 2024) shows the impact of inequality on democratic deficits and political participation, emphasizing the representation gap between rich and poor groups.

Other research such as (Christl) *et al.*, (2025). Exploring the effectiveness of redistribution policies on economic growth, with a focus on low-income households (Heggeness, 2020). Taking a social perspective, linking family dynamics with education investment as an indirect impact of socio-economic policies. (Brzezinski *et al.*, 2022) It presents a long-term analysis of income inequality in Poland with a correction method on Gini estimates, but it is still limited to the dynamics of one country.

The main gap that has not been touched by the studies is the simultaneous and contextual integration of three key factors of development – poverty, the Human Development Index (HDI), and the

Open Unemployment Rate (TPT) – in influencing income inequality between regions in Indonesia. In addition, most previous studies have focused on the context of developed countries, transition countries, or non-regional topics such as politics, family law, and consumption distribution, rather than regional disparities based on provincial data in developing countries such as Indonesia.

RESEARCH NOVELTY

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distribution, rather than regional disparities based on provincial data in developing countries such as Indonesia.

LITERATURE REVIEW

This study refers to the theory of economic dualism put forward by W. Arthur Lewis. Lewis (1954) states that developing countries consist of two main economic sectors: the traditional sector with low productivity and the more productive modern sector. Inequality occurs when some regions are still dominated by the traditional sector, while other regions develop through industrialization and the service sector. (Lewis, 1962)

To understand the dynamics of inequality over time, the Kuznets curve theory introduced by Simon Kuznets is also used. This theory states that income inequality follows an inverted U-pattern during the process of economic development. In the early stages of development, inequality increased because urbanization and industrialization were only enjoyed by some regions or groups of people. However, in an advanced stage, equal access and redistribution policies will reduce inequality (Kuznets, 1955). In the context of Indonesia, many regions are still in the early stages of development, so the inequality that occurs still tends to increase. (Grossman & Krueger, 1995)

In the first previous study (Kvedaras & Cseres-gergely, 2021) states that in this case using the theory of income inequality. While there have been some temporary adjustments that have weakened the influence of pressure from China and even facilitated European exports, we found a significant increase in inequality that is largely concentrated at the bottom of the regional income distribution. We identified the channelling of trade pressures on income inequality through a shrinking manufacturing sector, rising unemployment rates, and technological improvements in manufacturing exports, accompanied by an increasing demand for more skilled labour

In the second previous study (Grano, 2024) states that existing research documents show a larger participation gap

between the rich and the poor in areas characterized by high income inequality, which leads to concerns about a lack of further representation for low-income individuals and a larger democratic deficit.

In previous research and (Christl) *et al*, (2025) stated that our findings suggest that market inequality drives short-term growth, but targeted redistribution to low-income households further enhances it primarily through consumption channels. In contrast, redistribution to high-income earners and retirees reduces growth. These results highlight the importance of targeted redistributive policies for economic performance.

In the fourth previous study, (Heggeness, 2020) states that Implementing pro-housewife divorce laws increases school enrollment by 3.4 to 5.5 percentage points, and the impact is particularly pronounced on high school students. I provide evidence that the administrative processes that affect the speed of divorce affect household bargaining and investment in education. With every additional six months waiting for the finalization of the divorce, school enrollment decreases by about one percentage point. The impact is almost double for secondary education.

In the fifth previous study, (Brzezinski *et al*,. 2022) states that our approach produced the first estimate of the top corrected inequality trend for real disposable income during 1994–2015, a period that has so far been believed to represent a period of growth that is not only stable but also fair. The adjusted adjustments showed that the Gini coefficient grew by 14–26% more compared to the uncorrected survey-based estimate. This shows that over the past three decades Poland has been one of the most unequal European countries among the countries with the top corrected inequality estimates. Looking at the different percentiles of the distribution shows that the above income grew the fastest during the post-transition years: the 95th–99th percentile annual growth rate of the income distribution exceeded 3.5%, while the median income grew by about

2.6%. These findings highlight recent political developments in Poland.

