Determinants of Income Inequality Among Provinces: Panel Data Evidence from Indonesia

Article *in* Quality - Access to Success · November 2022

DOI: 10.47750/QAS/23.190.26

3 authors, including:

Endri Endri
Mercu Buana University
268 PUBLICATIONS **3,783** CITATIONS

SEE PROFILE

ISSN:1582-2559

GENERAL MANAGEMENT

Determinants of Income Inequality Among Provinces: Panel Data Evidence from Indonesia

Dedi WALUJADI[1], Indupurnahayu INDUPURNAHAYU[2], Endri ENDRI[3*]

[1]STIS Statistics Polytechnic, Jakarta, Indonesia, E-mail: walujadi@stis.ac.id
[2]Faculty of Economics and Business, Ibn Khaldun Bogor University, Indonesia, E-mail: indupurnahayu@uika-bogor.ac.id
[3*]Faculty of Economics and Business, Universitas Mercu Buana, Jakarta Indonesia, E-mail: endri@mercubuana.ac.id
*Corresponding Author

Received: 07.05.2022 **Accepted: 03.08.2022** **Published: 01.10.2022** **DOI: 10.47750/QAS/23.190.26**

Abstract

The purpose of this study is to determine the factors that have the potential to increase inequality in Indonesia. Inequality can be caused by economic and social factors, including unequal economic potential and activity, quality of human resources (measured by Human Development Index or HDI), population, investment, workforce, and government spending. Using panel data econometrics and taking advantage of the availability of macro data at the provincial level, the researcher investigates the factors that significantly influence inequality in 2010-2017 and proposes the economic and social factors need to improve in the near future. The results show that Gross Regional Domestic Product as a representation of the potential and magnitude of economic activity at Provincial Level has a significant positive influence, as well as the variables of government spending and Labor Force Participation Rate. Meanwhile, HDI and population as social factors have a significant negative effect on income inequality. The results of the individual effect show that the provinces that have the smallest individual values in reducing the Gini Ratio are the Provinces of West Papua and the Bangka Belitung Islands. Meanwhile, the provinces that have the greatest influence in increasing the Gini ratio are West Java, DI Yogyakarta, and Banten.

Keywords: *Income Inequality, Gini Ratio, Economic Growth, Government Spending, Indonesia*

1. Introduction

There has been an increasing trend of income inequality in recent years in most countries in the world. Several factors are thought to have influenced this trend, including the downward trend in the share of labor income in both developed and developing countries. It is believed that a lower share of the workforce is strongly associated with higher income inequality (measured by the Gini coefficient) (Mils, 2009). The World Bank (2016) reveals that income inequality in Indonesia increased significantly from 0.30 in 2000 to 0.41 in 2013, 2014, and 2015. The data also shows that the cake of economic growth over the past decade was mostly enjoyed by 20 percent of the top population, leaving the remaining 80 percent (or 205 million people). Further elaboration also shows that consumption per capita for the top 10 percent of Indonesia's population grew by more than 6 percent per year, for the poorest 40 percent it grew at less than 3 percent per year between 2003 and 2010.

In terms of national income, in 2000-2015 Indonesia's economic growth increased by an average of 6 percent (World Bank, 2016). The increasing rate of economic growth is not accompanied by a decrease in the level of income inequality. This shows that the increase in welfare due to the increasing rate of economic growth can only be felt by a handful of people. As has happened in several countries, this has become a dilemma between focusing on economic growth or reducing income inequality (Deininger & Olinto, 2000). Conditions that occur in Indonesia, increasing economic growth, and decreasing poverty rates in Indonesia are quite impressive are not followed by income distribution. This means that the people with the highest incomes are progressing faster than the majority of Indonesians. This will risk slowing Indonesia's economic growth in the long term and weakening social ties as a result of the large number of people who are still lagging in the mainstream of economic development.

