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Role of Education concerning the Gross Domestic Product, Human Development Index, and Poverty Rate in East Java

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ABSTRACT

This research was purposed to know the role of education and to analyze the relationships between Gross Regional Domestic Product (GRDP) and Human Development Index (HDI) on the poverty rate in East Java Province. The research method used was quantitative research. This research used secondary data obtained from the Central Bureau of Statistics of East Java. The data were analyzed by using panel data regression analysis with Fixed Effect Model (FEM) estimation and the aid of EViews 9.0 application program. The research result showed that PDRB and HDI variables simultaneously affected poverty rate in East Java Province from 2010 to 2016 that was 97.8506%. GRDP variable partially affected poverty rate that was -0.251899, and HDI variable was affected partially as well poverty rate, was -1.868236. To support the increment of human development index (HDI), it is necessary to enhance the role of education. It is generally accepted that a person's HDI income level will improve as their degree of education increases. This is achievable due to the fact that educated people tend to be more productive overall.

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1. INTRODUCTION

Indonesia has done very well in promoting economic growth and poverty alleviation by using International standard. For two decades before the Asian financial crisis in the late 1990s, economic growth was at average marked at 7 percentage per year. It was an achievement for East Asia, and it was substantially higher than the average growth rate of 3.7 percentage for all developing countries. At the same time, Indonesia's poverty rate fell from 28 percentage in the mid-1980s to approximately 8 percentage in the mid-1990s. It was compared with the poverty reduction from 29 to 27 percentage for all developing countries (Arsenio, Balisacan, ErnestoParia, 2002; Asra, 2010).

The success of economic growth is indicated by an increase in Gross National Product (GNP) and Gross Domestic Product (GDP), while the decrease in the poverty rate is measured by increasing human development index (Ranis and Stewart, 2005). Various studies analyzing the linkage between economic growth and human development have been largely undertaken, and those studies showed the result that economic growth was linked to the increase in human development (Maqin and Sidharta, 2017;

Nor and Doris, 2015; Ranis and Stewart, 2005). As stated by Gustav et al. (2000), there is a strong two-way relationship between economic growth and human development. On one side, economic growth provides the resources to enable sustained and sustainable human development; on the other hand, improving the quality of sustainable human resources is an important supporting factor for economic growth (GNP)

In macro terms, economic growth means an increase in Gross Domestic Product (GDP), or it is called Gross Regional Domestic Product (GRDP) for the region. GRDP summarizes the acquisition of added value from a production conducted by a region in term of goods or services at a certain time. The calculations of GRDP are in two ways, namely the current price and the constant price. GRDP based on current price is the value of goods and services calculated in a certain year. GRDP based on constant price is a calculation to see the economic growth rate of a region by the comparison of base year. This research took place in East Java, which has an important role in the development of GNP, HDI, and poverty reduction in Indonesia.

Human Development Index (HDI) is one of the variables affecting the Gross Domestic Product (GDP). The Human Development Index can help measure the country's achievement in various fields and we took health, education and living standard. Actually, researchers wanted to see the relationship between GDP and HDI in East Java by using secondary data from 2010 to 2016. In this paper, the researchers examined the relationship between Human Development Index and Gross Domestic Product. They also identified other factors affecting the GDP Poverty alleviation. There is a relationship between the Gross Domestic Product (GDP) and the Human Development Index (HDI). The Human Development Index component (HDI) includes health, education, and living standards. Is there a relationship between GDP and HDI? Researchers wanted to see whether other factors such as poverty level could affect the country's GDP. In this research, researchers wanted to investigate the relationship between the Gross Domestic Product and the Human Development Index and identify other factors affecting GDP, such as poverty.

