

# Do Fiscal Decentralization and Human Development Index Affect Poverty in Indonesia?

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**Abstract**—The study aim is to analyze how the effects of fiscal decentralization and Human Development Index (HDI) on poverty in Indonesia. This study employ secondary data in the form of time series from 2010 to 2017, and cross section data consisting of 33 provinces in Indonesia, so that the type of polled data can be categorized that is a combination of time series data (for 8 years) with cross section data 33 Province in Indonesia. The analytical method used is PLS (Panel Least Square) with a comparison of two models namely the Fixed Effect and Robust Least Square models. From the results of the Fixed Effect regression model shows that DDF has a negative and insignificant effect on Poverty, while HDI has a negative and significant effect on Poverty. The study found that each additional unit of DDF reduced poverty by 10.97 percent if the HDI remains. In addition, the Human Development Index unit reduced the number of poor by 79.83 percent if the DDF remains. These findings implied that to reduce the poverty, efforts to improve HDI need to be focused.

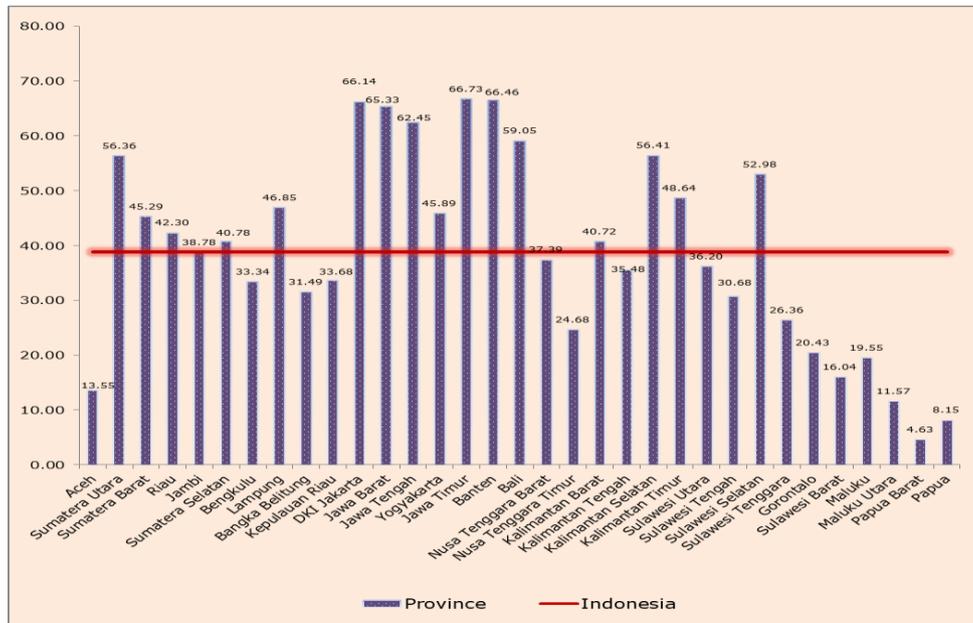
**Keywords**— Fiscal decentralization; Human development index; Poverty

## I. INTRODUCTION

Indonesia's decentralization process began with the emergence Indonesia's desire in giving authority to local governments after a centralized system of government that dominated for 32 years (Jamal, Muhammad, Masbar, & Aliasuddin, 2015). Although the Law on the basics of Government in the region (1974) has provided a decentralized framework a few decades ago, it has hardly been implemented to a lower level of government (Ahmad & Mansoor, 2002).

Centralized authority causes dissatisfaction, which in fact triggers injustice throughout the region in regional development and creates a desire for division or disintegration, especially in the Provinces of Aceh and Papua. Both provinces triggered a decentralization process in Indonesia, in addition to the desire to improve people's welfare (Kirana, 2014). Since 2001, the Government of the Republic of Indonesia has changed the government system from centralization to a decentralized system through the implementation of regional autonomy or often we known as the era of regional autonomy (Aulia, 2014). The implementation of regional autonomy was enacted starting January 1, 2001 through Law Number 22 of 1999 and Law No. 25 of 1999 has implications for the delegation of authority between the center and regions in various fields, where there has been a vertical rearrangement of relations between the Central Government, the Provincial Government and the Regency/City Government. This policy is contained in Law Number 32 of 2004 concerning Regional Government and Law Number 33 of 2004 concerning Financial Balance between the Central and Regional Governments. The implementation of decentralization in Indonesia in the past seventeen years has drastically changed the relations of the sector in government also between the central government and the regions (Suwandi, 2015). Through regional autonomy and fiscal decentralization, the central government provides regional governments with several powers accompanied by resources so that local governments have greater authority and power in implementing policies to explore revenues and carry out the role of allocation independently in determining development priorities in their regions (Aulia, 2014).