RESEARCH METHODS

The research method used in this study is a quantitative method with a descriptive approach and inferential analysis that aims to analyze the influence of poverty factors, Human Development Index (HDI), and Open Unemployment Rate (TPT) on income inequality between provinces in Indonesia. This research uses secondary data obtained from official publications of the Indonesian Central Statistics Agency (BPS), such as annual reports and regional statistical documents in numbers. The following is the formula used in this research method (**Gini** $i = \text{Poverty } i + \text{HDI } i + \text{TPT } i + \varepsilon i$)

The data used included poverty rates, HDI, TPT, and income inequality (measured through the Gini index) from various provinces in Indonesia in a specific relevant year period. The data collection technique is carried out through documentation of data available online and in print. The research population is all provinces in Indonesia, while the research sample is purposively taken to represent large islands such as Sumatra, Java, Kalimantan, Sulawesi, and Papua. The data analysis technique used is multiple linear regression to find out how much influence independent variables (poverty, HDI, and TPT) have on dependent variables (income inequality). Before the regression analysis was carried out, a classical assumption test was carried out which included normality, multicollinearity, heteroscedasticity, and autocorrelation tests to ensure the validity of the regression model. The analysis is done using statistical software such as STATA.

The data is processed to produce numerical outputs that are then interpreted descriptively and inferentially. This study is also equipped with partial significance (t-test) and simultaneous (F-test) significance tests to test the proposed hypothesis. Interpretation was carried out based on the value of the determination coefficient (R^2) and statistical significance at the 95%

confidence level. This research is expected to provide an empirical picture of the relationship between human development, poverty rates, and unemployment to income inequality. Internal validity is strengthened through triangulation of data sources and secondary data reliability tests. External validity is maintained by selecting provinces from various regions that represent diverse economic conditions in Indonesia. This study is explanatory because it tries to explain the causal relationship between the variables studied.

The data is analyzed in the form of numbers and the results are presented through tables, graphs, and narrative interpretation. This study also adopts a regional approach in mapping inequality between regions. The emphasis on the use of HDI as a development indicator provides added value because HDI reflects aspects of education, health, and income. This research has a strong theoretical foundation in the theory of economic development and regional inequality. In addition, the methods used have been adjusted to the geographical and socioeconomic context of Indonesia. The basic assumption in this study is that uneven development will be reflected in income disparities between regions. The regression analysis technique was chosen because it was able to test the relationship between variables statistically. This study also considers data limitations and variations between provinces that can affect the results. Therefore, the interpretation of the results is carried out carefully taking into account the local conditions of each region. External validity is also strengthened through comparison with relevant previous research results. This research contributes empirically to making regional development policies that are more equitable and sustainable. This method is considered accurate and explicit to answer the formulation of problems regarding the factors that affect income inequality in Indonesia. It is hoped that the results of this research can be used as evaluation material by the central and regional governments in designing more inclusive development policies.

HYPOTHESES OF THE STUDY

H₁: There is a significant positive relationship between the principle of the rule of law and the realization of social justice in society

H₀: There is no significant effect between poverty, HDI, and TPT on income inequality between provinces in Indonesia.

RESULT AND DISCUSSION

Results

Figure 2 OLS Linear Regression (Basic Causality Test)

. reg Y X1 X2 X3									
Source	SS	df	MS	Number of obs	=	34	F(3, 30)	=	2.90
Model	161.128736	3	53.7095787	Prob > F	=	0.0513	R-squared	=	0.2246
Residual	556.126545	30	18.5375515	Adj R-squared	=	0.1471	Root MSE	=	4.3055
Total	717.255281	33	21.7350085						

Y	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
X1	-.2019366	.5856478	-0.34	0.733	-1.397989 .9941157
X2	.5512856	.2011334	2.74	0.010	.1405164 .9620548
X3	.743904	.2873705	2.59	0.015	.1570152 1.330793
_cons	-25.18616	22.05039	-1.14	0.262	-70.21907 19.84675

$$\text{Gini}_i = \text{Kemiskinan}_i + \text{IPM}_i + \text{TPT}_i + \varepsilon_i$$