Shome and Tondon (2010) studied the balance of the human development index with economic growth, found the movement of two parameters of GDP and HDI, and examined whether there was a significant correlation between the two trends. Theoretically, it is stated that higher output level can be diverted to higher spending on education, health, and poverty alleviation that will ultimately impact on the productivity of citizens leading to higher economic growth. In other words, the higher the economic growth by increasing level of output, the higher spending on poverty alleviation program and HDI we will get. The relationship between economic growth and human development indicators such as poverty, health, and educational outcome can be well analyzed in term of long-term trend and fluctuation in the short term as stated by Conceicao et. Al. (2009) in 'Economic shock and human development: A review of empirical finding'. This research showed that at the aggregate and long-term levels, there was a strong positive correlation (though not linear) between GDP per capita and HDI.

Economic growth helps produce the resources needed for better human development, and enables a higher potential growth. Stevans & Sessions (2008) conducted a research on 'Relationship between Poverty and Return Economic Growth' and found that a dynamic relationship between economic growth and poverty in the context of a formal error correction model and also was included a measure of income inequality as a determinant of poverty. They found that the effect of GDP growth on poverty growth has diminished or remained unchanged over time, and the economic expansion of the 1980s in the U.S. has no impact on poverty. By using the formal error correction model, they found that the increase in economic growth was significantly associated with reducing the poverty rate for all families. Azielotta and Selvaratnam (2014) and Azielotta et al. (2015) noted that the coefficient could not reflect the overall ethnic distribution of income. The other components needed to be taken into account such as ethnic participation in the formal or informal economic sectors as well as ethnic property ownership. Akbar (2010) conducted a research on 'The Relationship between GDP and Human Development Index in India'. He used three indices that contributed to the Human Development Index. According to previous research which was conducted by Akbar, there was a positive relationship between GDP and

HDI. However, the researcher found that the research only used seven years of data, and the researcher suggested that the researcher should take at least 30 years of data to get more accurate results. Overall in this research, we have found that GDP had a positive relationship with HDI. The education index had the greatest impact on the domestic growth of the Human Development Index, and the increase in economic growth was significantly associated with the decrease in the poverty rate for all families.

Education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious, spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves, society, nation and state (U.U. Law No. No. 20 of 2003). But in general, there are four main problems of national education that need to be prioritized to overcome (Ujiyanti, Tatak Prapti; 2009). The problem in question is; 1) Issues of equal opportunity and access to education, 2) Quality improvement issues, 3) Educational relevance issues, and 4) Efficiency and education management system issues.

Education occupies a central position in development because the goal is to improve the quality of human resources, development in relation to human resource development, which means that development is not merely material and physical development but spiritual development, namely human development which is the main task of education. To improve the quality of human resources, education is needed because education is an activity that increases the quality of human resources, and human is one of the main capital of development. Based on the above relevant researches and phenomena, therefore it was necessary to study how the role of education to enhance economics and the improvement of the human resources development index.

2. METHODS

This research was quantitative research with the explanatory method. This research used secondary data analysis which was sourced from the documents of Central Bureau of Statistics in East Java. The research location was East Java Province. The data were collected by using a literature study and interviews. Moreover, the data were analyzed by using panel data analysis that was cross section data from 38 regencies / cities in East Java and time series data that was obtained from 2010 to 2016 with E-Views 9.0 program. This research placed the poverty rate as a function of GRDP and HDI rates, so the function equation is as follows:

$$CWA_{it} = f\ (GRDP_{it}, HDI_{it})$$

Based on the above function, it is transformed into an econometric model as follows:

$$CWA_{it} = \beta_0 + \beta_1 GRDP_{it} + \beta_2 HDI_{it} + e_{it}$$

2.1 Classic Assumption Test

The use of Ordinary Least Square (OLS) method in the regression analysis required several conditions to be met to produce valid parameter. If the classical assumption test was met, OLS estimator of alpha and beta was BLUE (Best Linier Unbiased Estimator) Mukhlis and Simanjuntak (2017: 15).

2.2 Panel Data Regression Estimation

The used selection of appropriate model estimation in this research was tested through three models: Pooled Least Square (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM).

