Analysis Of Comparative Of Regional Poverty: A Case Of Indonesia

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Abstract—The main focus in this study is to analyzing the development of regional poverty in Sumatra and to analyzing the factors that influence poverty levels, poverty depth index and poverty severity index in the Sumatra region. This research was conducted in the period 2010-2012 in Indonesia. This study uses qualitative and quantitative methods using panel data regression analysis. The results of the study show that the level of poverty is influenced by the level of education and the unemployment rate. Furthermore, the poverty depth index and poverty severity index are influenced by productivity, while the education level, unemployment rate and per capita income have no effect on the poverty depth index and poverty severity index.

Keyword—poverty depth index, poverty severity index, education level, unemployment rate, labor productivity, per capita income.

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1 INTRODUCTION

TO overcome the problem of poverty, some economists argue that poverty can be reduced by increasing the rate of economic growth through a process of increasing income so that income distribution is more evenly distributed. But in reality these conditions are difficult to achieve the problems that occur are very complex. According to Khandker and Hougton (2012) if you want to overcome poverty the government must be able to parse and resolve what is at the root of the problem of poverty. Because poverty is very closely related to regional characteristics, community characteristics, household characteristics and individual characteristics. The results of studies conducted in several developing countries indicate that poverty is generally in rural areas or resource-poor areas but does not close down also in suburban areas. Based on Central Bureau of Statistics (Badan Pusat Statistik/BPS) data the poverty rate in Indonesia is still quite high and spread across all regions in Indonesia including the islands of Papua and Maluku at 24.23 percent, Bali and Nusa Tenggara at 14.49 percent, then Sulawesi at 11.75 percent, Sumatera Island 11.53 percent, Java island 11.53 percent and Kalimantan island 6.66 percent, with the composition of rural poverty greater than urban. In detail, the description of the number of poor people in rural and urban areas can be seen in Figure 1.
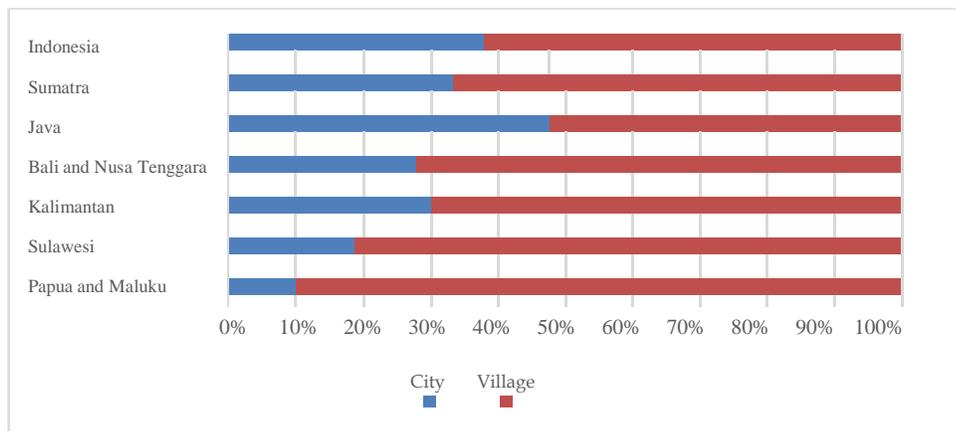
Figure 1. The number of poor people in urban and rural areas in 2016

In this study the discussion of poverty is more focused on the three main indicators, namely the poverty level, the depth of poverty and the poverty severity index, carried out in the Sumatra region. From the description above, the objectives of this study are to conducting a comparative analysis of poverty on the island of Sumatra and to analyzing factors that influence poverty, poverty depth index and poverty severity index in the Sumatra region.

2 LITERATURE REVIEW

2.1 Poverty in Statistical Calculation

According to BPS, poverty is an economic inability to meet basic food and non-food needs measured from the expenditure side. The poor are residents who have an average per capita expenditure per month below the poverty line. The poverty line consists of two components, namely the Food

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Poverty Line (QCC) and the Non-Food Poverty Line. The QCC is an expenditure value for minimum food requirements equal to 2100 kilocalories per capita per day.

