

## Mitigating Income Inequality in Bali Province, Indonesia

Muhammad Amrullah, Setyo Tri Wahyudi, Marlina Ekawaty

Department of Economic, Faculty of Economic dan Business, Universitas Brawijaya

Corresponding Author: [m\\_amrullah18@student.ub.ac.id](mailto:m_amrullah18@student.ub.ac.id)

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### Abstract

Studying the distribution of income in a region is an important topic to know about the factors that influence the distribution of income, then find out the factors that are the solution to problems related to income distribution, and later can minimize differences in income distribution disparities between regions. This paper estimates the relationship between Unemployment, Labor Participation, Employed Workers, Elementary School Graduates, Junior High School Graduates, and Senior High School Graduates to Income Inequality in 9 districts/cities in Bali Province throughout 2008-2018. This study estimates the relationship of six independent variables to income inequality as the dependent variable using multiple panel regression analysis with the Fixed Effect Model (FEM) model in 9 districts/cities in Bali Province over period 2008-2018. The results of this study found that Unemployment, Labor Participation, Employed Workers, Elementary School Graduates, Junior High School Graduates, and Senior High School Graduates are significant to Income Inequality. Unemployment and Junior High School Graduates positively affect to Income Inequality, then Labor Participation, Employed Workers, Elementary School Graduates, and Senior High School Graduates negatively affect to Income Inequality.

**Keywords:** Income Inequality; Gini Coefficient; Income Distribution; Education; Labor

**JEL Classification:** I24

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### 1. Introduction

Studying income inequality in a region is an important topic to know about the factors that give decreasing effect of income inequality region and the factors that affect increasing of income inequality in region. The regional inequality in Indonesia tends to increase from year to year. The decreasing of poverty and the increasing of economic growth are not followed by the decreasing of income inequality.

This research departs from the inequality theory explained by Simon Kuznet, which states that in the early stages of economic growth, income

distribution will deteriorate, but at a later stage the distribution of income will increase along with income distribution. This observation became known as the “inverted U” Kuznet curve, due to the longitudinal (time-series) change in the income distribution. As industries attract a larger fraction of the labor force, inequality starts decreasing (Biswas et al., 2017). The higher economic growth or the greater income per capita will create the greater difference between the poor and the rich. In the early stages of development, the increase in per capita income was accompanied by an increase in the value of Gini Index.

Some researchers are trying to investigate the reasons for resolving income inequality from multiple perspectives (Zhang & Chen, 2015). The income inequality is the essence of economic inequality (Militaru & Stanila, 2015). Studying income distribution is an essential key to resolving the inequality problem and shortening inequality between poor and rich (Shahpari & Davoudi, 2014).

Inequality in income distribution between high-income people and low-income people is a big problem that always faced by developing countries (Keeley, 2015). As a developing country, that fact is certainly happening in Indonesia. There are two types of inequality. First, the unequal distribution of income between income groups is measured by the Gini index. Second, inequality between regions is important to study because the concentration of Indonesia's economic activity still tends to be geographically concentrated into the Western Region of Indonesia for the 5 decades was given effect on regional inequality (Wahyudi & Jantan, 2015).

The variable that affects income inequality is unemployment (Nadya & Syafri, 2019). That study explores the possible connection between unemployment and income inequality in 33 Provinces within 2007 to 2016, and found that unemployment and income inequality are negatively correlated. Another research uses panel data regression analysis with cross-section data in 34 provinces and time series on 2015 until 2018 and found that education and poverty had a partial effect on income inequality in Indonesia, while unemployment had not to affect income inequality. Simultaneously, education, unemployment, and poverty affect income inequality in Indonesia (Hindun et al., 2019). Based on those studies, we can see the difference results regarding the relationship between unemployment and income inequality.

Besides unemployment, the participation of workers has also an influence on income inequality. In all provinces in Indonesia for the period 2013-2017, Labour Force Participation Rate have a positive and significant influence on

Income Inequality (Arsyillah, 2019). Meanwhile, other studies have found that Labour Force Participation Rate has a positive but not significant relation to Income Inequality in the Six Provinces in Java Island within 2010-2016 (Rahma, 2018). Discussing the effect of employed workers on income inequality in Indonesia for 2000-2016, the research (Distovianti, 2019) shows that the employed worker has a significant and positive effect on income inequality.