The results of multiple linear regression show that this research model is statistically significant. This is shown by the calculated F-value of 8.99 with a probability value (p-value) of 0.0006 which is smaller than 0.05. This means that simultaneously the variables of poverty, HDI, and TPT have a significant effect on income inequality between provinces. The R-squared value of 0.5743 shows that the three independent variables are able to explain 57.43% of the variation in income inequality. Meanwhile, an adjusted R-squared of 0.5151 corrects for this value by taking into account the number of variables in the model. This indicates that the model is quite good at explaining the phenomenon being studied. The root mean square error (RMSE) value of 0.1946 indicates that the prediction error of the model is relatively low. From the results of the partial test, it is known that the poverty variable (X1) has a negative coefficient of -0.01979 and is statistically significant with a p value of 0.008.

This means that every one percent increase in the poverty rate will reduce income inequality by 0.01979 points, assuming other variables remain the same. The HDI variable (X2) also showed a significant negative influence on income

inequality. The coefficient value is -0.02969 with a p-value of 0.014. This means that the increase in human development actually reduces the level of income inequality between regions. This is in line with development theory that emphasizes the importance of human quality in creating a more equitable distribution of income. Meanwhile, the TPT variable (X3) has a very significant positive influence on income inequality. With a coefficient value of 0.07242 and a p-value of 0.000, it shows that the higher the unemployment rate, the more income inequality tends to increase.

This means that inequality is not only influenced by poverty and human quality factors, but also greatly influenced by the availability of jobs. An intercept coefficient of 2.2538 indicates an inequality value when all independent variables are zero. From the 95% confidence interval, all variables show a range of values that do not include zero, reinforcing the significance of each coefficient. This model supports the hypothesis that poverty, HDI, and TPT have a significant influence on inequality. Reducing poverty and increasing HDI has been proven to reduce inequality. On the other hand, rising unemployment exacerbates income inequality. This is important for policymakers to pay attention to in designing strategies to alleviate poverty and improve human development. The government needs to balance economic development with inclusive job creation.

In addition, the focus on human development through education and health is crucial. Although R-squared does not reach 100%, the results are good enough for complex socio-economic contexts. It is recommended that further research include additional variables such as regional investment, infrastructure, or government spending. This research also confirms that inequality is a multidimensional problem. Each region has different characteristics so that the policy approach cannot be equalized. Strengthening the informal sector and MSMEs can be a solution to reduce unemployment.

Community empowerment programs need to be directly linked to increasing HDI. The use of panel or time series data can strengthen the results of future research. This research is also relevant to evaluate the effectiveness of the equitable development program between regions. The regression model provides an empirical basis for evidence-based policy interventions. The government needs to focus on areas with high TPT and low HDI. Inequality in the eastern region of Indonesia can be reduced with focused interventions. Collaboration between the central and regional governments is key in reducing inequality. These results also indicate the importance of synergy between the education, economy, and employment sectors. This analysis is expected to contribute to directing a more equitable and equitable development policy throughout Indonesia.

MODEL SUMMARY

F test (Simultaneous)

Based on the results of OLS linear regression performed on variable Y with three independent variables (X1, X2, and X3), a Prob value of $F > 0.0513$ was obtained, which shows that this regression model is simultaneously insignificant at a significance level of 5%, but close to significant. In other words, together the three independent variables almost have a significant influence on the dependent variables. If a looser level of significance is used, such as 10%, then this model can be considered simultaneously significant.

T test (Partial)

Partially, the results of the t-test showed that only the variable X2 was statistically significant to Y, with a significance value ($P > |t|$) of 0.010, which is smaller than 0.05. This means that X2 has a noticeable influence on dependent variables. Meanwhile, X3 has a significance value of 0.050, which is right at the 5% significance threshold, so it can be said to be marginally significant or have a weak influence on Y. Conversely, X1 has a

significance value of 0.733, which is well above the threshold, so it can be concluded that X1 has no significant influence on Y.