The poverty level is the percentage of poverty from the total population of an area (Sumedi and Supadi, 2004). The poverty level can be calculated by looking at the proportion of the number of poor people to the total population in the area. The higher the percentage of poverty, the greater the amount of poverty in the area and vice versa, the lower the percentage of poverty, the lower the number of people categorized in poverty. In measuring poverty, there is a Poverty Gap Index (P1) which is a measure of the average expenditure gap of each poor person to the poverty line (BPS, 2013). The calculation model is as follows:

$$P_2 = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{z - y_i}{z} \right]^2$$

P_1 : Poverty Gap Index z: Poverty Line
y_i : The average per capita expenditure per month of the population that is located below the poverty line (i = 1,2, ... q), $y_1 < z$
q : The number of people below the poverty line
n : Population Number

The Poverty Severity Index (P2) provides an overview of the distribution of spending among the poor. This measure provides complementary information on poverty levels (National BPS, 2016). For example, there may be cases that some poor population groups have high poverty rates but the poverty gap is low, while other population groups have low poverty levels but have a high poverty gap for poor people. The higher the index value, the higher the inequality of expenditure among the poor. The calculation model is as follows:

$$P_2 = \frac{1}{n} \sum_{i=1}^{q} \left[\frac{z - y_i}{z} \right]^2$$

P_2 : Poverty Severity Index z: Poverty Line
y_i : The average per capita expenditure per month of the population that is located
below the kemiskian line (i = 1,2, ... q), $y_1 < z$
q : The number of people below the poverty line
n : Population Number

2.2 Socio-Economic and Productivity Indicators

This study follows the role of socio-economic indicators in poverty alleviation, by analyzing education, unemployment rates, productivity, and per capita income. Education level indicators consist of education levels and departmental suitability. The level of education is the stage of education that is determined based on the level of development of students, goals to be achieved, and abilities developed from basic education to higher education.

According to the Central Bureau of Statistics (BPS) in employment indicators, unemployment is a population who does not work but is looking for work or is preparing a new business or a resident who is not looking for work because he has been accepted to work but has not started working.

In the aspect of productivity, Ndraha (1997), giving an understanding of productivity is a relationship between inputs (inputs) with outputs (output) of a production. Finally, per capita income is the average income of a country in a given period (generally one year).

3 RESEARCH METHOD

The data used in this study are secondary data in the form of cross section and time series sourced from the Central Statistics Agency (BPS) which includes poverty level data, poverty depth index, poverty severity index, education level, unemployment rate, productivity and income per capita . This research was conducted in 10 provinces in the Indonesian unitary Sumatra region using qualitative and quantitative descriptive methods. The analysis tool used for the first problem is used using the following development models:

$$Gx = \frac{Gx_1 \quad Gx_{t-1}}{} x100\ \% ....………………….....(3.1)$$

Where :
Gx   : Development of variable averages per year;
Gx_1 : Development of the year concerned;
Gx_{t-1} : Development of the previous year;
Gx_n : previous year development;
N   : number of periods

While to answer the second problem the panel data analysis model is used. In the panel data model the model equation is as follows:

$$TK = f(TPD, TPG, PK, PP) ....(3.2)$$

Where :
TK   : Poverty Level;
IKD : Poverty Depth Index;
IKK : Poverty Severity Index;
TPD : Education Level;
TPG : Unemployment Rate;
PK   : Work Productivity;
PP   : Per capita income

What is further specified is the panel data model:

$$TK_{it} = \beta_0 + \beta_1 TPD_{1it} + \beta_2 TPG_{2it} + \beta_3 PK_{3it} + Log\beta_4 PP_{4it} + e \quad \text{…....(3.3)}$$

$$IKD_{it} = \beta_0 + \beta_1 TPD_{1it} + \beta_2 TPG_{2it} + \beta_3 PK_{3it} + Log\beta_4 PP_{4it} + e \quad \text{...…(3.4)}$$

$$IKK_{it} = \beta_0 + \beta_1 TPD_{1it} + \beta_2 TPG_{2it} + \beta_3 PK_{3it} + Log\beta_4 PP_{4it} + e \quad \text{....…(3.5)}$$

Where :
TK   : Poverty Level;
IKD   : Poverty Depth Index;
IKK   : Poverty Severity Index;
TPD   : Education Level;
TPG   : Unemployment Rate;
PK Log   : Work Productivity Log;

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Log PP   : Per Capita Income Log;
β_0 : Constants;
$\beta_1, \beta_2, \beta_3$: Regression Coefficient;
i   : Province;
t   : Year;
e   : Disturbance error

