INCOME INEQUALITY AND DEVELOPMENT FACTORS: AN EMPIRICAL STUDY WITH PANEL DATA APPROACH

Al Bina[1], Anshari Putra[2]
[1,2] Economic Faculty, Universitas Asahan, Indonesia
E-mail: albinakisaran@gmail.com

Received: April, 2025; Accepted: April, 2025; Published: June, 2025
Permalink/DOI:

Abstract

Income inequality remains one of the main challenges in economic development in Indonesia. This study aims to empirically analyze the effects of the Human Development Index (HDI), economic growth, and unemployment rate on income inequality across 34 provinces in Indonesia from 2019 to 2024. Using panel data regression with the Random Effect Model (REM), the results reveal that the unemployment rate has a positive and significant impact on income inequality, while HDI has a negative and moderately significant effect. In contrast, economic growth does not significantly influence income inequality. These findings imply that income inequality can be reduced by improving human development and decreasing unemployment. Policies should focus on inclusive development, enhancing education and healthcare access, and expanding employment opportunities through local economic empowerment.

Keywords: Income inequality, HDI, Economic Growth, unemployment, REM

INTRODUCTION (Capital, 12 pts, bold)

Income inequality is one of the structural issues that continues to be a concern in economic development in Indonesia. Although various development policies have been implemented, inequality between regions and between individuals is still quite significant. Although various macroeconomic indicators show positive growth, income inequality remains high, reflected in the Gini Ratio which tends to stagnate or increase in some periods. This condition indicates that the results of development have not been enjoyed equally by all levels of society.

Income inequality is one of the structural issues that continues to be a concern in economic development in Indonesia. Although various development policies have been implemented, inequality between regions and between individuals is still quite significant. One measure that is often used to look at inequality is the Gini Ratio, which shows the distribution of income within a region. This inequality can be seen from differences in income between different individuals, groups, or regions. Based on data from the central statistics agency from 34 provinces in Indonesia during the 2019–2024 period, it can be seen that the Gini Ratio in some regions tends to stagnate at high rates, such as DKI Jakarta which reached 0.431 in 2023, while in other regions such as West Papua, the Gini Ratio reached 0.385 in the same year. In a global context, income inequality occurs not only in developing countries, but also in developed countries. For example, in the United States, a report from the Pew Research Center shows that in 2021, the wealthiest 20% of households controlled more than 50% of total national income (Pew Research Center, 2021). This emphasizes that income inequality is a universal issue and requires serious attention from various parties. This phenomenon can be attributed to Kuznet 's theory (Kuznets, 1995) which states that in the early stages of economic growth, income inequality will increase, and will only decrease after the country reaches a certain level of income. In other words, the relationship between economic growth and income inequality is inverted in the U-curve. However, the relevance of this theory in Indonesia is still a matter of debate. Based on the data used, there are regions with high economic growth but still experiencing large inequality. For example, Central Sulawesi Province recorded economic growth of 15.22% in 2022, but the Gini Ratio remained high at 0.305.

Various previous studies have tried to explain the determinants of income inequality from theoretical and empirical perspectives. One of the widely used approaches is the approach of human development, economic growth, and the labor market. The Human Development Index (HDI) is seen as an important indicator in measuring the quality of human resources and access to education, health, and a decent standard of living. Economic growth, on the other hand, is often associated with an increase in welfare in the aggregate, but does not necessarily guarantee a fair distribution of income. Meanwhile, the unemployment rate can cause economic exclusion that exacerbates income inequality.

Several studies show that income inequality in Indonesia does not fully follow the pattern proposed by Kuznets. For example, research by (Sutomo et al., 2024) found that despite economic growth, income inequality between provinces remains significant, suggesting that other factors may play a role in determining income distribution. In this data, it can be seen that provinces with high Human Development Index (HDI) do not always show low inequality. As an illustration, DKI Jakarta has the highest HDI (82.46 in 2023) but also records the highest Gini Ratio, indicating that growth and development have not been fully achieved.

This study aims to make an empirical contribution in understanding the influence of HDI, economic growth, and unemployment rate on income inequality between provinces in Indonesia. Using a panel data approach in 34 provinces during the period 2019–2024 and the Random Effect Model (REM) method, this study is expected to provide strong empirical evidence as a basis for the formulation of inclusive and equitable development policies.

METHOD

This study uses a quantitative approach with the panel data regression method. The data used are secondary data from 34 provinces in Indonesia during the

2019–2024 period. The dependent variable in this study is the Gini Ratio as a proxy for income inequality. The independent variables include the Human Development Index (HDI), Economic Growth (PE), and Open Unemployment Rate (PG).