The other variable that influences income inequality is Education. Education becomes an important factor determining wage level and contributes to the distribution of people's income (Nadya & Syafri, 2019). That study found, education has a positive and significant relation on income inequality in Indonesia. Base on study from OECD, the main reason increasing income inequality in labour is stable growth in demand for high-skilled workers in high-tech industries. This high-tech industries demand is the reason for wage growth for those with professional education, relevant knowledge, and skills to work in the high-tech information communication sector. As a result, wage differences between highly skilled and low skilled workers are lame (Kudasheva et al., 2015).

Meanwhile, Educated Labour has a relation to income inequality in East Java (Khusnah, 2015). That study found Educated Workforce variables significantly affected to income inequality between districts/cities in East Java in 2008-2013. Based on gender, returns to education for men is lower than for women. Education can reduce gender based income gap. (Wahyuni & Monika, 2017). The research that discusses the effect of education level on income inequality in Indonesia in 1987-2017, found the rate of growth in the number of high school graduates is able to reduce income inequality. However, the growth rate in the number of students at elementary graduates, junior graduates, and university graduates does not significantly affect income (Septiani, 2019). In other studies that discuss the relationship of education with income inequality, it found education has a negative and insignificant effect

on income inequality in provinces in Indonesia (Anshari et al., 2018).

The hypothesis of this study is Unemployment, Labor Participation, Employed Workers, Elementary School Graduates, Junior High School Graduates, and Senior High School Graduates have a significant effect on income inequality. The novelty of this research is to study income inequality in 9 districts/cities in Bali Province in the period 2008-2018. This study uses 11 years of period. This study adopts various previous research models to prove that all of these models can reduce income inequality but for the novelty of the research, researchers use new proxies in new models to find the relation of that proxies to income inequality. The new proxies relate to various levels of graduates from workers including elementary, junior high school, and senior high school graduates.

## 2. Research Method

The purpose of this article is to find the evidence of some crucial variables that affect income inequality. The equation of the research model is as follows:

This research uses quantitative research methods with estimations using the Multiple Regression Data Panel with Fixed Effect Method (FEM). This study uses E-views 10 Software analysis tools to help processing research data in the form of panel data. This study uses secondary data sourced from the Badan Pusat Statistik (BPS) of Bali Province. This study uses cross section data in the form of 9 regencies/cities in Bali Province including Denpasar City, Badung Regency, Gianyar Regency, Tabanan Regency, Bangli Regency, Klungkung Regency, Jembrana Regency, Karangasem Regency, and Buleleng Regency. Meanwhile, time series data are in the period 2008 to 2018.

Independent variables in this study are the unemployment, labor participation, employed workers, elementary school graduates, junior high school graduates, and senior high school

graduates. In most empirical study, the Gini coefficient used to describe income inequality (Zhang & Chen, 2015). The Gini coefficient is a broad index that applies in a global that describes income distribution level (Han et al., 2016).

That study suggests that the Gini coefficient is the most appropriate indicator for measuring social inequality, especially in a global context. The Gini coefficient is an aggregate income inequality measurement that provides robust and straightforward measures. Gini coefficient is used to measure the extent of the income distribution (consumption expenditure) among individuals or households. The Gini 0 coefficient represents perfect equality and everyone has the same income. Then, Index 1 implies ideal inequality that means the entire profit is in one individual.

Unemployment is the total unemployment percentage of the full labour force, not working but available and looking for a job. Badan Pusat Statistik (2020) describes that Unemployment consists of people who are unemployed and looking for work. Residents who do not have a job and prepare a business. residents who do not have a job and are not looking for work, because they feel it is impossible to get a job. residents who already have jobs, but have not started working. This variable uses data in percent.

The Labor Participation is using labor force participation rate data in percent. The Labor Participation Variable means The percentage of population over the age of 15 enters workforce and actives on economics activity in a country/region. The higher level of Employment Participation shows that the higher the supply of labor available to produce goods and services.

Employed Workers are using number of workforce in region. Employed Worker is economic activities carried out by a person with the intention of obtaining or helping for job to obtain income or profit, at least 1 hour (uninterrupted) in the past week. These activities include patterns of unpaid worker activities that help in a business / economic activity.

The next variable is about education from the workforce. Education level is a long-term

process that uses systematic and organized procedures, in which managerial workforce learns conceptual and theoretical knowledge for general purposes. Meanwhile, states that the education level of an employee can increase the company's competitiveness and improve company performance.

Elementary School Graduates uses data in percent which is percentage of workers who have education through elementary school. Junior High School Graduates uses data in percent which is percentage of workers who have education through junior high school. Senior High School Graduates uses data in percent which is percentage of workers who have education through senior high school.