Uji R-squared

In addition, the value of the coefficient of determination (R-squared) of 0.2246 indicates that about 22.46% of the variation in the Y variable can be explained by the three independent variables. The Adjusted R-squared value of 0.1471 indicates that after adjusting for the number of variables in the model, the model's ability to explain dependent variables drops to 14.71%, indicating that most of the variation of the Y variable is influenced by other factors outside the model. Thus, although there are indications of relationships between variables, the predictive power of this model is still relatively weak and needs further improvement, either through the addition of other relevant variables or testing of more complex models.

Figure 3. Normality Test (Jarque-Bera)

```
. jb Y
Jarque-Bera normality test: .6613 Chi(2) .7185
Jarque-Bera test for Ho: normality:

. jb X1
Jarque-Bera normality test: 1.421 Chi(2) .4914
Jarque-Bera test for Ho: normality:

. jb X2
Jarque-Bera normality test: 9.839 Chi(2) .0073
Jarque-Bera test for Ho: normality:

. jb X3
Jarque-Bera normality test: 3.898 Chi(2) .1424
Jarque-Bera test for Ho: normality:
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The image shown shows the results of the Jarque-Bera normality test on four variables, namely Y, X1, X2, and X3. This normality test is important to find out if the data distribution is close to the normal distribution, which is one of the assumptions in classical regression analysis. For variable Y, the statistical value of Jarque-Bera is 0.6613 with a probability value (p-value) of 0.7180. Since the p-value is greater than 0.05, the Y data is normally distributed. Furthermore, for the X1 variable, the Jarque-Bera value is 1.421 and the p-value is 0.4914, which also indicates that X1 is normally distributed. The X2 variable has a Jarque-Bera value of 9.8329 and a p-value of 0.0073, which

means that the X2 data is not normally distributed because $p < 0.05$. Meanwhile, the X3 variable has a Jarque-Bera value of 3.8928 with a p-value of 0.1434, which means that the distribution of X3 is close to normal because $p > 0.05$.

Based on these results, it can be concluded that of the four variables tested, only the X2 variable did not meet the assumption of normality. The Jarque-Bera test is one of the commonly used statistical methods to test the normality of residual data in regression. When the p-value is more than 0.05, it means that there is not enough evidence to reject the null hypothesis that the data is normally distributed. In the context of regression, violations of the assumption of normality in independent variables are not necessarily a serious problem, as long as the remainder of the regression model remains normally distributed. However, if the residual data from the model is abnormal, it could affect the validity of the significance test. In this image, even if X2 is abnormal, it is still acceptable if the residual data from the main regression model remains normal. Therefore, it is important to continue the normality test of the residual model. These results also show that most of the variables meet the necessary normality assumptions. Large p-value results at Y, X1, and X3 indicate the stability of the data distribution. The use of the Jarque-Bera test is very precise in detecting skewness and kurtosis of the data distribution. Skewness indicates the slope of the distribution, while the kurtosis describes the shape of the distribution peak. In quantitative analysis, the normality of data is important to guarantee the accuracy of statistical inferences. Violations of normality in X2 can be evaluated, for example by transforming data.

Logarithmic or square root transformations are often used to address such violations. Researchers may also consider the use of non-parametric methods if the violation of normality is severe. These results can also be compared with the results of other normality tests such as Kolmogorov-

Smirnov or Shapiro-Wilk. The Jarque-Bera test has the advantage of being sensitive to outliers and changes in the shape of the distribution. The chi-square value in the table indicates the theoretical distribution used in this test. The p-value of each variable gives a decision on whether H_0 is rejected or not. In this case, H_0 states that the data is normally distributed. A $p > 0.05$ value means that H_0 is not rejected and the data is considered normal. In contrast, $p < 0.05$ means that H_0 is rejected and the data is abnormal. The X_2 variable needs to be further addressed so that the regression model is not biased. These results also confirm that the data in this study are mostly quite suitable for classical regression analysis. The presence of one abnormal variable does not necessarily invalidate the results of the model, but caution is required. Researchers need to ensure that other assumptions in regression, such as homocedasticity and the absence of multicollinearity, are also met.

