Determinants of Human Development Index: Case Study of Provinces in Indonesia

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Abstract. The purpose of this study is to analyze the factors that influence human development index at the provincial level in Indonesia. The determining factors used are the unemployment rate, poverty, inflation, original local government revenue and foreign direct investment. This study uses secondary data in the form of panel data from 33 provinces in the 2010-2019 period obtained from the Central Bureau Statistic and Bank Indonesia. The analytical method used is panel data regression model. The empirical results showed that poverty, unemployment and inflation had a negative impact on the human development index. Original local government revenue and foreign direct investment have a significant positive impact on human development index. The results of this study provide recommendations for the government to reduce unemployment, poverty and inflation rates and increase original local government revenue and encourage foreign direct investment in order to increase the human development index at the provincial level.

Keywords: human development index; panel data regression model; Indonesia

1 Introduction

Economic performance is often connected with the achievement of economic growth. Increased in economic growth will increase employment opportunities, investment and increase government revenue from taxes. However, the emphasis on growth alone does not guarantee the quality of human resources to be better in terms of health and education. This discussion is related to the human development index (HDI).

HDI component consists of health (as measured by life expectancy), education (measured by the average length of schooling), standard of living (measured by gross national income per capita). In other words, the human development index is related to efforts to improve the quality of life of people who have decent incomes, healthy and educated families.

Sen who won the 1998 Nobel Prize in Economics from Harvard University stated that one way to think about development is to recognize the capabilities approach. The purpose of development is to improve human capabilities. These human capabilities include being able to live a long and healthy life, having sufficient food and shelter, being able to work in a safe and meaningful workplace and being able to finance education and health (Karlan and Murdoch, 2014).

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HDI values range between 0 and 1 (in Indonesia the range is often stated between 0 and 100). A country or region can be grouped into HDI scores, namely very high (greater or equal to 0.80), high (0.700-0.799), moderate (0.550-0.699) and low (less than 0.55) [2]. HDI for Indonesia in 2019 was ranked 111 (out of 189 countries) with a value of 0.707. With this achievement, Indonesia is included in the high HDI category. Indonesia is included in a high HDI group along with Thailand (rank 77) and the Philippines (rank 106). ASEAN countries that achieved a very high HDI level were Malaysia, Singapore and Brunei, while other ASEAN countries namely Vietnam, Laos, Myanmar and Cambodia were in medium HDI [3]. Indonesia's achievement for the HDI is the average of the achievements of HDI by Province. The province with the highest HDI is DKI Jakarta (0.8076) while the lowest is Papua (0.6084).

Achieving a high value of HDI is needed to ensure the improvement of the quality of human resources for development. Therefore, it is necessary to study further what factors can rise the value of HDI. In this study, the macroeconomic variables considered are poverty rate, open unemployment rate, original local government revenue, inflation and foreign direct investment. A partial study of these factors has been carried out by several researchers, such as Yolanda, (2017), [5], [6] and [7]. However, some of them produce insignificant estimation results and some of the results were contradicted to the theory or rational thinking. Therefore, it is necessary to conduct further research by considering larger observations.

2 Literature Review

2.1 Poverty and Human Development Index

The level of poverty causes many people to be unable to pay for their children's education and maintain the health of family members. This causes a decrease in the HDI value. Research conducted by [8], [9], [10], [11], [7] and [12] also assesses that HDI is negatively affected by poverty rate. Based on this, hypothesis 1 can be derived as follows:
H1: It is assumed that the poverty rate is positively related with the HDI.

2.2 Open unemployment rate and Human Development Index

In conditions where the unemployment rate is high, community participation in development is low so that per capita income is low. The high number of unemployed also means that it is increasingly difficult for some people to meet their family's education and health care needs. This will result in a decrease in HDI. Empirical research conducted by [13] also shows that the unemployment rate has a negative effect on HDI. Based on this, the following hypotheses 2 can be derived:
H2: It is suspected that the unemployment rate has a negative effect on the HDI.