These conditions indicate that the objectives of economic development have not been achieved. The objective of economic development in addition to increasing national income must ensure equitable income for all levels of society some scholars have linked increased levels of income inequality to the process of economic restructuring, others have suggested that changes in social conditions or a combination of the two are primarily responsible for the phenomenon (Albrecht & Albrecht, 2007). Others have argued that technological change (Blanchard, 1997), globalization (Mils, 2009), and the weakening of the bargaining power of labor (Blanchard & Giavazzi, 2003) are at least partly responsible for increasing inequality. Thus, the relationship between the level of economic growth caused by the restructuring and economic globalization, and its impact on income inequality in Indonesia needs special attention to achieve development goals in Indonesia. This problem is in line with the conventional hypothesis proposed by Kuznets (1955) which states that the inequality of income distribution is a necessary condition for achieving economic improvement. It is a common phenomenon that the higher the level of economic growth of a country, the higher the level of income inequality in that country. This shows a trade-off between fast economic

growth but with a high level of inequality or slow economic growth. According to Todaro and Smith (2009) the achievement of equity, as opposed to income inequality in developing countries, can be a condition for independent economic growth. This statement is based on several arguments, namely 1) Equitable income will increase public access to credit, school financing, and insurance; 2) Equity will increase the standard of living and work productivity; 3) Equity will increase people's purchasing power; 4) Equity will increase the active role of the community in development. This shows that good income distribution can be a way to overcome socio-economic problems, and even increase economic growth. The view of Todaro and Smith (2009) that there is a possible negative relationship between economic growth and income inequality, is supported by an in-depth empirical study of areas experiencing high-income inequality and at the same time experiencing poverty. The findings of this study indicate that the policy that must be taken is to overcome the problem of inequality. Policies are directed at identifying situations where high levels of inequality may be detrimental to overall economic growth policies and can explain measures that will increase economic growth and redistribution of income at the same time so that development goals can be achieved. Based on the problems described above, this study aims to investigate the economic and social factors that influence income inequality in 2010-2017. It is expected that the results of study will fill in the gap the controversy to achieve equity between the efforts to increase economic growth through improving quality of human resources with the restructuring and economic globalization.

2. Literature Review

Economic development is a conscious and directed effort of a nation to make changes through a series of combination processes through the utilization of existing resources to achieve a better life, namely by increasing the welfare of the community which continues in the long term (Todaro & Smith, 2009). One of how people's welfare increases can be described by the level of national income and a high rate of economic growth. Reduction of income inequality and poverty alleviation are also other objectives of implementing economic development. Economic development is a process experienced by all countries with various challenges that must be faced. Problems in economic development do not only look at poverty caused by low income. However, more than that has spread to become part of social problems.

Todaro and Smith (2009) explain that there are three core goals of development, including:

Increasing the availability and expanding the distribution of various necessities of life, such as food, clothing, shelter, health, and security protection.

The improvement of living standards also includes increasing the provision of employment opportunities, improving the quality of education, as well as increasing attention to cultural and human values, all of which are not only to improve material welfare but also to foster self-esteem in the individual and the nation concerned.

Expansion of economic and social choices, namely by freeing them from the entanglement of slavery and dependence, not only against other people or nations but also against any forces that have the potential to undermine their human values.

According to the Neo-Classical Hypothesis proposed by Kuznets (1955), in the early stages of a country's development process, developmental inequality between regions tends to increase. This process will continue until inequality reaches its peak. Then, if the development process continues, the development gap between these regions will gradually decrease. It is this observation that has come to be known as the "Inverted-U" Kuznets curve, because of the longitudinal (time-series) changes in the income distribution. The Kuznets curve can be generated by a continuous growth process stemming from the expansion of the modern sector. Based on this hypothesis, development inequality between regions tends to be higher generally in developing countries, and the opposite will happen in developed countries. The truth of this Neo-Classical Hypothesis has been tested by Williamson (1965) through a study of development inequality between regions in developed and developing countries using time series and cross-section data. The results show that the Neo-Classical Hypothesis is empirically proven. This means that the development process of a country can indirectly reduce the level of development inequality between regions, but at the initial stage the opposite happens (Hill, 2021).\

One of this income inequality can be measured using the Gini coefficient. The Gini coefficient is a measure of aggregate inequality whose numbers range from zero (perfect equality) to one (perfect inequality). In practice, countries with a high degree of inequality range from 0.50 to 0.70 while for countries with relatively even income distribution, the figure ranges from 0.20 to 0.35 (Todaro & Smith, 2009). According to the BPS definition, the Gini coefficient is based on the Lorenz Curve, which is a curve that compares the distribution of a certain variable (eg income) with a uniform distribution that represents the cumulative percentage of the population. The Gini Index formula or Gini coefficient is formulated in the formula below:

$$GR = 1 - \sum_{i=1}^{n} f_{pi}\, x\, (Fc_i + Fc_{i-1})$$

Description:

GR: Gini Coefficient

Fpi: Frequency of population in the i-th expenditure class

Fci: Cumulative frequency of total spending in class i-th expenditure

Fci-1: Cumulative frequency of total spending in class output to i-1

Schweinitz (1976) suggested that eight factors cause inequality in income distribution in developing countries (NSB), namely: 1) high population growth; 2) inflation; 3) inequality of development between regions; 4) heavy investment in capital intensive projects; 5) low social mobility; 6) implementation of import substitution industrial policy; 7) deteriorating exchange rate (term of trade); 8) and the fall of the handicraft industry and the home industry. The economic development of a country is declared successful if there is economic growth accompanied by reduced inequality in income distribution. Some Neo-Classical economists argue that economic growth tends to reduce poverty and income inequality even in the early stages of growth. There is empirical evidence of this view based on observations made in several countries including Taiwan, Hong Kong, Singapore, and China. The Neoclassical group is very optimistic that economic growth tends to practically reduce income inequality and poverty (Rayo & Becker, 2007).

As stated by Todaro and Smith (2009), currently, inequality is not only related to economic problems triggered by economic restructuring and globalization. Inequality also indicates the occurrence of social inequality in society. A large population with a narrow area allows for an unequal distribution of income. The increase in population has resulted in intense competition for jobs. The supply of labor that is greater than the demand for labor makes lower-class workers willing to be paid for sub-standard wages. This has an impact on the increase of inequality. According to Rayo and Becker (2007), HDI has a negative effect on inequality. Rayo and Becker (2007) elaborated more deeply on the role of formal education based on the results of their research. They found that the higher the formal education of the workforce, the higher the productivity, and this supports economic growth. This is following the theory of human capital, which states that education has an influence on economic growth and will reduce income inequality because education plays a role in increasing labor productivity (Saluy et al., 2021). This theory assumes that population growth is determined by individual productivity. If everyone has a higher income due to higher education, then economic growth can be achieved. In other words, through increasing labor productivity, economic growth, either directly or indirectly, will have a negative effect on income inequality (Silitonga et al., 2020). Harrod-Domar explained that capital formation/investment is an important factor in determining economic growth. In his theory, Harrod-Domar argues that investment has an effect on economic growth from a longer-term perspective. The investment will have an effect, either directly or indirectly, on economic growth. With an increase in investment, economic growth will increase, along with an increase in growth, it will affect income inequality. An increase or decrease in investment that is interconnected with economic growth is one of the triggering factors for income inequality between regions (Arsyad, 2010).

Several studies have been conducted related to the level of inequality, among others by Cai et al. (2002), and Waluyo (2009). Research by Cai et al. (2002) on income inequality and economic growth in China uses. The multiple regression method with Ordinary Least Square (OLS) and Feasible Generalized Least Square (FGLS) estimation. Variables that are thought to influence the level of inequality are economic growth, Human Development Index (HDI), labor participation rate, comparison of agricultural labor productivity, marketization index, investment, investment efficiency, government spending. The results showed that at the 5% significance level the comparison of labor productivity had a positive effect on income inequality. Meanwhile, the economic growth rate, labor force participation rate, investment level, and marketization index have a positive effect at the 1% level, and government spending has a negative effect at the 1% level. The study of Waluyo (2009) is about the relationship between the level of income inequality and economic growth. This research was conducted using the OLS method with the standard error category using the Newey-West HAC method. The results show that HDI has a positive effect and the level of distribution of assets has a negative effect on economic growth at a significance level of 5%, while the level of income inequality has a negative effect at a significance level of 10%. In the second model, HDI and investment have a significant positive effect on economic growth at the 5% level. Meanwhile, income inequality and the level of distribution of assets have a negative effect at a significance level of 10%.