3. FINDINGS AND DISCUSSION

3.1 Classic Assumption Test

Table 1. The Result of Multicolinearity Test

	GRDP	HDI
GRDP	1.000000	0.157103
HDI	0.157103	1.000000

The table above shows that the independent variable correlation coefficient is less than 0.8. It can be said good data if the value of correlation between independent variables is below 0.8 (Gujarati, 2006: 68). Thus, it can be concluded that the data did not occur multicollinearity.

Table 2. The Result of Heteroscedasticity Test

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.238920	0.444734	-0.537219	0.5916
GRDP	0.030256	0.034079	0.887805	0.3756
HDI	-0.005205	0.177643	-0.029303	0.9766

Based on the test result, it indicated that the probability value of each independent variable was above α (5%), so the data in this research was said to be homoscedasticity and was free from heteroscedasticity problem.

3.2 Panel Data Regression Estimation

Table 3. The Result of Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	74.663960	(37,226)	0.0000
Cross-section Chi-square	686.815756	37	0.0000

The data above shows that the value of Cross-section F is 0.0000 <0.05; so, the best model was Fixed Effect Model (FEM).

Table 4. The Result of the Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	13.398580	2	0.0012

Based on the data above, it shows that the value of Cross-section F is 0.0012 <0.05; so that, the best model was Fixed Effect Model (FEM).

3.3 Statistical Significance Test

The value of T-table was seen from df = n-k = 266-3 = 263. Thus, the value of t table of df = 263 was 1.650668

Table 5. T test

Variable	*T-count*	*T-table (α=5%)*	*Probability*	*Description*
GRDP	-2.171741	1.650668	0.0309	Significantly negative
HDI	-3.089961	1.650668	0.0023	Significantly negative

The value of the GRDP variable indicated that t-count> t table that was 2.171741> 1.650668, so it can be concluded that there was a significant influence between GRDP the poverty rate in East Java Province. The value of HDI variable indicated that t-count> t table that was 3.089961> 1.650668, so it can be concluded that there was a significant influence between HDI on poverty rate in East Java Province. Sign (-) means negative effect.

The effect of each independent variable on the dependent variable was seen from the value of the following coefficients:

Table 6. Coefficient

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.80940	1.513667	8.462500	0.0000
GRDP	-0.251899	0.115990	-2.171741	0.0309
HDI	-1.868236	0.604615	-3.089961	0.0023

Thus, the partial influence of GRDP variable on poverty rate in East Java Province from 2010 to 2016 was -0.251899. It means that if there is an increase of GRDP by 1 billion, then there is a decrease of poverty rate of 0.251899%. The effect of HDI on poverty rate in East Java Province from 2010 to 2016 was -1.868236. It means that if there is an increase in HDI of 1 unit, then there is a decrease in poverty rate of 1.868236%.

Table 7. F Test

R-squared	0.978506	Mean dependent var	2.468677
Adjusted R-squared	0.974797	S.D. dependent var	0.440904
S.E. of regression	0.069996	Akaike info criterion	-2.342980
Sum squared resid	1.107259	Schwarz criterion	-1.804108
Log likelihood	351.6163	Hannan-Quinn criteria	-2.126494
F-statistic	263.8109	Durbin-Watson stat	0.792498
Prob (F-statistic)	0.000000		

Based on the above result, it shows that the value of Prob (F-statistic) is 0.000000 <0,05, so it can be concluded that the gross regional domestic product and the index of human development had a significant effect simultaneously on poverty rate in East Java Province from 2010 to 2016.

Table 8. R^2 Determination

R-squared	0.978506	Mean dependent var	2.468677
Adjusted R-squared	0.974797	S.D. dependent var	0.440904
S.E. of regression	0.069996	Akaike info criterion	-2.342980
Sum squared resid	1.107259	Schwarz criterion	-1.804108
Log likelihood	351.6163	Hannan-Quinn criter.	-2.126494
F-statistic	263.8109	Durbin-Watson stat	0.792498
Prob (F-statistic)	0.000000		

Based on the above result, it shows that the value of R2 is 0.978506. It means that the poverty rate in East Java Province from 2010 to 2016 was affected by GRDP and HDI that was 97.8506%, while 2.1494% as the rest, was affected by other variables that were not in this research.