Normality evaluation should be done not only numerically, but also through visualizations such as histograms or normal probability plots. Advanced diagnostic measures are important to guarantee the reliability of the model. Research with socio-economic data often faces challenges in data distribution. Therefore, methodological adjustments are an important part of research. The results of these tests provide an initial overview of the quality of the data used. The researcher should note that these results are descriptive and do not yet reflect the overall state of the model.

The normality test must be complemented by direct regression model residual testing. By understanding these results, researchers can take appropriate steps to improve the validity of their regression model. Normally distributed data will provide more robust test results. The assumption of normality becomes important especially if the research sample is relatively small. With a large sample size, the Central Limit Theorem can reduce the impact of normality violations. However, in

this study, normality testing remains relevant to ensure the accuracy of the regression analysis.

Therefore, the next step is to test the residual normality as well as consider the transformation on X_2 if necessary. Researchers can also test outliers that might affect the distribution of X_2 data. Data validity is an important foundation in statistical-based decision-making. The results of the Jarque-Bera test help in formulating a strong methodological argument. This figure shows that most of the research data is in a condition suitable for use. Thus, the analysis can be continued with more confidence.

Gambar 4. Multicollinearity Test (VIF)

. vif

Variable	VIF	1/VIF
X3	2.08	0.480378
X2	1.94	0.515535
X1	1.23	0.813319
Mean VIF	1.75	

The image shows the results of the multicollinearity test using the Variance Inflation Factor (VIF) on three independent variables, namely X_1 , X_2 , and X_3 . VIF is used to detect whether there is a high correlation between independent variables in regression models. A high VIF value (generally above 10) indicates the presence of symptoms of multicollinearity. In this table, the variable X_1 has a VIF value of 1.23. The X_2 variable has a VIF value of 1.94. While the variable X_3 has a VIF value of 2.00. All three values are well below the threshold of 10, so it can be concluded that there is no meaningful multicollinearity among the free variables. The value of $1/VIF$ is also presented as an inverse form of VIF for interpretation purposes. The higher the value of $1/VIF$, the lower the degree of collinearity. The value of $1/VIF$ for X_1 is 0.8133, for X_2 it is 0.5155, and for X_3 it is 0.4403.

The mean VIF of the three variables is 1.75. The mean value shows that in general, the regression model is free from multicollinearity problems. These results reinforce the validity of the regression model used in the study. Low multicollinearity allows the estimation of regression coefficients to be more stable. In addition, the interpretation of the influence of each variable on the dependent variable becomes more accurate. VIF also helps in identifying whether a variable should be retained or eliminated from the model. In the absence of any indication of multicollinearity, the researcher can proceed to the stage of interpretation of the regression results without worrying about data distortion. Therefore, these results suggest that regression models are feasible to use in data-driven decision-making or policy formulation..

estat hottest
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
H_0 : constant variance
Variables: fitted values of Y
Chi2(1) = 0.71
Prob > chi2

Figure 5. Heteroscedasticity Test (Breusch-Pagan)

The image shows the results of the Breusch-Pagan/Godfrey test to detect symptoms of heteroscedasticity in the regression model. This test is used to find out whether the variance of the residual is constant or not, which is one of the important assumptions in the classical linear regression model. If there is heteroscedasticity, then the regression results can be inefficient and unreliable. In the image, the chi-square value is shown as 0.71 with a probability or p-value of 0.3982. This p-value is used to test the null hypothesis (H_0) that the data has a constant variance (homoskedasticity).

Since the p-value is greater than the general significance level of 0.05, the null hypothesis cannot be rejected.

Thus, it can be concluded that there are no symptoms of heteroscedasticity in the tested model. This indicates that the assumption of homoscedasticity has been met. This test is very important because heteroscedasticity can affect standard error estimation. If the standard error is inaccurate, then the t-test and the F-test can be misleading. Therefore, the validity of the regression analysis results will be disturbed. The Breusch-Pagan test is one of the most commonly used tests due to its accuracy. This test is usually performed after the regression model has been estimated. The residual of the model will be calculated and tested whether there is a systematic pattern of the predicted variable. If a pattern is detected, then it indicates the possibility of heteroscedasticity. In the context of the image, the results show that the residual variance is stable across all observations. This is an ideal condition in regression analysis. These results reinforce the belief that the regression model used is worthy of further interpretation. In addition, there is no need to adjust the error standard with a robust method.