Figure I and Table I show that the comparison of the average degree of fiscal decentralization in 2010-2017 by province in Indonesia. There are still many provinces that are below the national average (38.92 percent/Medium). On average overall, East Java Province ranked first in the last 8 years, but in 2017 DKI Jakarta was categorized as Regional Financial Capability very well with a degree of fiscal decentralization of 66.42 percent while East Java Province (figure II) despite obtaining very good criteria but DDF growth continued to decline which was only 53.34 percent (ranked 5th out of 7 provinces with very good regional financial capability criteria) under the Province of West Java (54.10 percent). The lowest degree of Fiscal Decentralization with the criteria of very less on average in 2010-2017 is West Papua at 5.85 percent.



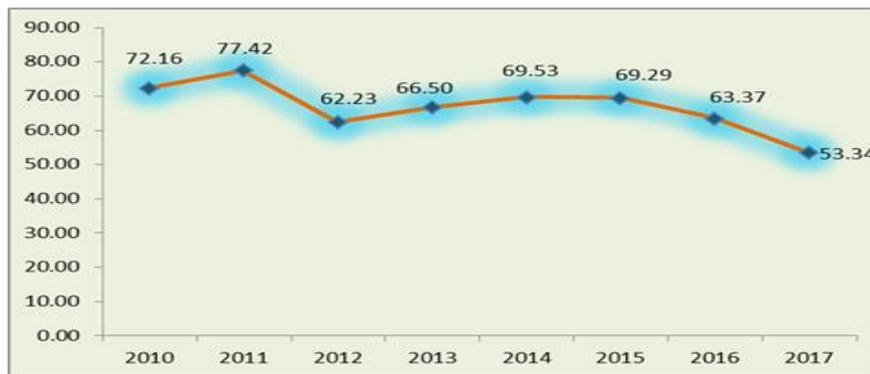
Source: Ministry of Finance Republic Indonesia, 2018

FIGURE I. AVERAGE DEGREES OF FISCAL DECENTRALIZATION TAHUN 2010-2017

TABLE I. CRITERIA FOR REGIONAL CAPABILITY OF FISCAL DECENTRALIZATION 2010-2017

Province	Regional Financial Capability
Papua Barat, Papua	Very less
Aceh, Sulawesi Barat, Maluku, Maluku Utara	Less
Nusa Tenggara Timur, Sulawesi Tenggara, Gorontalo	Enough
Jambi, Bengkulu, Bangka Belitung, Kepulauan Riau, Nusa Tenggara Barat, Kalimantan Tengah, Sulawesi Utara, Sulawesi Tengah	Medium
Sumatera Barat, Riau, Sumatera Selatan, Lampung, Yogyakarta, Kalimantan Barat, Kalimantan Timur	Good
Sumatera Utara, DKI Jakarta, Jawa Barat, Jawa Tengah, Jawa Timur, Banten, Bali, Kalimantan Selatan, Sulawesi Selatan	Very good

Source: Ministry of Finance Republic Indonesia, 2018

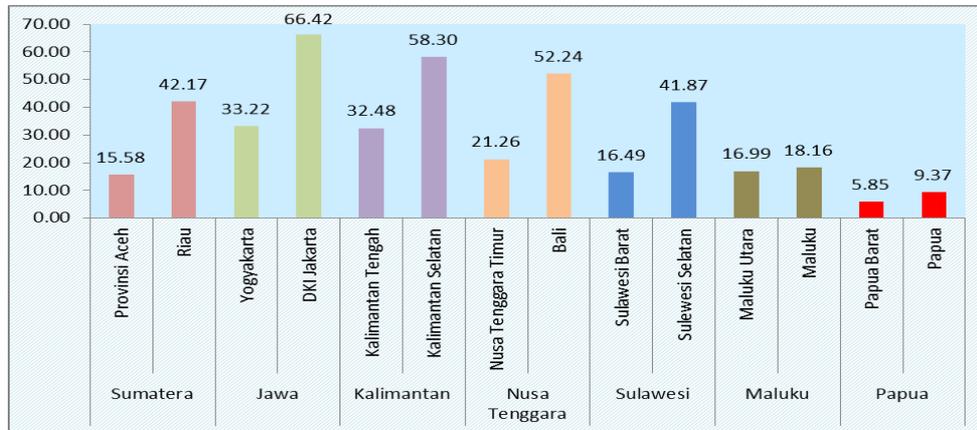


Source: Ministry of Finance Republic Indonesia, 2018

FIGURE II. DEGREE OF FISCAL DECENTRALIZATION EAST JAVA PROVINCE 2010-2017 (PERCENT)

Indonesia is an archipelagic country, based on figure III it can be seen the degree of Indonesia's fiscal decentralization in 2017 where the Aceh Province DDF is in the lowest position in Sumatra, namely obtaining less regional financial capability criteria (15.58 percent) while Riau is the Province that has the highest DDF of 42.17 percent with good criteria. The highest DDF in Java