In the regression model estimation method using panel data, it can be done through three approaches, including Common Effect Model (CEM), Fixed Effect Model (FEM), or Random Effect Model (REM) (Basuki & Prawoto, 2019). Of the three regression models that can be used to estimate panel data, the regression model with the best results will be used in the analysis. So in this study to find out the best model that will be used in analyzing whether with the Pooled Least Square (PLS), Fixed Effect Model (FEM), or Random Effect Model (REM) model, the test is first carried out using the Chow test and the Hausman test.

The analysis was carried out using E-Views software, and the data was sourced from the Central Statistics Agency (BPS). The panel data regression model refers to regression that uses panel information. The data regression type of the panel can be expressed as follows:

$$GINI\_it = \alpha + \beta_1 IPM\_it + \beta_2 PE\_it + \beta_3 PG\_it + u\_it$$

where i indicates the cross-section unit (province) and t indicates the unit of time (year).

Common Effect Model (CEM)

CEM explains the differences in interception and slope coefficients over time and individually. Time series and cross-section data were combined to perform regression. Ordinary Least Square (OLS) regression is used to estimate the outcome. Combined regression, or general effect, is the name given to this method. Therefore, in this type there is no effect from individuals. The model in the form of an equation system in general is as follows:

$$Yit=\beta 0+\beta 1X1it+\beta 2X2it+\cdots+\beta KXkit+\varepsilon it$$

Fixed Effect Model (FEM)

FEM is one of the many estimation techniques used in the panel data regression type. The following is a general form of the regression type of panel data with fixed effectmodel: $Yit=\beta it+\sum\beta kXkitpk=1+\varepsilon it$

Random Effect Model (REM)

Random effect models are useful for solving problems resulting from fixed effect models. For panel data, a fixed effect model with a dummy variable raises the problem of the degree of freedom that is lost from the model. Furthermore, dummy variables can obscure the original model. As a result, the error component model or random effect model is used to estimate. The equation of random effect model is as follows, according to Setiawan and Kusrini (2010):

$Yit=\beta 0+\delta it+ \sum \beta kPk=1Xkit+\varepsilon it$

Panel Data Regression Model Estimation Model Selection

The Chow test is used to determine one of the panel data regression models, especially between FEM and CEM. The Hausman test is used to determine one of the regression models between FEM and REM. With criteria (Basuki & Prawoto, 2019):

Table 1: Decision Making Criteria

Testing	Result	Results
chow Test	Prob > 0.05 Prob < 0.05	ECM FEM
Hausman Test	Prob > 0.05 Prob < 0.05	REM FEM

RESULTS AND DISCUSSION
Chow Test
The chow test is carried out to compare or choose which one is the best between *Common Effect Model (CEM), Fixed Effect Model (FEM).* Decision making by looking at the probability value (p) for the cross-section F. If the value of p > 0.05, then the chosen model is *the Common Effect Model.* But if p < 0.05 then the chosen model is *the Fixed Effect Model.* Here are the results of the chow test :

Table 2. Hausman Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	96.696186	(33,166)	0.0000
Cross-section Chi-square	610.381924	33	0.0000

Data proces e-views, 2025

The above results show that the prob value of Cross Section F and Chi Square is 0.0000 < 0.05, meaning that the best model to use is the model using *the Fixed Effect Model.* So the data testing continues to the Hausman test.

Hausman Test
Uji hausman dilakukan untuk membandingkan atau memilih mana model yang terbaik antara *Fixed Effect Model* dan *Random Effect Model.* Pengambilan

keputusan dengan melihat nilai probabilitas (p) untuk cross section random. Jika nilai dipilih p >0,05 maka model yang terpilih adalah *Random Effect Model.* Tetapi jika p < 0,05 maka model yang dipilih adalah *Fixed Effect Model.* Hasil uji hausman sebagai berikut :

Table 2. Hausman Test

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	4.931181	3	0.1769

Data diolah e-views, 2025

The above results show that the prob value of Random Cross Section is 0.1769 > 0.05, meaning that the best model to use is the model using *the Random Effect Model*.

Classic Assumption Test

Gujarati (2004), (Basuki & Prawoto, 2019) concluded that "another advantage of panel data is that panel data has the implication that classical assumption testing does not have to be done", so panel data does not require classical assumption testing such as normality or autocorrelation. However, in this study, a classification assumption test was carried out, namely a multicollinearity test to show that there is no high correlation value between independent variables.

Multicollinearity Test

Multicollinearity Test Results

The results of the multicollinearity test showed that there was no high correlation value between independent variables not exceeding 0.90 (Ghozali, 2013:83) so that it was concluded that there was no multicollinearity between independent variables.