3.4 An increase of GRDP of East Java

The population of East Java was the second largest in Indonesia after West Java that was 47,379,389 people (Central Bureau of Statistics of West Java, 2016). The potential human resource can increase productivity if it is managed properly, and it is on target. However, the poverty rate occurred

in East Java is high although the last few years had decreased. East Java Province is on the first with the largest number of poor people in Indonesia that is 4,708,555,816 people and reached 12.05% (Central Bureau of Statistics, 2018). The percentage has exceeded the average poverty rate in Indonesia that was 10.70% in 2016 (Central Bureau of Statistics, 2018).

Table 9. The Development of GRDP, HDI, and Poverty Index in East Java

No	Year	The Amount of GRDP in 2010 (Million Rupiah)	HDI (%)	Poverty Rate (%)
1	2010	990.648.800	65,36	14,87
2	2011	1.054.978.800	66,06	13,80
3	2012	1.124.298.800	66,74	13,08
4	2013	1.195.143.500	67,55	12,73
5	2014	1.267.863.300	68,14	12,28
6	2015	1.340.541.000	68,95	12,34
7	2016	1.420.950.800	69,74	12,05

Source: The Processed Data of Central Bureau of Statistics of East Java, 2018

The above table shows an increase in GRDP. The increase is due to the manufacturing industry sector which has a significant increase every year. The manufacturing industry sector contributed to GRDP which was Rp 411,028,390 million in 2016; in fact, the sector has developed in urban areas, so poverty in urban areas was lower than in rural. The second influential sector is large and retail trade; car and motorcycle repairs with a value of Rp257,126,660 million. The high consumption of people of East Java on purchasing cars and motorcycles is supported by the credit provided to facilitate society to purchase. The third sector is agriculture, forestry, and fishery that is Rp164,687,460 million. East Java Province is a producer of rice, corn, broiler, beef cattle, and the cultivation of the largest marine products in Indonesia. According to Jusuf (2016), East Java produced 41.3% of fish as marine product; 32% of corn; 17.4% of rice; 12.4% of broiler; and 7.9% of beef cattle.

Based on the research result done with panel data analysis, it can be said that the Gross Regional Domestic Product and Human Development Index affected the poverty rate in East Java Province from 2010 to 2016 was 97.8506%. The partial effect of the GRDP variable on the poverty rate was -0.251899. The effect of HDI on the poverty rate in East Java Province from 2010 to 2016 was -1.868236. The poverty rate could be reduced by increasing those two variables. The most dominant variable affecting the poverty rate was the human development index; so that, the East Java provincial government can make improvement to increase HDI, so it will reduce poverty in the next year.

3.5 HDI and The Decrease of Poverty in East Java

The success of economic development is indicated by many indicators such as economic growth, employment improvement, purchasing capacity improvement, healthcare quality improvement, and many other indicators. From various indicators of economic development progress, one of them is a success in improving the quality of human development. The indicator of improving the quality of human development comes from changes in HDI. According to UNDP, the change in HDI is influenced by three indicators, namely, the Health index, education index, and purchasing power index. Therefore, the change in HDI is associated with the change in the three indices. HDI improvement can be caused by these three components simultaneously or perhaps due to the increase of one or two of these components, and vice versa. East Java province had an HDI that increases every year and is in the medium category of human development, that was between the percentage of 0,50-0,799 (Central Bureau of Statistics of East Java, 2018).