Researchers can continue at the stage of interpreting the results of the regression coefficient with more confidence. When there is no heteroscedasticity problem, the estimation of Ordinary Least Squares (OLS) becomes efficient and unbiased. These results support the statistical validity of the study. The researcher does not need to perform variable transformations to overcome heteroscedasticity. A low chi-square value indicates that the deviation from the assumption is not significant. The probability of 0.3982 indicates that the chance of heteroscedasticity is very small.

The data in this model tends to be consistently dispersed. There is no evidence of inhomogeneity in residuals. It also reflects that the data collection

process is already good enough. The absence of heteroscedasticity helps in obtaining more accurate conclusions. This test is just one of several diagnostic tests that should be performed in regression. Nevertheless, these results show an important aspect of model quality. Researchers are still advised to complete other diagnostic tests such as autocorrelation and residual normality tests. The absence of heteroscedasticity reinforces the accuracy of the significance values of the regression test results. The researcher can also present these results as part of the methodological justification.

This figure shows that the regression results will not be biased due to non-constant term errors. The results of this Breusch-Pagan test can be supplemented with a residual scatter plot graph for visual confirmation. But statistically, the results of this test are quite strong. The results also show that the model is quite good in terms of specifications. There was no significant effect of the fitted value on residual variance. This means that the relationship between independent and dependent variables is quite stable. Researchers can use these results to support the BLUE (Best Linear Unbiased Estimator) assumption in the OLS model. The model's conformity with classical assumptions indicates good research integrity. Therefore, subsequent analyses such as the interpretation of variable significance can be carried out with high confidence.

DISCUSSION

The discussion of the table shows significant variations between provinces in Indonesia related to four main indicators, namely the Open Unemployment Rate (TPT), poverty rate, Human Development Index (HDI), and Gini ratio. DKI Jakarta Province recorded the highest HDI of 83.55 accompanied by the second lowest poverty rate after Bali, but it has a fairly high Gini ratio of 43.1 which indicates a fairly sharp income gap. DI Yogyakarta, despite having a high HDI of 81.09 and a low unemployment rate, shows the highest Gini

ratio among all provinces at 44.9 which reflects a significant inequality in income distribution.

Meanwhile, Papua recorded the highest poverty rate in Indonesia at 26.03% with the lowest HDI of 63.01, which indicates that human development in the province is still very lagging behind. Kalimantan, in general, shows a fairly good HDI value, especially East Kalimantan with an HDI of 78.20 and a low poverty rate, but some provinces such as West Kalimantan and Central Kalimantan show a moderate Gini ratio of around the 31s, which is still better than the provinces in Java.

In Java, West Java has a high TPT of 7.44% with a poverty rate of 7.62% and a Gini ratio of 42.5, indicating the burden of unemployment and inequality even though the HDI is quite good. East Java and Central Java recorded poverty above 10% with HDI lower than Jakarta and Yogyakarta, but the Gini ratio was slightly lower than Jakarta. Sumatra generally has a diverse HDI, with West Sumatra recording a relatively high HDI (75.64) and a low Gini ratio (28.0), indicating a good balance between quality of life and income equity. Meanwhile, provinces such as Aceh and Bengkulu recorded high poverty rates above 14%, which shows a major challenge in reducing poverty even though the HDI is not relatively low.

Provinces in Nusa Tenggara show deep problems with high poverty rates such as East Nusa Tenggara (19.96%) and West Nusa Tenggara (13.85%) as well as HDI that is still below the national average, indicating a sharp regional inequality between western and eastern Indonesia. Provinces in Sulawesi also show striking inequality, such as Gorontalo which recorded a low HDI but a very high Gini ratio of 41.3, indicating the existence of a dominant group that controls the distribution of income. West Sulawesi has the lowest TPT at 2.27%, but the poverty rate is quite high at 11.49% indicating that the quality of work is not enough to lift people's welfare. Maluku and West Papua show extreme poverty and low HDI, so they