To avoid problems in data processing due to the large gap between the independent variable and the dependent variable, the model equation is transformed into a natural logarithmic form. The natural logarithmic form is used because in general the value of variables is very large and the variable units are different from one another. Logarithmic transformation will make a non-linear relationship in a model can be used in a linear model. In addition, logarithmic transformation can transform data that is not normally distributed into normally distributed (Wahyudi, 2020). In this study, researchers use logarithmic data transformation for Elementary school graduates Data, Junior High School Graduates Data, Senior High School Graduates Data as independent variables, and Income Inequality Data as dependent variable.

The research data are taking from the *Badan Pusat Statistik* (BPS) of Bali Province. The research model uses Multiple Regression Data Panel with Fixed Effect Method (FEM) to estimate six independent variables on income inequality as the dependent variable. In determining the best model, three tests were conducted in selecting panel data estimation techniques. First, the Chow Test is carried out to choose the Common Effect or Fixed Effect estimation technique. Second, the

Hausman Test was carried out to choose the Fixed Effect or Random Effect estimation technique. Third, the Lagrange Multiplier Test is performed to choose the Common Effect or Random Effect estimation technique (Wahyudi, 2020).

**Table 1. Diagnostic Test**

Test Name	Value	Result
Jarque-Bera for Normality Test	0.310107	Normal
Durbin-Watson Stat for Autocorrelation Test	2.080434	No Autocorrelation
Correlations Coefficient for Multicollinearity Test	0.6554	No Multicollinearity
Park Test for Heteroscedasticity Test	0.0924	Homoscedasticity

**Source: E-Views Data Processing Results (2020)**

Then the regression model was tested with diagnostic tests to prove that the regression model passed all classic assumption tests. To produce the best, linear, unbiased estimator (BLUE) parameter estimation values, classic assumption testing is needed including Normality Test, Multicollinearity Test, Heteroscedasticity Test, and Autocorrelation Test (Wahyudi, 2020).

The next step is testing the effect of the independent variable on the dependent variable by testing the significance of the influence of the independent variable on the dependent variable either partially or jointly with an analysis of the Coefficient of Determination ( $R^2$ ), Partial Test (t Test), and Simultaneous Test (F Test).

### 3. Results and Discussion

#### 3.1 Result

The diagnostic test results are presented in Table 1 named Diagnostic Test Table. The researchers have tested classical assumptions including Normality Test with Jarque-Bera Test, Autocorrelation Test with Durbin-Watson Stat Test, Multicollinearity Test with Correlations

Results, and Heteroscedasticity Test with Park Test.

The result of Normality Test with Jarque-Bera Test shows there is no abnormal data. The Jarque-Bera Test results P-Value in 0.310107. It means that P-Value is greater than 0.05 (Alpha Value), so the residual data is normally distributed. The next test is Autocorrelation Test with Durbin-Watson Stat. The results show The Durbin-Watson Stat 2.080434, the lower limit of Durbin-Watson 1.51812, the upper limit of Durbin-Watson 1.80135, 90 total observations and 7 total variables. Further, there is no positive autocorrelation because The Durbin-Watson 2.080434 is greater than the upper limit (1.80135). There is no negative autocorrelation because the value of  $(4 - \text{Durbin Watson Stat})$  1.920 is greater than the upper limit (1.80135).

The result of Multicollinearity Test with Correlations Results shows the maximum level of coefficient in 0.6554. It means all coefficient correlations on Multicollinearity Test is lower than 0.8 (Multicollinearity Limit). The final result shows there is no multicollinearity. Further, the result of Heteroscedasticity Test by Park Test shows the P-Value of coefficient in residual in 0.0924. It means that P-Value of coefficient in residual is greater than 0.05, so

there is no heteroscedasticity or the residual is homoscedasticity.

The statistical results of the model in Table 2 show all variables including Unemployment, Labor Participation, Employed Workers, Elementary school graduates, Junior high school graduates, and Senior High School Graduates are significant to Income Inequality with the confidence levels above 95%.

Unemployment and Junior High School Graduates positively affect the Gini coefficient, so that income distribution will be lame. That an increase in Unemployment and Junior High School Graduates can make the increasement of income distribution. This result is similar to the previous study (Hindun et al., 2019) in which unemployment affect income inequality.