3. Research methodology

This study uses annual data available at the BPS-Statistics Indonesia (BPS) both at the Head Office and 33 provincial branches of BPS in Indonesia for 2010-2017. The variables used as the dependent variable for the inequality indicator are the Gini ratio coefficient and the independent variables include Gross Regional Domestic Product (GRDP), HDI, total population, Foreign Direct Investment (FDI), Labor Force Participation Rate (LFPR), and government spending/ expenditures. The analysis was carried out using descriptive statistics presented in the form of tables and graphic visualizations and using inference through a panel data econometric model approach. The Common Effect, Fixed Effect, and Random Effect Model will then be selected by performing the Chow test and Hausman test. The Chow test was conducted to see if there was an individual effect in the panel data. While the Hausman test was conducted to test the correlation between individual effects and errors or to see whether there was a fixed or random effect in the panel data regression model. The effect remains appropriate if we focus on a particular set of provinces in this case Indonesia, and our conclusions are limited to the behavior of that set of provinces. Although Fixed Effect (FE) model is more precise, it is often observed that there are too many parameters in the model and thus a possible loss of degrees of freedom which can be avoided by assuming that the individual effects are random. The random effects (RE) model is an appropriate specification when it has a large population size of observations (Sugianto et al. 2020).

3.1. Empirical model and variables used

The response variable (dependent variable) is the Gini ratio, while the predictor variables are the amount of economic activity (GRDP), HDI, Population, FDI, LFPR, and Government Expenditures. The specified empirical model is as follows:

$$Gini\ Ratio = f(GRDP, HDI, FDI, Government\ Expenditure, Population, LFPR) \quad (1)$$

$$Gini\ ratio_{it} = \alpha_0 + \beta_1 GRDP_{1it} + \beta_2 HDI_{2it} + \beta_3 FDI_{3it} + \beta_4 GovernmentExp_{4it} + \beta_5 Population_{5it} + \beta_6 LFPR_{6it} + e_{it} \quad (2)$$

Description :

i = Cross section

t = Time series

α= Intercept

β = parameter to be estimated

e = error term

The following is a description of these variables:

Gini coefficient ratio (Y). The Gini Ratio coefficient is based on the Lorenz Curve, which is a cumulative expenditure curve that compares the distribution of a certain variable (eg income) with a uniform distribution that represents the cumulative percentage of the population. The Gini Ratio coefficient is used to measure the overall level of income inequality. The Gini coefficient value ranges from 0 to 1, a value of 0 means perfect equality, while if it is 1 it means perfect inequality.

Gross Regional Domestic Product/GRDP (X1) is the total gross value added arising from all economic sectors in a region. Value added is the added value from the combination of production factors and raw materials in the production process.

The Human Development Index/HDI (X2) explains how the population can access development outcomes in terms of income, health, education, and so on.

Foreign Direct Investment/FDI (X3) is an investment activity to conduct business in the territory of the Republic of Indonesia which is carried out by foreign investors, either using fully foreign capital, or in joint ventures with domestic investors.

Government Expenditure (X4) is government sector expenditure including purchases of goods and services and payment of subsidies. Government spending is used to perform important government functions, such as national defense and education. These expenses are financed by both taxes and loans.

The total population (X5) is taken from the results of the 2010 population census and 2015 Large Population Survey between Censuses 2010 and 2020. For other years, BPS projection data is used.

Labor Force Participation Rate LFPR (X6) is the percentage of the total population of the labor force with a population of working age (15 years and over).

4. Results and Discussion

4.1. Descriptive Analysis

The descriptive statistical analysis aims to provide an overview of the object of research. Descriptive analysis in the study was carried out in two ways: a) statistics of the variables used between provinces and in the observation period, namely by looking at the mean, standard deviation, minimum and maximum values of each variable; b) Visual description of the dependent variable - Gini ratio, the trend during the observation period nationally and by province. The same visualization was carried out on the independent variable used in this case is the labor force participation rate (LFPR), because it is believed that one of the main accesses to reduce income inequality is equal access to work. The statistical distribution for each variable in this study is shown in table 1.

Variable	Observation	Mean	S.D.	Min	Max
Gini ratio	264	0.370	0.0382	0.275	0.459
GRDP_at Constant Prices	264	2.53e+008	3.52e+008	1.50e+007	1.64e+009
HDI	264	67.2	4.52	54.5	80.1
FDI	264	785.	1.24e+003	0.200	7.12e+003
Government_Exp	264	2.20e+007	2.96e+007	3.19e+006	1.85e+008
Number_Population	264	7.59e+003	1.06e+004	765.	4.80e+004
LFPR	264	70.1	3.78	61.6	81.1

Table 1. Statistics Description of the Variables Used
Source: Data processed by researchers.