2.3 Original Local Government Revenue and Human Development Index

High original local government revenue means that local governments have a greater opportunity to move the wheels of the local economy, improve the lives and welfare of their people, including for education and health. Therefore, the higher the original local government revenue, the higher the HDI. Based on this, the third hypothesis can be derived as follows:
H3: It is assumed that the original local government revenue has a positive influence on HDI.

2.4 Inflation and Human Development Index

High inflation will decline people's purchasing power, thereby reducing the people's ability to consume, including the consumption of health services and family education. This causes the HDI to decrease. Previous research conducted by [14] also shows that HDI is affected by inflation. Based on this, the following 4 hypotheses can be derived:
H4: It is suspected that inflation has a negative influence on HDI

2.5 Foreign Direct Investment and Human Development Index

In the theory of economic growth, one of the factors that influence output is Capital [15]. Changes in the capital stock in the economy, which is nothing but investment, will affect output. Increased investment will have a positive effect on economic output and national income per capita. One of the types of investment is foreign direct investment. Based on this, research hypothesis 5 can be derived as follows:
H5: It is suspected that foreign direct investment has a positive influence on HDI.

3 Research Method

The type of data used in this study is secondary data in the form of panel data from 33 provinces in Indonesia in 2010-2019. This data was obtained from the Central Bureau of Statistic and Bank Indonesia. Based on the type of data, the regression model used is the panel data regression model. This panel data equation can be expressed as follows:

$$HDI_{i,t} = \beta_0 + \beta_1 POV_{i,t} + \beta_2 UNEMP_{i,t} + \beta_3 OLGR_{i,t} + \beta_4 INF_{i,t} + \beta_5 FDI_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where:
HDI = Human development index
POV= Poverty rate (in percentage)
UNEMP= Unemployment (in percentage)
OLGR = Original Local Government Revenue (in trillion Rupiah)
INF = Inflation rate (in percentage)
FDI= Foreign Direct Investment (in millions of US Dollars)
ε = error term

There are 3 alternative models that will be selected in the regression model of panel data, namely the common effect model, the fixed effect model and random effect model. The model selection was based on the redundant fixed effect and Hausman tests. The hypothesis used in the redundant fixed effect model is:
Ho: common effect model
Ha: fixed effect model
If the F-Stat and Chi-Square probabilities are less than a certain alpha significance level, then Ho is rejected. The selected model is the fixed effect model.In order to choose between the random model and the fixed effects model, the Hausman test is used. In this test, the hypotheses used are:
Ho: random effect model

Ha: fixed effect model.
If the Chi-square probability is lower than a certain alpha significance level, then Ho is rejected. The chosen model is the fixed effect model.

4 Results and Discussion

Table 1 shows the test results of the redundant fixed effect and Hausman. Statistical value of cross section F and cross-section Chi-Square are significant at 1 percent alpha. It means that the selected model is Fixed Effect Model. In the Hausman test, Chi-Square cross-section statistic is significant at 1 percent alpha. Based on this, the selected model is the fixed effect model.

Table 1. Redundant Fixed Effect and Hausmant Tests

Kind of Tests	Statistic	d.f	Prob.
Redundant Fixed Effect:			
Cross-section F	7.457609	(32, 292)	0.0000
Cross-section Chi-square	197.121083	32	0.0000
Hausman:			
Cross-section random	24.361357	5	0.0002

Fixed Effect model used for analysis is Pooled EGLS (Cross section weights). The estimation results are shown in table 2. The high adjusted R-Square and F-Stat values indicate that all the independent variables used are able to explain the variation of the human development index.

All independent variables have a significant effect on 1 percent alpha and the direction of the effect is as expected. In other words, this research is able to prove the truth of the hypothesis. The level of poverty, unemployment and inflation have a negative influence on the HDI. Increase in poverty rate, unemployment rate and the inflation rate will reduce HDI. Original local government revenue and foreign direct investment have a positive influence on HDI. The increase in original local government revenue and foreign direct investment will increase HDI.