4   RESULTS

4.1 Comparative descriptive analysis of poverty in the Sumatra Region

In the 2010-2016 period, the highest average poverty rate occurred in Aceh Province with an average poverty rate over the past seven years of 18.4 percent, meaning that the proportion of the poor to the total population in Aceh Province was 18.04 percent. While in the same period, the average depth index of poverty and the highest poverty severity index occurred in Bengkulu Province not in Aceh Province with an average depth of poverty index for the past seven years of 3.08 percent and an average poverty severity index of 0 , 84 percent means that the average expenditure gap of each poor person to the poverty line in Bengkulu Province is 3.08 percent and the average expenditure inequality among the poor in Bengkulu Province is 0.84 percent.

Furthermore, in the period of 2010-2016, the lowest average poverty rate occurred in the Province of Bangka Belitung Islands with poverty rates over the past seven years amounting to only 5.45 percent, meaning that the proportion of the poor to the total population in the Bangka Belitung Islands Province was 5.45 percent. For the level of poverty, the depth index and poverty and the lowest poverty severity index also occur in Bangka Belitung Province with a depth index of poverty for the past seven years which was only 0.42 percent, meaning the average expenditure gap of each poor person to the poverty line in the Province The Bangka Belitung Islands amounted to 0.42 percent, while the poverty severity index for the past seven years was only 0.08 percent, meaning that the average expenditure inequality among the poor in the Bangka Belitung Islands Province was 0.08 percent.

4.2 Quantitative Analysis of Factors Affecting Poverty Levels

Chow test is done to compare / choose which model is best between PLS and FEM

TABLE 1
CHOW TEST TO CHOOSE BETWEEN PLS MODELS AND FEM

Redundant Fixed Effects Tests Pool: POOL Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	140.725495	(9.56)	0.0000
Cross-section Chi-square	221.336482	9	0.0000

Based on the output Eviews, it shows that both F test and Chi-Square are significant (Prob. 000000 and 0,0000 smaller than alpha 0,05) so that this model hypothesis Ho is rejected and H1 is accepted. Thus, it can be concluded that the FEM model is better than the PLS model.

Hausman Test Is done to compare / choose which model is best between FEM and REM.

TABLE 2
HAUSMAN TEST TO CHOOSE BETWEEN THE FEM MODEL WITH REM

Correlated Random Effects - Hausman Test Pool: POOL			
Test cross-section random effects			
Test Summary Chi-Sq. Statistic	Chi-Sq.	d.f.	Prob
Cross-section random	2.448553	4	0.6539

Based on the output Eviews shows that the value of Chi-Square statistics has a greater Prob than alpha 0.05 (0.6539> 0.05), so the hypothesis H0 is accepted and H1 is rejected. Thus it can be concluded that the REM model is better than FEM. So based on the results of these tests it can be seen that the model used in this study is the Random Effect (REM) Model.

4.3 REM Model Estimation Results

TABLE 3
RESULTS OF ESTIMATION OF RANDOM EFFECT (REM) METHODS FACTORS AFFECTING POVERTY LEVELS

Dependent Variable: TK?

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TPD	-0.793859	0.375911	-2.111825	0.0385
TPG	0.181681	0.105894	1.715682	0.0910
LOGPK	0.110693	0.780712	0.141784	0.8877
LOGPP	-1.653098	2.554945	-0.647019	0.5199
C	26.78604	8.423569	3.179893	0.0023
Random Effects (Cross)				
Aceh--C	6.021280			
Sumaterautara--C	-0.274892			
Sumaterabarat--C	-3.803944			
Riau--C	-0.836521			
Jambi--C	-2.847538			
Sumateraselatan--C	2.060970			
Bengkulu--C	5.194818			
Lampung--C_	2.670003			
Kepulauanbangkabel--C	-6.338942			
Kepulauanriau--C	-1.845234			

Cross-section random		4.439493	0.9717
Idiosyncratic random		0.757848	0.0283

Weighted Statistics

R-squared	0.336066	Mean dependent var	0.717914
Adjusted R-squared	0.295208	S.D. dependent var	0.891878
S.E. of regression	0.748749	Sum squared resid	36.44059
F-statistic	8.225312	Durbin-Watson stat	0.755387
Prob(F-statistic)	0.000020		

Unweighted Statistics

R-squared	0.239274	Mean dependent var	11.15000
Sum squared resid	1031.481	Durbin-Watson stat	0.026687

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4.4 Coefficient of Determination (R2)

From the test results obtained the coefficient of determination (R2) of 0.3360 means that for 33.60 percent variation in poverty levels is explained by the independent variables in the level model education, unemployment rate, work productivity and income per capita while the remaining 66.40 percent is explained by other variables outside of research.