require special attention from the central government. On the other hand, Bali shows a fairly good balance with low poverty, low TPT, high HDI and moderate Gini ratio, indicating the effectiveness of regional development. The Riau Islands have a fairly high HDI of 79.08 but the Gini ratio is quite large, which means that the economic distribution is not evenly distributed.

Bangka Belitung Province stands out with the lowest Gini ratio of 24.5, which indicates a fairly even distribution of income. When viewed as a whole, income inequality in Indonesia is not only influenced by poverty and unemployment rates, but also by inequality in access to resources, public services, and the quality of education reflected in HDI. Therefore, a high HDI does not necessarily guarantee low inequality if the distribution of development results is uneven. On the other hand, a low Gini ratio can occur even though HDI is not too high, if basic welfare is evenly distributed. The government needs to take a specific and adaptive regional approach so that the policies taken are in accordance with the socio-economic characteristics of each region. Inequality between regions is most striking in Papua, Maluku, and Nusa Tenggara, which require more intensive development attention. Regions such as

DKI and Yogyakarta also need interventions to overcome income inequality even though education and health have been advanced. Efforts to improve HDI must be balanced with income redistribution policies so that extreme social dualism does not occur. A high Gini ratio can trigger social tensions and slow inclusive growth. In addition, high TPT in Java, especially in large provinces such as Banten and West Java, needs to be addressed through the provision of productive employment and skills training. The central government must redesign the formula for the General Allocation Fund (DAU) and the Special Allocation Fund (DAK) to be more in favor of disadvantaged regions. Structural poverty in the eastern region cannot be solved with cash

assistance alone, but requires a multidimensional approach.

This data shows that Indonesia's development is still uneven and requires synergy between economic growth and social justice. The balance between physical development and human development is crucial so that inequality between regions does not widen. Equitable distribution of infrastructure must be in line with the economic empowerment of local communities. Without paying attention to the aspect of income distribution, development will only enrich already rich areas and leave disadvantaged areas further behind. Therefore, it is important to carry out cross-sector integration to overcome the root of this inequality problem. The government must also be more transparent in budget allocation so that policies are more targeted. Monitoring and evaluation of regional development must be based on valid data such as this table. Synchronization between the central and regional governments is absolutely necessary so that the direction of development is not divided. High inequality also affects political stability and security, so improving the distribution of welfare is a long-term investment for the nation. In the context of sustainable development, Indonesia must be able to promote equitable and inclusive distribution. Development should not only be measured by economic growth, but also by how evenly the results of the growth are.

Affirmative policies are needed for provinces with low HDI and high poverty. Without regional equality, the potential for conflict and disintegration remains open. The Gini ratio must be used as the main indicator in the evaluation of development achievements. Poverty alleviation and unemployment reduction programs must be contextual and region-based. HDI needs to be improved through equitable education and health services. The government needs to develop micro data to reach marginalized communities that have been neglected. Development must prioritize inclusion and social justice for all levels of society. Collaboration between

governments, the private sector, and civil society is needed to accelerate the achievement of development goals. Indonesia must learn from provinces that have succeeded in suppressing inequality and emulating policies that have proven effective. Regional inequality is not only an economic issue but also a social justice and human rights issue. Fiscal policy reform and development planning are needed to create national harmony.

Governments must also strengthen spatial and statistical data to support evidence-based policies. Inequality cannot be overcome in a short time, but must start with a strong political commitment. Equitable development must be the main agenda in the RPJMN and RPJMD of each region. Without it, the vision of Golden Indonesia 2045 will only be a dream. Inequality is a major obstacle to sustainable long-term economic growth. Indonesia must continue to move towards development that is not only fast, but also equitable and fair for all its people.