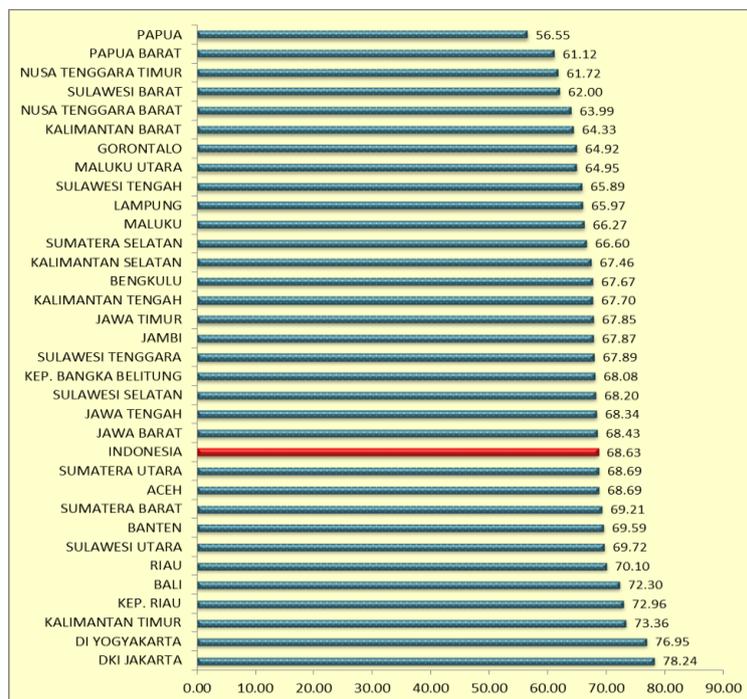
is in DKI Jakarta (66.42/very good) and the lowest is in Yogyakarta Province but still in the medium category (33.22 percent). Likewise with other provinces, although there are some provinces that have very good criteria such as in Nusa Tenggara Island, Bali Province has 52.24 percent while East Nusa Tenggara (21.26 percent) and on Papua Island, West Papua get a lower DDF of 5.85 with very poor categories. From Figure III it can be seen that there is still a very high difference between islands, this shows that the regional financial capacity is still low to self-reliance.



Source: Ministry of Finance Republic Indonesia, 2018

FIGURE III. COMPARISON OF THE DEGREE OF FISCAL DECENTRALIZATION BY ISLAND IN INDONESIA IN 2017 (PERCENT)

Fiscal decentralization can also empower local governments to collect their own income without relying on central government grants. In Latin America, decentralization increase local government spending in 1985 amounted to 20 percent of total government spending to around 30 percent in 2010. However if the local revenue is not growing, about 10 percent of total national income, it will cause local finances become vulnerable and less predictable so that it will affect long-term planning. Local governments in Indonesia currently manage almost a third of total public spending and about half of development expenditure. Local governments are required to provide health, education, environment and infrastructure services. Therefore, fiscal decentralization is expected to contribute greatly to human development in the poorest areas (UNDP, 2016).



Source: Central Bureau of Statistics, 2018

FIGURE IV. AVERAGE PERCENTAGE OF HUMAN DEVELOPMENT INDEX 2010-2017

Figure IV shows that there are still many provinces whose human development index is below the national average (68.63 percent) in 2010-2017. If the North Sulawesi Province DDF is below national, but for HDI is above the national average (69.72 percent). West Java, which also obtained very good criteria in managing its regional capabilities but obtained a low percentage of HDI (68.43 percent) compared nationally.

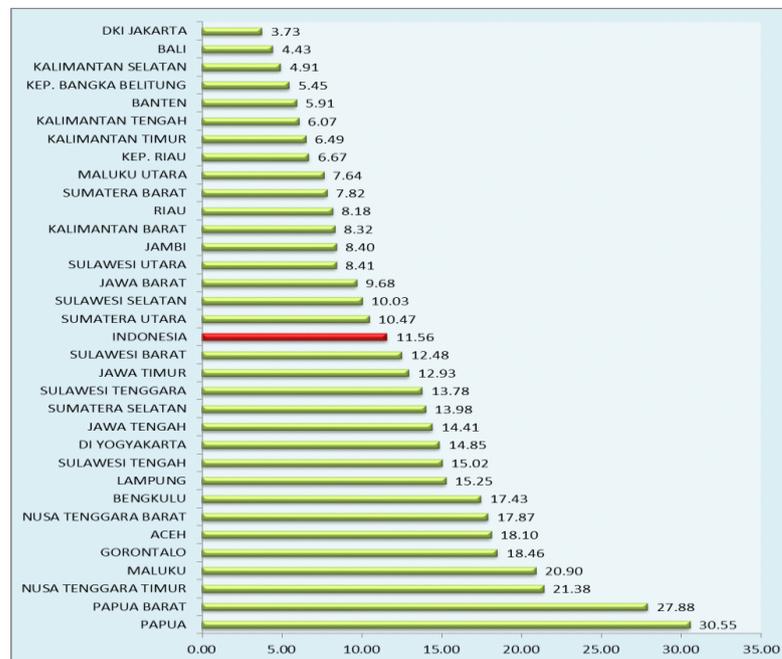
The fiscal decentralization policy can have an influence on efforts to reduce poverty. This is due to the notion of poverty is a decline in the quality of various aspects of life, whether basic needs, household income or security. Meeting the basic needs of society in order to reduce poverty is the result of the decentralization policy, which is quite important (Risalam, 2013)

Fiscal decentralization takes the government closer to the people and local governments also get better information about regional needs so that better able to regulate regional policies. In theory, fiscal decentralization ought to positively affect on poverty alleviation in light that the voice of the poor is more capable of being heard, namely increasing access, quality of public goods and services and reducing vulnerability to poverty (Silas, Wawire, & Okelo, 2018).