Table 2. Estimation Result of Pooled EGLS (Cross-section weights)

Dependent Variable: HDI				
Constant and independent Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob**
C	73.55030	0.496211	148.2237	0.0000
POV	-0.057343	0.016136	-3.553824	0.0004
UNEMP	-0.758285	0.071925	-10.54268	0.0000
OLGR	0.142808	0.031207	4.576128	0.0000
INF	-0.311983	0.027549	-11.32452	0.0000
FDI	0.000449	0.000115	3.924162	0.0001
Weighted Statistics				
R-squared	0.937641	Mean Dependent Variaabel		220.0838
Adjusted R-squared	0.929739	S.D. dependent Var		81.13044
S.E. of regression	3.794607	Sum of square resid		4204.521
F-Statistic	118.6631	Durbin-Watson Stat		1.001427
Prob (F-statistic)	0.0000			

The selection of the fixed effect model means that the characteristics of each province are important in forming the human development index. The characteristics of this province are related to other factors other than the independent variables used in the model estimation. These factors are related to economic activities, education and health facilities, including local government policies and management in an effort to increase the regional human development index. The characteristics of each province are described by the intercept, which is shown in Figure 1. The higher the intercept of a province, the higher the province's ability to improve its regional human development index. Based on Figure 1, provinces that have relatively high intercepts are DI Yogyakarta (82.172064), Kalimantan Timur (81.02865), DKI Jakarta (80.421401) and Riau Islands (79.772292) and Provinces that have low intercept values are Papua (62.31515), Sulawesi Barat (66.94800) and Nusa Tenggara Timur (66.99809).

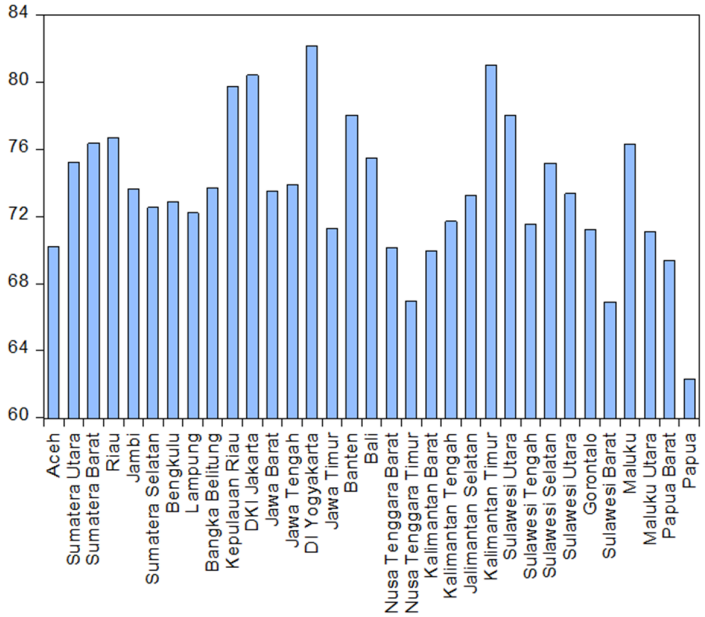

Fig 1. Estimated Provincial Intercept in Indonesia

5 Conclusions and Policy Implications

5.1 Conclusions

Several conclusions and policy implications can be drawn from the results of this study. First, human development index is negatively influenced by poverty, unemployment and inflation. Second, human development index is positively effected by original local government revenue and foreign direct investment. Third, there are differences in the ability of each province in improving the regional human development index. DI Yogyakarta, DKI Jakarta, Jawa Barat and Kalimantan Timur are provinces that have high ability to improve the

human development index, while Papua, Nusa Tenggara Timur and Sulawesi Barat are the opposite.

5.2 Policy Implications

There are several policy implications that can be taken in order to improve the human development index at the provincial level. First, local governments must reduce poverty, unemployment and inflation rates. Second, increasing original local government revenue which is directed at increasing the human development index, among others, through improving health and education as well as encouraging regional economic development. Third, make policies that are attractive to foreign investment in the regions. Fourth, the provincial government makes policies, coordinates and monitors the achievements of the human development index.

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