In this study, the amount of data used was 264 (33 provinces x 8 years) observations consisting of 33 provinces in the 2010-2017 period. The average Gini ratio from 33 provinces in the 2010-2017 period is 0.370 with a maximum Gini ratio of 0.459 and a minimum of 0.275. The Gini value of the ratio reflects the considerable variation and the occurrence of even distribution and inequality in the provinces in Indonesia. The standard deviation of 0.0382 is usually used to measure the level of variation or the degree of spread of the data from the calculated average or can describe which variable is the most unstable. In Table 1, it can be seen that the largest standard deviation value is in the GRDP_at Constant Prices variable of 3.52e+008 compared to the calculated average of 2.53e+008.

4.2. Inferential Analysis

To obtain quantitative information on the extent to which economic and social factors affect the level of inequality, this study uses the panel data regression method. The inferential analysis will be carried out based on the results of the best model estimation. To get the best model estimate from the panel data, several stages must be carried out, namely: the formation of a regression model (common, fixed, and random), the formation of an estimation model, testing of variance-covariance heterogeneity, testing model assumptions, and estimating the best model.

Formation of panel data regression model

Common model

Variable	Coefficient	Std. Error	t-Statistics	p-value
(1)	(2)	(3)	(4)	(5)
Intercept	0,398	0,095	4,171	0,000
log(GRDP)	-0,003	0,005	-0,535	0,593

HDI	-0,001	0,001	-1,452	0,148
FDI	0,008	0,002	3,316	0,001
Govt'. Expenditure	0,000	0,000	2,389	0,018
log(Population)	-0,001	0,005	-0,115	0,909
LFPR	0,001	0,001	1,631	0,104
Dependent: Gini Ratio $F_{stat} = 6{,}235\ (0{,}000)$ $R^2 = 0{,}127$				

Table 2. Common Effect Models. Coefficient Estimations
Source: Data processed by researchers.

The output for the Common Effect Model shows that the investment variables (FDI) and government expenditures have a significant effect on the 5 percent error rate on the Gini ratio, while the GRDP, HDI, population, and LFPR variables have no significant effect on the Gini ratio.

Fixed model

Variable	Coefficient	Std. Error	t-Statistics	p-value
(1)	(2)	(3)	(4)	(5)
Intercept	-0,319	0,347	-0,918	0,359
log(GRDP)	0,061	0,024	2,527	0,012
HDI	-0,007	0,002	-4,551	0,000
FDI	0,003	0,003	1,148	0,252
Govt. Expenditure	0,001	0,000	2,314	0,022
log(Population)	-0,075	0,066	-1,148	0,252
LFPR	0,001	0,001	1,901	0,059
Dependent: Gini Ratio $F_{stat} = 24{,}391(0{,}000)$ $R^2 = 0{,}805$				

Table 3. Fixed Effect Models, Coefficient Estimations
Source: Data processed by researchers.

The output for the Fixed Effect Model shows that the variables of GRDP, HDI, and the variables of government expenditure have a significant effect on the 5 percent error rate on the Gini ratio, and HDI, population, and LFPR have no significant effect on the Gini ratio.

Random model

Variable	Coefficient	Std. Error	t-Statistics	p-value
(1)	(2)	(3)	(4)	(5)
Intercept	0,301	0,179	1,678	0,095
log(GRDP)	0,013	0,012	1,100	0,273
HDI	-0,004	0,001	-4,263	0,000
FDI	0,003	0,002	1,471	0,142
Govt. Expenditure	0,001	0,000	2,668	0,008
log(Population)	-0,017	0,012	-1,333	0,184
LFPR	0,001	0,001	1,853	0,065
Dependen : Gini Ratio $F_{stat} = 5{,}218\ (0{,}000)$ $R^2 = 0{,}109$				

Table 4. Random Effect Models, Coefficient Estimations
Source: Data processed by researchers.

The output for the Random Effect Model shows that the HDI variable and FDI investment have a significant effect on the 5 percent error rate on the Gini ratio and the variables of GRDP, government spending, population, and LFPR have no significant effect on the Gini ratio.

Formation of Estimation Model

Selection of common model and fixed-effect model (Chow test)

The first step to determine the best model of panel data regression is to perform the Chow test. Chow test compares the Common Effect with the Fixed Effect.

Hypothesis : $H_0 : \alpha_1 = \alpha_2 = \cdots = \alpha_5 = \alpha$ (Same Intercept/CEM)

H_1 : at least one $\alpha_i \neq \alpha$ (FEM)

Effects Test	Statistical-test	d.f.	p-value
(1)	(2)	(3)	(4)
Cross-section F	24,379	(32;224)	0,000
Cross-section Chi-square	394,560	32	0,000

Table 5. Output Chow Test
Source: Data processed by researchers.