5 HYPOTHESIS TESTING

5.1 F test statistic

Can be seen in table 5.6 above it is also known that the Prob value (f Statistics) 0.000020 <0.05, it means that Ho is rejected and accepts Ha, which means the test together shows the level of education, unemployment, work productivity and income per capita simultaneously significant level of poverty in the provinces of Sumatra.

5.2 Statistic t test

To test the significance of the influence of education level, unemployment rate, work productivity and income per capita on poverty levels in the provinces of Sumatra partially, the statistical t test is used. The t test statistic is useful to see the magnitude of the influence of each independent variable on the dependent variable partially. The confidence level is 90 percent with a two-way test and df = 65 (n = 70-5). The value of the t table obtained is 1.6686 used by t test tools. Statistics can be seen in the following table:

TABLE 4
STATISTIC t VALUES IN THE REM METHOD

Variable	t Calculate	t Table	Prob.	Information
Level of education	-2,11182	1,6686	0,0385	Significant
Unemployment Rate	1,71568	1,6686	0,0910	Significant
Work productivity	0,14178	1,6686	0,8877	Not significant
Income per capita	-0,64701	1,6686	0,5199	Not significant

In the table above, it can be explained that:

1. It is known that the t value of the education level variable is -2.11182 and t table 1.6686 so that the value of t count> t table, meaning H0 is rejected and accepts Ha. When viewed from the Prob of R of 0.0385 because of Prob <0.1, then H0 is rejected and that the level of education affects the level of poverty in the provinces throughout Sumatra.
2. It is known that the t value of the variable unemployment rate is 1.71568 and t table is 1.6686 so the value of t count> t table, meaning that H0 is rejected and accepts Ha. If seen from the Prob of R of 0.0910 because of Prob <0.1, then H0 is rejected and accepts Ha. This shows that the unemployment rate affects the level of poverty in the provinces throughout Sumatra.
3. It is known that the t value of the variable work productivity is 0.14178 <t table 1.6686 so that H0 is accepted and rejects Ha. When viewed from the Prob of work productivity of 0.8877 because Prob> 0.1, then H0

is accepted and rejects Ha. This shows that work productivity does not affect the poverty level of the provinces in Sumatra.
4. It is known that the value of t calculated per capita income variable is -0.06471 <t table 1.6686 H0 is accepted and rejects Ha. When viewed from the Prob of per capita income of 0.5199 because Prob> 0.1, then H0 is accepted and rejects Ha. This shows that per capita income does not affect the poverty level of the provinces in Sumatra.

6 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

1. During the period 2010 to 2016 the education level variable and the unemployment rate significantly affected the poverty rate of the provinces in Sumatra. While the variables of work productivity and income per capita variables have no significant effect on the poverty levels of the provinces in Sumatra
2. During the period of 2010 to 2016 only work productivity variables had a significant negative effect on the development of the depth index of poverty. While the variable education level, unemployment rate and per capita income have no effect on the depth of poverty in the provinces of Sumatra, developments in poverty levels, poverty depth index and poverty severity index of provinces in Sumatra
3. During the period 2010 to 2016, the variables that could affect the severity of poverty in the provinces in Sumatra were work productivity. While the variable education level, unemployment rate and income per capita did not significantly influence the depth index of poverty.

6.2 Suggestion

1. Every province must always increase the opportunity of its population to get cheap and quality education and evenly distributed to the countryside. This is to increase the level of public education so that it can improve the quality of human resources and reduce poverty.
2. Each province must open the widest possible employment opportunities to the community, open new employment opportunities, open skills courses or educational institutions that produce ready-made workers so that they can reduce unemployment and reduce poverty
3. Build and perfect a social protection system for the poor to protect the poor from the possibility of being unable to deal with social and economic shocks
4. Increasing the GRDP of each province in Sumatra so that per capita income and work productivity increases so that it becomes capital to alleviate poverty
5. For further researchers related to this research problem, it is expected to be able to replace or add to the independent variables that are thought to influence poverty levels, poverty depth indexes and poverty severity indexes in all Sumatra provinces.

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