The coefficient of Unemployment positively affects the Gini coefficient, it means 1 percent increase in Unemployment followed by 1 percent increase Gini coefficient. This relationship is similar from previous study which relationship between unemployment and income inequality has a positive correlation. (Nadya & Syafri, 2019). Further, The coefficient of Junior High School Graduates positively affects the Gini coefficient, it means 1 percent increase in Junior High School Graduates followed by 1 percent increase Gini coefficient.

**Table 2. Fixed Effect Model Regression Result**

<b>Dependent Variable: Income Inequality</b>			
<b>Variable</b>	<b>Coefficient</b>	<b>Prob.</b>	
C	-0.532855	0.0876	
UNEMPLOYMENT	6.67E-06	0.0139	
LABORPARTICIPATION	-0.009530	0.0002	
EMPLOYEDWORKERS	-3.98E-07	0.0002	
LOGELEMENTARYGRADUATES	-0.097257	0.0095	
LOGJUNIORGRADUATES	0.208386	0.0065	
LOGSENIORGRADUATES	-0.033850	0.0476	
<b>Effects Specification</b>			
R-squared	R-squared	0.818134	Prob (F-statistic) 0.000000

Labor Participation, Employed Workers, Elementary school graduates, and Senior High School Graduates negatively affect the Gini coefficient, so that income distribution will be equitable. That an increase in Labor Participation, Employed Workers, Elementary school graduates, and Senior High School Graduates can make reduction of income distribution. The coefficient of Labor Participation negatively affects the Gini coefficient, it means 1 percent increase in Labor Participation followed by 1 percent decrease in Gini coefficient. This result is partially similar to the previous study (Arsyillah, 2019) in which Labor Participation have a positive and significant influence on Income Inequality. This study finds Labor Participation has a negative and significant influence on Income Inequality. The coefficient of Employed Workers negatively affects the Gini coefficient, it means 1 percent increase in Employed Workers will effect 1 percent decrease in Gini coefficient. This relationship is partially similar to previous studies (Distovianti, 2019), that employed workers are significant to income inequality with negatively effect.

The coefficient of Elementary school graduates negatively affects the Gini coefficient, it means 1 percent of increase in Elementary school graduates will effect 1 percent a decrease of income distribution. This relationship is in contrast to previous studies (Septiani, 2019) where elementary

graduates is not significant to income inequality. The coefficient of Senior High School Graduates negatively affects the Gini coefficient, it means the 1 percent of increase in Senior High School Graduates will effect 1 percent of decrease in income distribution. This result is similar to the previous study (Septiani, 2019) in which the senior graduates have a negatively effect and significant influence on income disparity.

The  $R^2$  value 0.8181 indicates six independent variables selection explaining Income Inequality variable variation by 81.81%. It means all variables in the model can explain 81.81% of dependent variable. While 18.19% is explaining by other variables outside the model. The decision is acceptable if the F test shows a significant value. In this model, the probability of F value is 0.000000. It means that the F test is significant at a 5% significance level. We can conclude that this regression model is suitable and statistically significant. Based on the results above, the final model in this study is:

Based on Figure 1, the workforce with Junior High School graduated and Senior High School graduated trend change in Bali Province in period 2008-2019 displayed in Figure 1. The workforce with Junior High School graduated peaked to its highest point of 21.17 in 2008.

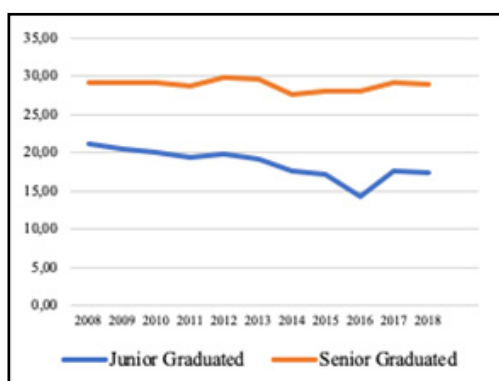


Figure 1. Junior High School Graduates and Senior High School Graduates in Bali Province 2008-2018

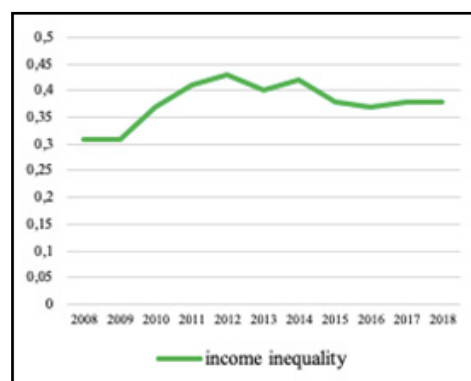


Figure 2. Income Inequality in Bali Province 2008-2018

Then it declined to the lowest point of 14.16 in 2016, but it rose again to 17.69 in 2017. Meanwhile, The workforce with Senior High School graduated peaked to its highest point of 29.91 in 2012. Then it declined to the lowest point of 27.60 in 2014, but it rose again to 28.15 in 2015.