Fiscal decentralization leads to increase the efficiency in direct service delivery, thereby increasing access by the poor to basic, services, such as education, health, electricity, water and waste. Community participation and the capacity of citizens to watching local government are greater in the decentralization method. Thus, there are opportunities to increase transparency and accountability that lead to a reduction in corruption and overall improvements to the local government. This is expected to reduce the vulnerability of the poor. Good governance will lead to progress, such as improvements in education (school performance), indicators of quality of life, even GDP growth (Kaufman, Swagel, & Dunaway, 2003).

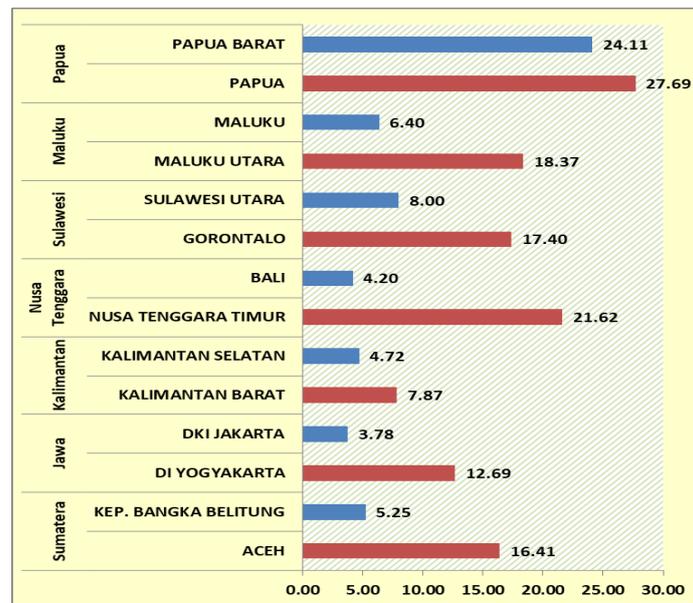
Based on OECD (2005) only one third of the countries analyzed, fiscal decentralization can lead improvements in poverty alleviation. In most other countries, fiscal decentralization has no effect at all. In countries that do not have the capacity to satisfy their basic functions and initially are in an environment with high inequality, there is a risk that decentralization will increase poverty (Bardhan & Mookherjee, 2005). This shows that the relationship between poverty reduction and fiscal decentralization is considered unclear and the results will be really influenced by the specificity of a country, and the structure and design of fiscal decentralization in the country concerned (Silas, Wawire, & Okelo, 2018)

Figure V shows that the average percentage of poor people in 2010-2017 is still high and there are still a lot of provinces in Indonesia that are above the national average of poverty. Namely, East Java Province, which gained a large degree of fiscal decentralization with a very good category, the percentage of poor people was also high at 12.93 percent. But in 2017 (figure VI) the provinces on Kalimantan Island were provinces that had the lowest percentage of poverty compared to other islands this was because North Kalimantan Province was not included in the research object. Although the lowest percentage of poverty is in the province of Java, regionally the island of Java has a difference of 8.91 percent between DKI Jakarta Province (3.78 percent) and DI Yogyakarta Province (12.69 percent). In 2017, Aceh Province was ranked as the sixth poorest province in Indonesia after Papua, West Papua, East Nusa Tenggara, Maluku and Gorontalo.



Source: Central Bureau of Statistics, 2018

FIGURE V. AVERAGE PERCENTAGE OF POOR POPULATION IN 2010-2017



Source: Central Bureau of Statistics, 2018

FIGURE VI. COMPARISON OF THE AVERAGE PERCENTAGE OF POOR POPULATION BY ISLAND IN INDONESIA IN 2017 (PERCENT)

The research aims to analyze the effect of fiscal decentralization and human development index (HDI) on poverty in Indonesia. In the introduction author discussed brief explanation of fiscal decentralization, human development index and poverty, then the authors provide a description of literature review, in the finding and discussion the author will analyze the effect of fiscal decentralization and HDI at poverty using panel data with analysis of Fixed Effect Model and Robust Least Square. In last part, the author will discuss the conclusions of the results and policy implications.