Based on the output, with a significance level of 5 percent, the test decision states that it rejects the initial hypothesis which means that the fixed effect model fits the data.

Selection of random effects and fixed-effect models (Hausman test)

Then the Hausman test was carried out to find out the best model between random effects and fixed effects.

Hypothesis: $H_0 : E(u_{it}|X_{it}) = 0$ (REM)

$H_1 : E(u_{it}|X_{it}) \neq 0$ (FEM)

Test Summary	Chi-Sq. Statistics	d.f.	p-value
(1)	(2)	(3)	(4)
Cross-section random	14,237	6	0,027

Table 6. Output Hausman test
Source: Data processed by researchers.

Based on the output, with a significance level of 5 percent, the test decision states that it rejects the initial hypothesis, which means that the fixed effect model fits the data.

Variant Covariance Heterogeneity Test

Based on the previous calculation, the selected model is the Fixed Effect Model so that heterogeneity of covariance variance is tested to determine the appropriate estimation method. The first test is to find out whether the covariance variance matrix produced is heteroscedastic or homoscedastic.

Lagrange Multiplier test (LM test)

By the proposed hypothesis, namely the initial hypothesis where the homoscedastic covariance matrix with the alternative hypothesis is the heteroscedastic covariance matrix.

The result of the calculation is that the value of $\lambda_{LM} = 46{,}194$ when compared with the value of $\chi^2_{(0{,}05;\,32)} = 46{,}194$ then the decision is to reject H_0. So it can be concluded with a 95 percent confidence level that the covariance variance matrix structure is still heteroscedastic.

Lagrange Multiplier test for Cross-Sectional Correlation

Furthermore, the Cross-Sectional Correlation test was carried out to find out whether there was a correlation between individuals or provinces. By the hypothesis proposed that in the initial hypothesis there is no correlation between individuals with the alternative hypothesis there is a correlation between individuals.

So it can be concluded with a 95 percent confidence level that there is a correlation between individuals.

Based on these tests, it can be concluded that the structure of the covariance variance matrix is heteroscedastic and there is a correlation between individuals so that the estimation method used is cross-sectional with weight.

The estimation model formed is:

Variable	Coefficient	Std. Error	t-Statistics	p-value
(1)	(2)	(3)	(4)	(5)
Intercept	-0,187	0,267	-0,701	0,484
log(GRDP)	0,056	0,019	3,038	0,003
HDI	-0,006	0,001	-5,593	0,000
FDI	0,004	0,002	1,920	0,056
Govt. Expenditure	0,001	0,000	3,988	0,000

log(Population)	-0,128	0,052	-2,473	0,014
LFPR	0,001	0,001	2,033	0,043
Dependent : Gini Ratio $F_{stat} = 75{,}795\ (0{,}000)$		$R^2 = 0{,}928$		

Table 7. Estimated Coefficient of Fixed Effect Models with estimated cross weight
Source: Data processed by researchers.

The output for the Fixed Effect Model shows that the variables of GRDP, HDI, government expenditure, population, and LFPR have a significant effect on the 5 percent error rate on the Gini ratio and the FDI variable has a significant effect on 10 percent error rate on the Gini ratio.

4.3. Best Model Estimation

So it can be concluded that based on the test, the model chosen is the fixed effect cross weight estimation model, with the estimation model:

$$\widehat{Gini}_{it} = -0{,}187 + 0{,}056^{***}\log(RGDP_{it}) - 0{,}006^{***}\,HDI_{it} + 0{,}004^{*}FDI_{it}$$

$$+ 0{,}001^{**}GovtExp_{ti} - 0{,}128^{**}\log(Population_{it}) + 0{,}001^{**}LFPR_{it}$$

Notes : ***) significant at $\alpha = 1$ percent; **) significant at $\alpha = 5$ percent; *) significant at α=10 percent

Based on the estimation results of the best model, all variables that are thought to have an effect are proven to affect inequality with different levels of statistical significance. The results of the study show that the variables that are expected to reduce income inequality are the increase in HDI and population. Meanwhile, economic growth, increased government spending, and increased LFPR increase income inequality. The model estimation results which show that HDI has a negative effect on increasing income inequality provide feedback that HDI can be used as an approach to measuring people's welfare as GRDP as a measure of prosperity that represents the occurrence of Economic Development. The value of $\hat{\beta}_2 = -0{,}006$ means that every one-unit increase in the human development index (HDI) of each province will reduce the gap as measured by the Gini ratio by 0.006. Increasing the HDI value is not a simple problem, because it is related to the three main components of human development, namely education, health, and purchasing power.