Based on Figure 2, the Gini Coefficient declined to its lowest point of 0.31 in 2008 and 2009. Then it began to rise to the highest point of 0.42 in 2014, but it declined again to 0.38 in 2015. When there was an increase in the number of workforce with Junior High School graduated in 2016, it was seen that the Gini Coefficient also increased. This indicates that an increasing trend of workforce with Junior High School graduated was followed by a enhancement in the Gini Coefficient in Bali Province. It means there is a positive relation between those variables.

The Gini Index chart that occurs in Bali Province can be stated in accordance with the inequality theory presented by Simon Kuznet. That theory explains that in the early stages of economic growth, the income distribution will deteriorate. It means that before reaching the highest point in economic development, income inequality will not show a consistent decline. Therefore, the increase and decrease in the Gini Index that occurred in the Province of Bali reflected that the Province of Bali was an area that had not yet reached the highest point in development and its people were not evenly prosperous yet.

If number of workforce with Junior High School graduated increases, the GINI coefficient also increases. This result is due to the existence of a 9 year compulsory education program. Many people think that after their child completes the compulsory education program for 9 years, the child can work. Many students in several areas with a low Gini Index in 2018 such as Bangli Regency have a high labor force participation rate as a result of the large number of junior

school graduates who are immediately looking for work to help their families. Such as they help his parents to plant rice, to carve artwork from wood, to do construction work, and various other jobs. Whereas in areas with a high Gini Index in 2018 such as Denpasar City, it turns out that there are still many students who continue their studies to university and few workers who only graduate junior school.

Meanwhile, when The Workforce with Senior High School graduated decreased from 2010 to 2011, it turned out that the Gini Coefficient had increased. Whereas when the workforce with Senior High School graduated increased in 2014 to 2015, the Gini Coefficient decreased in numbers. This relationship certainly shows a negative relationship between The Workforce with Senior High School graduated and Gini Coefficient in Bali Province. That result is similar to (Septiani, 2019) in which the level of education of the workforce, High School Graduates have a significant influence on income disparity, but in this study, not only find the significant relation, but also find the direction of the relationship between The Workforce with Senior High School graduated and Gini Coefficient in Bali Province, that is negative relation.

The Gini coefficient increases sequentially occurred in 2009 to 2013, this could indicate an increase in inequality when there is an increase in the economy in the Province of Bali as illustrated by Kuznets. The declining trend of the Gini coefficient in Bali Province from 2014 to 2018 and getting the lowest point from the past 5 years reflects the government's policy on mitigating income inequality is quite useful.

#### 4. Discussion

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## 5. Conclusions

In the estimated model, the results show Unemployment, Labor Participation, Employed Workers, Elementary School Graduates, Junior High School Graduates, and Senior High School Graduates are significant to Income Inequality. Unemployment and Junior High School Graduates positively affect the Income Inequality, and Labor Participation, Employed Workers, Elementary school graduates, and Senior High School Graduates negatively affect the Income Inequality. Some things that can be done in an effort to create a better income quality is by reducing the unemployment rate by opening up new jobs, increasing the involvement of the workforce and developing the education sector until 12 years graduates in the Bali Province.

As novelty, this study found a negative relation between Labor Participation and Income Inequality. That result is different from previous study which found the relationship between unemployment and income inequality are positively correlated. Further, the result about a positive relationship between unemployment and income inequality in this study is different from previous study which found unemployment has a negative impact on income inequality (Nadya & Syafri, 2019) education and unemployment on the inequality of income distribution and see which provinces contribute the most to income inequality in Indonesia. This study used Panel regression analysis with the Eviews 8 analysis tool. The data used in this research are Gini ratio, GDRP growth rate, mean of school duration, and open unemployment rate from 33 Provinces within 2007 to 2016 (330 observations). Meanwhile, Elementary School Graduates, Junior High School Graduates, and Senior High School Graduates as the research variables in this study were rarely used by previous studies.

The suggestion in this study for the further researchers is this research model can be used in other areas with different time series data intervals. This effort will give different results compared to the results of this study. Furthermore, the future researchers can use the

number of university graduates workforce and involvement of female workers in Bali Province to find the relationship to income inequality.

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