## II. LITERATURE REVIEW

### A. Fiscal Decentralization

Most of the theories behind the study of fiscal decentralization are based on Musgrave's (1939) the functions of government theory. Musgrave (1939) defines the government main role in the economy, namely allocation, distribution and stabilization. Based to Musgrave (1956) the duty of the government in maximizes social welfare thru allocations public goods provision must be submitted to local government levels. Following the principle of subsidiary as well called to as an efficiency criterion states that services and goods must be provided on the lowest level of government. (Silas, Wawire, & Okelo, 2018)

Decentralization means that local governments are responsible for expenditure and income. In addition, decentralization involves different degrees of "political decentralization" with the responsibility of "authority", namely designing policies, while "administrative" namely delegates in the "managerial" implementation phase, which has been in practice in Japan, where centrally designed policies are carried out at the local level. Thus, local autonomy in public spending is limited (Sato, 2014)

According to the Law of the Republic of Indonesia Number 33 of 2004 concerning Financial Balance between the Central Government and Regional Government, the definition of decentralization is the transfer of governmental authority by the Government to autonomous regions to be able to regulate and administer governmental affairs in the system of the Republic of Indonesia.

The Chinese government is trying to pay for social goods after the introduction of market reforms. Therefore, the central government in China decided to adopt a fiscal decentralization policy are the regional government was responsible for generating its own income (Su and Zhao, 2004).

Fiscal decentralization is a delegation of authority and responsibility from the central government to the local government for public functions or those aimed at improving the welfare of the community. The concept of fiscal decentralization is often referred to as the money follow function which means that the authority from the central government to the regional government will be followed by the division of authority in the aspect of receiving funding (Zulyanto, 2010 in Sudewi & Wirathi, 2013).

The degree of fiscal decentralization according to the results of the University of Gadjah Mada (UGM), Faculty of Social and Political Sciences research in Tangkilisan (2005), Bisma and Susanto (2010), using the interval scale are as follows:

**TABLE II. INTERVAL SCALE OF FISCAL DECENTRALIZATION**

<i>Degree of Fiscal Decentralization/DDF (%)</i>	<i>Regional Financial Capability</i>
00 – 10.00	Very less
10.01 – 20.00	Less
20.01 – 30.00	Enough
30.01 – 40.00	Medium
40.01 – 50.00	Good
> 50.00	Very good

Source: Litbang Depdagri Team–Fisipol UGM, 1991

### B. Human Development Index

The HDI is composed of three indices: Life expectancy to birth is a measure chosen for describes quantitatively the quality of human life in each country. Educational index, measured by a two-component geometric average: the average school year for adults aged 25 years (MYSI / Mean Year of Schooling Index) and expected school years for school-aged children index (EYSI/ Expected years of schooling). Income Index where Gross National Income per capita represents a component of wealth index with purchasing power parity (PPP), which replaces the old Gross Domestic Product (Maccari, 2014).

### C. Poverty

Poverty is a multidimensional concept, so poverty can be defined as inadequacy of income, shelter, food, opportunities of employment, or the basis of physical assets such as land and livestock. Poverty is also interpreted as hold no access to secure and clean drinking water, being sick and unable to go to the doctor, unable to go to school and unable to read and write. Poverty is also intended about the risk of uncertainty about the future, representation or freedom, powerlessness, vulnerability, and lack of voice (World Bank 1990 dan 2001).

## III. METHOD

The research area is 33 provinces in Indonesia. This is due to the limited data on North Kalimantan not included in the research object. This research was carried out during the period 2010 to 2017. The type of data used in the study is data panel analysis, which is a combination of time series and cross section data (Ghozali & Ratmono, 2017). Panel data analysis has several advantages. One of the advantages of the data panel method is to determine changes in time series periods. Another advantage is controlling individual heterogeneity, which provides data that are more informative, variability, degree of freedom and efficiency and less collinearity between variables (Baltagi, 2005).

To analyze whether Fiscal Decentralization and Human Development Index Affect Poverty in Indonesia, the initial equation uses the model of multiple linear regression equations with fixed effects linear panel data as follows (Gujarati & Porter (2010), Sayed, Isa & Kun (2017), Verardi & Wagner (2010)) :

$$P_{it} = \alpha + \beta_1 DDF_{it}' + \beta_2 HDI_{it}' + u_{it} \quad i = 1, \dots, N \quad t = 1, \dots, T$$

where  $P_{it}$  is the poverty in 33 provinces in Indonesia;  $DDF_{it}$  is the degree of fiscal decentralization in 33 provinces in Indonesia;  $HDI_{it}$  is the human development index in 33 provinces in Indonesia;  $\alpha$  is the constant;  $\beta_1, \beta_2$  are the regression coefficient;  $u$  is the stochastic error term;  $i$  is the cross sections or regional dimensions; and  $t$  is the time series period .