The results of the study which show an increase in inequality caused by an increase in GRDP are $\hat{\beta}_1 = 0{,}056$, meaning that every one percent increase in the GRDP of each province will increase inequality as reflected by the Gini ratio of 0.056. Meanwhile, government spending also has a positive effect on increasing income inequality, which is equal to $\hat{\beta}_2 = 0{,}001$. This means that every one billion rupiah increase in government spending in each province will contribute to an increase in the Gini ratio of 0.001. The LFPR coefficient value is $\hat{\beta}_6 = 0{,}000$, meaning that every one percent increase in the LFPR of each province will increase the Gini ratio by 0.001. This figure shows the magnitude of the effect of LFPR on increasing inequality is very small. It is suspected that this condition is not reflect to the current phenomenon of economic restructuring and globalization, that those who can enter the job market are people who have high education and skills.

The coefficient of the population variable is $\hat{\beta}_5 = -0{,}128$, meaning that every one percent increase in population change in each province will reduce the Gini ratio by 0.128. Although this figure shows the highest elasticity value of reducing inequality, in the long run, it is not the best solution for reducing the level of income inequality. Population increase in the long term will be followed by various social problems when the local government does not have an increase in the quality of human resources. So it is very important here to address that the effectiveness of government spending is a keyword to overcome the problem of income inequality in Indonesia. Finally, inviting direct investment as an effort to adopt/transfer technology and expand trade networks with an effect of $\hat{\beta}_4 = 0{,}004$. The results of this study indicate that every one billion US$ increase in FDI investment in each province will increase the Gini ratio by 0.004. In addition to the aspect of the elasticity coefficient which describes the influence of the independent variable, the results of panel data regression also show differences in individual effects in each province. The province that has the largest cross-section effect is West Java Province and the lowest in West Papua Province. The cross-section effect shows that if all the independent variables, namely GRDP, HDI, government spending, FDI investment, population, and LFPR are constant, the province with a fairly large Gini ratio is West Java and the lowest in West Papua.

No.	Province	Effect	No.	Province	Effect
(1)	(2)	(3)	(1)	(2)	(3)
1	ACEH	-0.007	18	WEST NUSA TENGGARA	0.029
2	NORTH SUMATERA	0.040	19	EAST NUSA TENGGARA	0.022
3	WEST SUMATERA	0.012	20	WEST KALIMANTAN	0.005
4	RIAU	-0.014	21	CENTRAL KALIMANTAN	-0.066
5	JAMBI	-0.039	22	SOUTH KALIMANTAN	-0.004
6	SOUTH SUMATERA	0.037	23	EAST KALIMANTAN	-0.060
7	BENGKULU	-0.031	24	NORTH SULAWESI	0.024
8	LAMPUNG	0.044	25	CENTRAL SULAWESI	-0.012

9	BANGKA BELITUNG ISLANDS	-0.136
10	RIAU ISLANDS	-0.078
11	DKI JAKARTA	-0.118
12	WEST JAWA	0.154
13	CENTRAL JAWA	0.115
14	DI YOGYAKARTA	0.130
15	EAST JAWA	0.102
16	BANTEN	0.118
17	BALI	0.053
26	SOUTH SULAWESI	0.100
27	SOUTHEAST SULAWESI	0.018
28	GORONTALO	0.001
29	WEST SULAWESI	-0.096
30	MALUKU	-0.023
31	NORTH MALUKU	-0.109
32	WEST PAPUA	-0.141
33	PAPUA	-0.078

Table 9. Cross Section Effect Coefficient of Individual Provinces
Source: Data processed by researchers.