The components of HDI, such as the education index, health index, and expenditure index, increased which is based on the data above. The education index is assessed from two aspects, namely, the study expectation and the average length of study. The average length of study functions to measure the level of education which is taken after graduating from junior high school. The average length of study in East Java Province from 2010 to 2016 ranged from 6.85-7.23 years (Central Bureau of

Statistics of East Java, 2018). This number shows that the last education of the community in East Java is set until the level of college, namely D3, S1, and S2.

Study expectation is the number of years that can be enjoyed by a certain age population in having education. The higher the expectation of the length of study, the better the equity of education the community can perceive. The expectation of the length of study in East Java from 2010 to 2016 ranged from 11.74 to 12.98 years (Central Bureau of Statistics of East Java, 2018). The data shows that the education level will be perceived by the population at least until the level of high school and college.

The health index is seen from the life expectancy that identifies the average number of years that a person will take while living. The higher the life expectancy, the better the success of the region can be identified in the field of health, and vice versa. The life expectancy of community of regency / city in East Java from 2010 to 2016 ranged from 62.84-73.87 (Central Bureau of Statistics of East Java, 2018), which means that the average age of the community is 62 years 10 months 6 days to 73 years 10 month 17 days.

The standard of life worthy is appropriate to be seen from the amount of GNP per capita in a region. GNP per capita represents expenditure issued by a person to fulfill his needs. The higher the level of GNP, the more the amount of income spent and used to fulfill someone's needs. GNP per capita in East Java Province from 2010 to 2016 increased from Rp 9,002,000 to Rp10,715,000 (Central Bureau of Statistics of East Java, 2018). The amount represents the average expenditure in one year from each individual. The higher the rate of expenditure, the more fulfilled the needs of each individual. The higher the level of public spending, the higher the HDI, and it shows that the population can meet their basic needs. In other words, poverty diminishes and prosperity grows.

3.6 HDI and Education Role

In general, it is proven that the more educated a person is, the better their income level. This is possible because educated people are more productive than uneducated people. A person's productivity is due to his technical skills obtained from education. The adherents of the Human Capital theory argue that education is an investment in human resources that provides monetary or non-monetary benefits. The non-monetary benefits of education are obtaining better working conditions, job satisfaction, consumption efficiency, satisfaction in enjoying retirement and the benefits of a longer life due to improved nutrition and health.

Fundamental changes in the calculations Human Development Index (HDI) with new methods include using the Old School Expectancy indicator (HLS) to replace the literacy rate indicator (AMH) in the calculation of the education index and the use of indicators. Gross National Income (GNI) per capita replaces Gross Domestic Product (GDP) per capita in calculating the standard of living index. The use of the Old School Expectancy (HLS) indicator in calculating the education index, for example, makes Human. The Development Index (HDI) with the new method is able to capture a more relevant picture in education and the changes that occur compared to the Human Development Index (HDI) with old method. Expected Old School (HLS) is the average number of years spent by residents aged 15 years and over to pursue all types of formal education ever undertaken. The Old School Expectancy Indicator (HLS) is calculated from the variable of the highest level of education completed and the level of education being carried out.

The United Nations Development Program (UNDP) standard is a minimum of 0 years and a maximum of 15 years. In addition to the Old School Hope (HLS) will be one of the components forming the Human Development Index (IPM) or Human Development Index (HDI) indicator, there is also the School Participation Rate (APS) indicator known as one of the indicators successful development of access to education services in an area, be it a province, district or city in Indonesia.

4 CONCLUSION

The research result indicated that there was a relationship between economic growth, which was marked by the number of GRDP and Human Development Index, and the poverty rate in East Java. For 6 years (2010-2016), the development in the economic sector of East Java Province experienced an increase which was seen from the GRDP sector. Moreover, the development in the social sector by looking at the quality of human resources also increased. Theoretically, both factors can reduce poverty. The poverty rate in East Java has fluctuated. It decreased in 2010-2014, then it increased in 2015, and it decreased again in 2016. In general, it is also proven that the more educated a person is, the better their income level of HDI. This is possible because educated people are more productive than uneducated people.

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