However, because the panel data experienced an outlier, Robust Least Square is an alternative method for data experiencing outlier problems, where Robust Regression is an alternative model for the least squares that can be used appropriately when there is evidence that the distribution of error terms is far or abnormal, and/or there are outliers that will affect the equation. Robust regression model will be strong against outliers. A robust estimate is relatively unaffected by small changes in large data components (Ryan, 1997). Data used in the study was obtained from the relevant agencies such as the Central Bureau of Statistics and the Ministry of Finance Republic of Indonesia. Besides that, data was also collected through literature studies have the shape of journals, scientific writings and the internet that are related to this research.

According to Rousseeuw and Leroy (1987), regression outliers are points that deviate from linear relationships determined from  $n-1$  other points, or at least from most of these points (Ryan, 1997). Alternatively, Outliers are some observations that have different significant characteristics and move away from other observations in the dataset (Sayed, Isa, & Sek, 2017).

The influence of the outliers will interfere in the process of data analysis and should be avoided in many ways. In terms of its relation to regression analysis, outliers can cause the following things (Soemartini, 2007), namely: (a) Large residuals from the model formed or  $E[e] \neq 0$ ; (b) The variance on the data becomes larger; and (c) Interval estimates have a wide range.

Outlier detection in this study can use the method (1) *scatter plot* that is by plotting the data between residual (e) with the predicted value Y ( $\hat{Y}$ ). If one or more data is located far from the overall data collection pattern, it indicates an outlier. *Scatter plots* will be easy to understand because they show data graphically and without involving complex calculations (Ghazali, Yuniarti, & Hayati, 2015). (2) The Box plot method that uses quartile and range values. The range (IQR, Interquartile Range) implies a quartile 1 difference to quartile 3, or  $IQR = Q3 - Q1$  (Soemartini, 2007).

One of the most important and most used robust regression estimates is the M-estimation introduced by Huber. In principle, the M-estimation is an estimate that minimizes an objective function  $\rho$  (Ghazali, Yuniarti, & Hayati, 2015). The parameter estimation is  $\hat{\beta}$  and the residual estimate is  $r_i$  and  $i = 1 \leq i \leq n$ . For robust regression uses weigh so the error value can be reduced. This study uses M-regression type so the estimator value can increase the Gaussian efficiency by measuring standardization in  $\sigma$ . The M-regression estimation equation is as follows (Sayed, Isa, & Kun, 2017):

$$\hat{\beta}_M = \arg \min_{\beta} \sum_{i=1}^n \rho \left\{ \frac{r_i(\beta)}{\sigma} \right\}$$

#### IV. FINDING AND DISCUSSION

By analyzing the effect of fiscal decentralization and human development index on poverty in Indonesia, two approaches are taken, namely Least Squares and Robust Least Square Panel estimates, PLS and RLS estimation results are as follows:

##### A. Test Model selection

###### 1. Chow Test

The Chow test is carried out to choose best model.

TABLE III. CHOW TEST

<i>Effects Test</i>	<i>Statistic</i>	<i>d.f.</i>	<i>Prob.</i>
Cross-section F	156.993501	(32,229)	0.0000
Cross-section Chi-square	827.057358	32	0.0000

Source: Result of research, 2018

If the value is prob. Chi-square is  $0.0000 < 0.05$  ( $\alpha = 5\%$ ) then  $H_0$  rejected, means the fixed effect model is more precise than the common effect model (Ghozali & Ratmono, 2017).

###### 2. Hausman Test

The Hausman test is used to choose between using the fixed effect model or the Random Model Effect.

TABLE IV. HAUSMAN TEST

<i>Test Summary</i>	<i>Chi-Sq. Statistic</i>	<i>Chi-Sq. d.f.</i>	<i>Prob.</i>
Cross-section random	6.553378	2	0.0378

Source: Result of research, 2018

If the value is prob. Chi-square is  $0.0378 < 0.05$  ( $\alpha = 5\%$ ) then  $H_0$  rejected, means the fixed effect model is more precise than Random effect model (Ghozali & Ratmono, 2017).

##### B. Test Significance Of Individual Parameters (Statistical Test t)

TABLE V. TEST THE SIGNIFICANCE OF INDIVIDUAL PARAMETERS

<i>Variable</i>	<i>Fixed Effect Model</i>	<i>Robust Least Square</i>
DDF	0.9129	0.0000
HDI	0.0000	0.0000

Source: Result of research, 2018

The regression of the fixed effect model result show that the two independent variables are included in the regression model. The Coefficient of Degree of Fiscal Decentralization is as large  $0.9129 > 0.05$  ( $\alpha=5\%$ ) shows DDF has no significant effect on poverty (P) while Human Development Index (HDI) coefficient is  $0.0000 < 0.05$  ( $\alpha=5\%$ ) shows HDI has a significant effect on

poverty (P) at level of 95 percent. The robust model regression results show that the two independent variables are included in the regression model. The Coefficient of Fiscal Decentralization and Human Development Index are respectively 0.0000<0.05 ( $\alpha=5\%$ ) shows DDF and HDI have a significant effect on poverty (P) at level of 95 percent.