5. Conclusion

The results of panel data regression show that the GRDP variable as a representation of economic growth has a significant positive coefficient. This means, in general, the results of the study show that increasing economic growth increases income inequality in 33 provinces in Indonesia in 2010-2017. The same applies to increases in government spending, LFPR, and FDI. It is suspected that based on these results, economic prosperity with the current economic restructuring program is only enjoyed by some people who are ready for the current flow of economic development. So that in the future it is necessary to improve programs and development strategies that are more pro-poor (mainstreaming the poor and having low education). The results of this study also show that an increase in HDI scores correlates with a decrease in inequality. In other words, the results of the study confirm that in addition to the economic growth rate, the HDI figure is very useful and can be used as the main strategy to reduce inequality. The results of the study indicate that the three components of the HDI indicator need to be the basis for effective allocation of government spending in the fields of health, education, and assistance for economic activities related to the development and ease of access of micro dan small enterprises and Cooperatives to loan funds.

References

[1] Albrecht, D. E., & Albrecht, C. M. (2007). INCOME INEQUALITY: THE IMPLICATIONS OF ECONOMIC STRUCTURE AND SOCIAL CONDITIONS. Sociological Spectrum, 27(2), 165–181. https://doi.org/10.1080/02732170601118153.

[2] Arsyad, L (2010). Ekonomi Pembangunan, Edisi 5. Yogyakarta: UPP STIM YKPN

[3] Blanchard, O. J., Nordhaus, W. D., & Phelps, E. S. (1997). The Medium Run. Brookings Papers on Economic Activity, 1997(2), 89. https://doi.org/10.2307/2534687.

[4] Blanchard, O., & Giavazzi, F. (2003). Macroeconomic Effects of Regulation and Deregulation in Goods and Labor Markets. The Quarterly Journal of Economics, 118(3), 879–907. https://doi.org/10.1162/00335530360698450.

[5] Cai, F., Wang, D., & Du, Y. (2002). Regional disparity and economic growth in China. China Economic Review, 13(2–3), 197–212. https://doi.org/10.1016/s1043-951x(02)00072-x.

[6] Deininger, K., & Olinto, P. (1999). Asset Distribution, Inequality, and Growth. Policy Research Working Papers. https://doi.org/10.1596/1813-9450-2375.

[7] Hill, H. (2021). What's happened to poverty and inequality in Indonesia over half a century? Asian Development Review, 38(1), 68–97

[8] Kuznets, S. (1955). Economic growth and income inequality. The American Economic Review, 45(1), 1– 28. https://doi.org/10.2307/2118443.

[9] Mills, M. (2008). Globalization and Inequality. European Sociological Review, 25(1), 1–8. https://doi.org/10.1093/esr/jcn046.

[10] Rayo, L., & Becker, G. S. (2007). Evolutionary Efficiency and Happiness. Journal of Political Economy, 115(2), 302–337. https://doi.org/10.1086/516737.

[11] Saluy, A.B., Abidin, Z., Djamil, M., Kemalasari, N., Hutabarat, L., Pramudena, S.M., & Endri, E. (2021). Employee productivity evaluation with human capital management strategy: The case of covid-19 in Indonesia. Academy of Entrepreneurship Journal, 27(5), 1-9.

[12] Schweinitz, K. de. (1976). Economic Growth and Social Equity in Developing Countries. By Irma Adelman and Cynthia Taft Morris. (Stanford, Calif.: Stanford University Press, 1973. Pp. 257. $10.00.). American Political Science Review, 70(1), 232–233. https://doi.org/10.1017/s0003055400264459.

[13] Silitonga, T.B., Sujanto, B., Luddin, M. R., & Susita, D., & Endri, E. (2020). Evaluation of Overseas Field Study Program at the Indonesia Defense University. International Journal of Innovation, Creativity, and Change, 12(10), 554-573.

[14] Sugianto, S., Oemar, F., Hakim, L., & Endri, E (2020). Determinants of Firm Value in the Banking Sector: Random Effects Model. International Journal of Innovation, Creativity, and Change, 12(8), 208-218.

[15] Todaro, M. P., & Smith, S. C. (2009). Economic development. Boston: Pearson Addison Wesley.

[16] Waluyo, J. (2009). Hubungan Antara Tingkat Kesenjangan Pendapatan dengan Pertumbuhan Ekonomi: Suatu Studi Lintas Negara. Economic Journal of Emerging Markets, 9(1) 1–20. https://doi.org/10.20885/vol9iss1aa621

[17] Williamson, J.G. (1965). Regional Inequality and the Process of National Development, a Description of the Patterns. Economic Development and the Cultural Change, 3(4), 1-84.

[18] World Bank. (2016). Indonesia's rising divide. World Bank Group. Retrieved from http://documents.worldbank.org/curated/en/267671467991932516/Indonesias-rising-divide