Tabel 3. Uji Multikolinieritas

	IPM	PE	PG
IPM	1.000000	-0.004610	0.190052
PE	-0.004610	1.000000	-0.302243
PG	0.190052	-0.302243	1.000000

Process data e-views, 2025

Results of Regression Equation Estimation

The estimation model used is the Random Effect Model (REM) based on the results of the Hausman test which shows that REM is more suitable than *the Fixed Effect Model* (FEM) or *Common Effect Model* (CEM). So that the results of the regression equation in this study use the Random Effect Model, as follows:

Table 4. Output Regresi Random Effect Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.412315	0.047318	8.713659	0.0000
IPM	-0.001191	0.000651	-1.829722	0.0688
PE	0.000271	0.000230	1.177673	0.2403
PG	0.003296	0.000671	4.915395	0.0000
Effects Specification				
			S.D.	Rho
Cross-section random			0.042397	0.9440
Idiosyncratic random			0.010328	0.0560
Weighted Statistics				
R-squared	0.128787	Mean dependent var		0.034181
Adjusted R-squared	0.115653	S.D. dependent var		0.011019
S.E. of regression	0.010376	Sum squared resid		0.021424
F-statistic	9.805723	Durbin-Watson stat		1.257610
Prob(F-statistic)	0.000005			

Process data e-views, 2025

The results of the Random Effect Model (REM) estimation showed that the variable unemployment rate had a positive and significant effect on income inequality (coefficient: 0.003296; p-value: 0.0000). This indicates that an increase in unemployment will increase the level of inequality. Theoretically, this condition occurs because unemployment reduces people's chances of participating in income distribution.

Meanwhile, the HDI variable has a negative coefficient of -0.001191 and is significant at the level of 10% (p-value: 0.0688). This shows that improving the quality of human development tends to reduce income inequality, in line with the concept of development as freedom from (Sen, 1999) which emphasizes the importance of capabilities in overcoming social inequality.

The economic growth variable has a positive coefficient of 0.000271 but is not significant (p-value: 0.2403). The positive direction indicates that economic growth has not had a sufficient impact on equity, in accordance with the Kuznets inverted-U hypothesis (Todaro, M. P., & Smith, 2010) which states that inequality increases in the early stages of growth.

At an R Square value of 0.128787 (about 12.9%), it means that the model is able to account for about 12.9% variation in income inequality. Then the probability value of the statistical F is obtained as 0.000005, indicating that the model as a whole is significant.

These findings are consistent with studies (Ferreira et al., 2021) and Anand & Ravallion (1993) which say that economic growth needs to be balanced with equal access to education and employment. Therefore, the focus of policy should be directed to, improving the quality and access to education and health, developing job training programs based on market needs, encouraging inclusive economic growth through the MSME sector and the local economy.

CONCLUSION

This study shows that income inequality in Indonesia is significantly influenced by the unemployment rate and the quality of human development. Meanwhile, economic growth has not shown a significant influence on inequality.

The policy implications of this outcome emphasize the importance of efforts to reduce unemployment and increase HDI to encourage equitable distribution of welfare. The government needs to develop employment policies and human resource development simultaneously and integratedly so that the economic growth achieved is inclusive.

REFERENCE

Basuki, A. T., & Prawoto, N. (2019). Analisis Regresi Dalam Penelitian Ekonomi dan Bisnis (Dilengkapi Aplikasi SPSS dan Eviews). *PT Rajagrafindo Persada, Depok*, *18*, 1–52.

Ferreira, F. H. G., Lakner, C., Lugo, M. A., & Ozler, B. (2021). Inequality of Opportunity and Economic Growth: A Cross-Country Analysis. *SSRN Electronic Journal*, *8243*. https://doi.org/10.2139/ssrn.2457346

Kustiwi, I.A. 2024. “Accounting Information System (AIS): Integration of Artificial Intelligence and Management in Farm Tourism Kelompok Tani Elok Mekar Sari.” DiE: Jurnal Ilmu Ekonomi Dan Manajemen 15(1):123–31. doi: 10.30996/die.v15i1.10634.

Kustiwi, I. A., Hwihanus, H. 2023. Sistem Informasi Akuntansi Dari Sisi Audit Internal. JPEKBM (Jurnal Pendidikan Ekonomi, Kewirausahaan, Bisnis, dan Manajemen, Vol 7, No 2. Kuznets, S. (1995). Economic growth and the environment. *Quarterly Journal of Economics*, *110*(2), 353–377. https://doi.org/10.2307/2118443

Sen, A. (1999). Evaluative Reason : *Oxford: Oxford University Press*, 5.

Sutomo, D. A., Paddu, A. H., Uppun, P., & Saudi, N. D. (2024). Disparity and Income Inequality in Indonesia. *Journal of Law and Sustainable Development*, *12*(1), e2266. https://doi.org/10.55908/sdgs.v12i1.2266

Gujarati, Damodar N. (2004). Basic Ekonometrics, Fourth Editions. Singapore: McGraw-Hill Inc. Ewlinger

Setiawan dan Kusrini (2010). Ekonometrika. Yogyakarta: Andi

Todaro, M. P., & Smith, S. C. (2010). Economic Development. In *Routledge Handbook of Marxian Economics*. https://doi.org/10.4324/9781315774206-29