### C. Determination Coefficient

TABLE VI. STATISTICAL TEST

<i>Model</i>	<i>R-squared</i>
Fixed Effect Model	0.978175
Robust Least Squares	0.381579

Source: Result of research, 2018

The results of regression calculations fixed effect model obtained values R-squared ( $R^2$ ) amounted 0.978175, this value implies that 97.82 percent poverty (P) in Indonesia is jointly able to be explained by independent variables used in the model or influenced by fiscal decentralization degree variables (DDF) and human development index (HDI). While the remaining 2.18 percent is influenced by another variables may belonging in the model outside the poverty variable. By using robust regression values are obtained R-squared ( $R^2$ ) amounted 0.381579, this value implies that 38.16 percent poverty (P) in Indonesia is able to be explained by independent variables used in the model or influenced by fiscal decentralization degree variables (DDF) and human development index (HDI). While the remaining 61.84 percent is influenced by another variables may belonging in the model outside the poverty variable.

### D. Least Squares Panel By Using Fixed Effect Model

TABEL VII. PANEL LEAST SQUARES WITH FIXED EFFECT MODEL

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
C	56.08116	3.577536	15.67592	0.0000
DDF	-0.001633	0.014920	-0.109442	0.9129
IPM	-0.645044	0.049573	-13.01200	0.0000
Effects Specification				
<b>Cross-section fixed (dummy variables)</b>				
<b>R-squared</b>	<b>0.978175</b>	<b>Adjusted R-squared</b>	<b>0.974934</b>	

Source: Result of research, 2018

$$P = 56.08116 - 0.001633DDF - 0.645044HDI$$

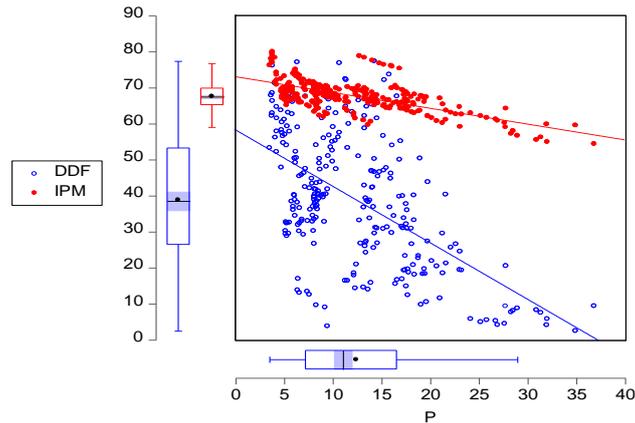
The interpretation in this equation is:

1. The constant of 56.08116 means that if the degree of Fiscal Decentralization (DDF) and Human Development Index (HDI) is zero then the poverty variable (P) is 56.08116.
2. Regression coefficient of -0.001633 means that each additional unit for DDF will reduce poverty (P) by 0.001633 (0.1633 percent) if the HDI is fixed.
3. The regression coefficient of - 0.645044 means that each additional HDI unit will reduce poverty (P) by 0.645044 (64.50 percent) if the DDF is fixed.

### E. Outlier

On regression analysis of cross sectional, there are three categorize of outliers that may lead the least squares to be disturbed. Rousseeuw and Leroy (1987) define it as vertical outliers, poor advantage points and good advantage points. 1) Vertical outliers are the outermost observations in the y dimension but nay in the explanatory variable space (variable x). Its existence is very influential both in terms of intercept estimations and regression coefficients, but has an impact on the latter, which is lighter. 2) Bad advantage points are observations that are both outside the explanatory variable space and located far from the regression line. Will greatly affect the estimation of both intercepts and slope coefficients. 3) The last is the point of good leverage is the observation that is outside the space in the explanatory variable but is located close to the regression line. Their presence only slightly affects the intercept estimates and regression coefficients but affects inference. When analyzing panel data, the fourth outlier category must be considered, namely blocking concentrated outliers that correspond to situations where most of the outermost observations are concentrated in a limited number of time series (Bramati and Croux, 2007 in Verardi & Wagner, 2010)

Outlier detection using scatter plots and box plot, results in a scatter plot between Poverty, Fiscal Decentralization and Human Development Index with residual values, which can be seen in Figure VII.



Source: Result of research, 2018

FIGURE VII. SCATTER PLOT AND BOXPLOT

According to Soemartini (2007) based on the image above, there are several data that are located far from the overall data collection pattern, therefore indicating an outlier. While the Bloxplot method uses quartile and range values, there are also some data that are out of reach or quartile, so outliers are identified.

F. Robust Least Square

TABLE VIII. ROBUST LEAST SQUARES WITH THE M-ESTIMATION METHOD

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	70.66754	5.095098	13.86971	0.0000
DDF	-0.109725	0.019508	-5.624667	0.0000
IPM	-0.798264	0.080606	-9.903238	0.0000
Robust Statistics				
R-squared	0.381579	Adjusted R-squared	0.376840	

Source: Result of research, 2018

Robust regression parameter values with M-estimates in 2010-2017 are obtained as follows:

$$P = 70.66754 - 0.109725DDF - 0.798264HDI$$

The interpretation in this equation is:

1. A constant of 70.66754 means that if the degree of Fiscal Decentralization (DDF) and Human Development Index (HDI) is zero then the poverty variable (P) is 70.66754.
2. The regression coefficient of -0.109725 means that each additional unit for DDF will reduce poverty (P) by 0.109725 (10.97 percent) if the HDI is fixed.