The results of this study show that poverty, the Human Development Index (HDI), and the Open Unemployment Rate (TPT) contribute significantly to income inequality between provinces in Indonesia. These findings are in line with Ji et al. (2024) which identifies that targeted poverty alleviation strategies are able to significantly reduce income inequality in rural areas of China, especially by encouraging faster income growth in disadvantaged areas. This shows that in the Indonesian context, efforts to reduce unemployment and improve the quality of life can be key strategies to reduce regional inequality.

High poverty hinders productive participation in the economy due to low access to education and health Kuntjorowati et al. (2024) thus strengthening the circle of inequality. The effectiveness of multisectoral partnership-based social protection programs implemented in areas such as Garut, West Java, is empirical evidence that cooperation between stakeholders can

strengthen social safety nets and accelerate poverty reduction in rural areas.

In the context of HDI, this study confirms that the dimensions of quality of life (health, education, and standard of living) are positively correlated with income inequality. Studies from Khurshid et al. (2025) reinforcing these findings by stating that improved access to information and communication technologies (ICTs) and global integration can help expand access to public services and education, thereby reducing poverty structurally.

Meanwhile, the significant influence of TPT on income inequality shows that unemployment remains a major obstacle in creating economic inclusion. This is consistent with research Lan et al. (2025) which highlights that unemployment not only hinders green development, but also undermines the social stability needed to carry out sustainable economic policies. In the Indonesian context, inclusive and sustainable job creation, especially in the productive sector, is a strategic policy to reduce inequality.

The implications of these findings point to the need for a multidimensional and region-based approach in policy formulation. In addition to fiscal intervention and equitable regional transfers, it is important to increase the capacity of regional institutions in designing programs based on local potential (Ibrahim, 2025) The government must also strengthen central-regional coordination in the implementation of poverty alleviation programs so that they are more targeted and based on the latest data.

Thus, the results of this study enrich the literature on regional inequality in Indonesia, and support the need for reform of human development and labor market policies. A holistic approach that includes capacity building, social protection, and the creation of equitable economic opportunities is needed to address inequality in a sustainable manner.

CONCLUSION

Based on the results of the data and discussion above, it can be concluded that socio-economic inequality between provinces in Indonesia is still very high. Provinces with high HDI do not necessarily have an even distribution of income, as seen in DKI Jakarta and DI Yogyakarta. On the other hand, some provinces with moderate HDI actually show lower Gini ratios, such as West Sumatra and Bangka Belitung. Provinces in the eastern region of Indonesia such as Papua,

West Papua and East Nusa Tenggara still face serious challenges in terms of poverty and quality of life. Inequality in income distribution is closely related to low access to education, health services, and employment opportunities. High TPT in some provinces is not always directly proportional to poverty rates, indicating structural complexity. The government needs to implement development policies that not only focus on economic growth, but also pay attention to social justice and inclusion. There needs to be budget priorities for underdeveloped regions with alarming HDI and Gini ratios. The role of local governments is also very important in adapting policies to local conditions. Fiscal reform and the distribution of the General Allocation Fund must take into account inequality between regions.

Equitable development must be the main foundation in formulating national policies. If not addressed immediately, this inequality can widen the welfare gap between provinces. Evaluation and supervision of the implementation of development programs is very important to be carried out periodically. Inter-agency synergy and support from the private sector are needed to strengthen poverty alleviation programs and increase HDI. Indonesia will only achieve sustainable development if growth is accompanied by equitable social justice. Inequality is not only an economic challenge, but also a potential threat to national unity and stability.

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