Fiscal decentralization will have a positive influence on poverty reduction if followed by an increase in per capita income. Increased income is a reflection of an economic growth. Potential areas will produce products in the form of goods and / or services that have value to increase sales and attractiveness to consumers. Fiscal decentralization can also be a driver of economic growth in autonomous regions. Economic growth can increase the number of jobs that can reduce the number of poor people. The increase in employment can absorb a lot of workforce the impact of reducing the poor population (Sudewi & Wirathi, 2013).

Silas, Wawire and Okelo analyzed the effects of fiscal decentralization as measured by local revenue; the results of the study were that if there was an increase in regional income below 44.47 percent it would cause a decrease in poverty. The regional expenditure section indicates that initially if regional expenditures were low below 0.52 percent it would increase the incidence of poverty. Regional expenditure of more than 0.52 percent will reduce the incidence of poverty. This study shows that there are differences in the effect of fiscal decentralization on poverty incidence between marginalized districts and other districts, with the effect of higher poverty incidents for marginalized districts compared to other districts. Based on the empirical findings above, this study concludes that fiscal decentralization has a distributive effect. The effect of fiscal decentralization on the outcome of

poverty alleviation and human development depends on the nature and design of fiscal decentralization, the level of fiscal decentralization and specific regions.

3. Regression coefficient of - 0.798264 means that each additional HDI unit will reduce poverty (P) by 0.798264 (79.83 percent) if the DDF is fixed.

The results of this study were reinforced by Madan's (2012) study which found a complementary relationship between Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) in the major states in India (using regression analysis) which is a negative relationship between the two requires increased economic opportunities, equitable education and distribution among all groups of people.

Testing of residual normality using robust regression obtained that the residuals had normal distribution. Then it can be concluded the Robust Least Square model by using the M-Estimation method is the right model to overcome outliers.

## V. CONCLUSION

This study analyzes the effect of fiscal decentralization as measured by the degree of fiscal decentralization (DDF) and Human Development Index (HDI) on poverty as measured by the percentage of poor people in Indonesia in 2010-2017. The research area is 33 provinces out of 34 provinces in Indonesia. This is due to the limited data of North Kalimantan Province not included in the research object. The type of data used in the research is panel data analysis, which is a combination of time series data and cross section (Ghozali & Ratmono, 2017).

The study used two model comparisons. From the regression results the Fixed Effect model shows that from the two independent variables belonging in the regression model. The Coefficient of Degree of Fiscal Decentralization is as large  $0.9129 > 0.05$  ( $\alpha=5\%$ ) shows DDF has no significant effect on poverty (P) while Human Development Index (HDI) coefficient is  $0.0000 < 0.05$  ( $\alpha=5\%$ ) shows HDI has a significant effect on poverty (P) at the level of 95 percent. While the Robust model regression results show that from the two independent variables included in the regression model. The Coefficient of Fiscal Decentralization and Human Development Index are respectively  $0.0000 < 0.05$  ( $\alpha=5\%$ ) shows DDF and HDI have a significant effect on poverty (P) at the level of 95 percent. However, based on images via scatter plot and bloxplot, there are some data that are located far from the overall data set pattern or there are some data that are out of range or quartile, therefore indicating an outlier. In the panel data outlier influence is considered.

The results of the research can be deduced that the Robust Least Square model using the M-Estimation method is the right model to overcome outliers. Where the Robust Least Square model get a constant of 70.66754 means that if the degree of Fiscal Decentralization (DDF) and Human Development Index (HDI) is zero then the poverty variable (P) is 70.66754. Each additional unit for DDF will reduce poverty (P) by 0.109725 (10.97 percent) if the HDI remains. In addition, every addition of Human Development Index unit will reduce poverty (P) by 0.798264 (79.83 percent) if the DDF remains. This identifies that the magnitude of the influence of HDI on poverty is compared to the effect of fiscal decentralization on poverty.

Based on the results of this study there are several policy implications that need further attention. Among them, first, the small magnitude shows that the effect of fiscal decentralization on poverty alleviation is still very small even though at the beginning of the implementation of the decentralization policy the expected effect on poverty reduction is greater, considering that after decentralization it should be the reach of local governments to pay closer attention to the poor and be able to immediately overcome the problem of poverty. Second, HDI has had a far greater impact on poverty alleviation, showing that Life expectancy, MYSI/ Mean Year Of Schooling Index, EYSI/Expected years of schooling, and PPP/Purchasing Power Parity. Has been headed in the right direction. Therefore, the government needs to design programs aimed at increasing HDI, especially in the fields of education, health, and employment.

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