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# Effects of Human Development and Capital Stock on Income Inequality in Indonesia

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***Abstract:*** *The purpose of this study is to empirically investigate the effects of human development and capital stock on income inequality across 33 provinces in Indonesia over the period from 2012 to 2017. Annual data of human development index, capital stock, and inequality index were analyzed using the multiple panel regression. Based on the fixed effect model of panel data analysis, the study found that both human development and capital stock affected significantly and negatively income inequality across 33 provinces in Indonesia. These findings imply that, to reduce the income inequality nationwide, the government of Indonesia should focus on improving the dimensions of human development index by allocating more budgets on economic, educational, and health sectors. Additionally, the government should provide conducive environment for the domestic and foreign investors to attract more investment in the country.*

***Keywords:*** *Human development, Capital stock, Income inequality, Panel data.*

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## I. Introduction

Regional income inequality is an interesting topic to study due to its unsolved problem in an economy. To improve the standard of living and the welfare of the community, it requires equitable economic development in a country. Prioritizing the development in certain region of a country causes inequality of income distribution and in turn it leads to an increase in social conflict (Udjianto and Susanto, 2017). Greater income inequality leads to lower economic growth. Thus, efforts to reduce inequality contribute not only towards an improvement of social justice, but it also to enhancement of economic prosperity. Inequality of income adversely affects economic growth because low level of economic growth causes level of per capita income to decline. A high-income level of a person is more economical than those of the low-income level since the person with high-income level would have more resources for investment (Brueckner and Lederman, 2015).

Inequality indicates an unequal income distribution across the regions. Inequality in a region is one of the impacts of the initial development itself and if not addressed immediately it will have a negative impact on the regional development (Aprianoor and Muktuali 2015). With the magnitude of a disparity between regions will result in the development of potential sectors that have a competitive advantage in each region. The higher the level of economic growth of a region reflects the higher the level of welfare of the region, and vice versa. According to Vaulina and Liana (2015), the decrease in inequality is caused by the concentration of regional economic activities, equitable investment allocation, and the level of mobility of factors of production between regions. This indicates that regional inequality is closely related to equitable growth and the concentration of regional economic activities.

In their study, Mahmood and Noor (2015) found that human capital inequality and income distribution inequality positively correlated with economic development, thus to reduce income inequality in developing countries it is necessary to design policies focusing on minimizing human capital inequality. The contribution of human capital to income inequality in a region is very important because human capital reduces income inequality. Furthermore, Li (2016) found that the gap in basic education in an area is caused by the ineffective and uneven allocation of educational resources. The findings of these studies proved an increased in capital stock, which is measured by the total private investment and human development, which is measured by human development index have an impact on decreasing income inequality in a region.

Through private investment, capital flows would improve the existing businesses entity and create new businesses would, in turns, offer more employment opportunities, support production processes, transfer technology, access international markets through export products, and quality control. Production activity benefits the economy as a whole for a country. In addition, private investment also increases capital, economic production capacity. One of the reasons for high-growth countries is because they devote a substantial part of their output to investment (Dornbusch et al., 2008).

Due to the important of human development and capital stock in reducing an increasing of income equality in Indonesia, this study empirically explores the effects of human development and capital stock and income inequality in Indonesia over the period from 2012 to 2017. Different to the earlier studies on income equality in Indonesia that only investigated the income inequality in certain provinces; this study investigates the impact of human development and capital stock on income inequality across 33 provinces in Indonesia.

The findings of the study is hoped to provide some policy guidelines for the policy makers and relevant government authorities to combat income inequality nationwide by focusing on the human development and capital stock.

The rest of this study is structured as follows. Section 2 provides the literature review on relevant previous studies, and followed by research method in Section 3. Section 4 discusses the findings and finally the conclusion in provided in Section 5.

## II. Selected Review of Previous Studies

### 2.1. Income inequality

Increased income inequality adversely affects the regional economic growth. Wu and Li (2017) found that the level of local economic growth has a positive effect on improving welfare, while income inequality has a negative effect on increasing prosperity in the province of China. This empirical finding proved that the level of regional economic growth is negatively influenced by the level of regional income inequality.

The problem of economic inequality is increasingly complex because it is influenced by various aspects, as it does not only come from the human aspect but also from natural aspects, such as geographical characteristics and natural resource potential. Ye et al. (2017) stated that the regional imbalances that occur in Chongqing from sectoral structures and spatial policies and economic development, as well as the development of GDP per capita between regions, found that there was a dynamic evolution of unbalanced development into balanced development so as to reduce regional inequality.

Sjafrizal (2008) documented that factors affecting income inequality between regions comprises: (1) differences in the content of natural resources; (2) geographical conditions; (3) lack of mobility of goods and services; (4) concentration of regional economic activities; and (5) allocation of development funds between regions. Income inequality between regions is a common aspect of economic activity in the area. This inequality is caused by differences in the content of natural resources and differences in demographic conditions found in each region so that the ability of an area to drive the development process is different. The difference in the wealth of this region also leads to the existence of developed regions and underdeveloped regions.

### 2.2. Human development and income inequality

In relation to human capital relations, one of them is education with income inequality. Arisman (2018) found that a portion of the population and per capita income growth rates affected positively human development index in ASEAN member countries. Similarly, Asmita et al. (2017) documented that the human development index reduced the inequality of income distribution and economic growth in the province of North Sumatra, Indonesia. There was a positive impact of the human development index to income inequality.

Development of human capital is a priority in regional economic development. Benni and Chowdappa (2017) argued that human development is a very important sector and is the main concern of the government in the development strategy in the Karnataka Region of Hyderabad, India. This study proved that the development of human capital is very important in increasing income inequality between regions. Studying on the variations in education in the West Bengal, India, Banu and Surendra (2015) also found regional disparities in education levels were caused by various factors, such as history, social, cultural, economic, and government policies that have not been effective. Education determines efficiency in the economy, if a region has a good education it contributes to an increase in regional income and economic growth.

Furthermore, Lee (2017) found that a more even distribution of education contributed significantly to reducing income inequality so that the expansion of education was a major factor in reducing income inequality. Wicaksono et al. (2017) argued that education and wealth and the employment sector were the contributors to income inequality in Indonesia. They found evidence that high human capital would reduce income inequality in an area. Furthermore, by using a cointegration panel, Yu et al. (2015) found long-term effects of educational inequality on the economic growth in China during the 1990-2010 period. They also found that inequality was more relevant to economic performance than education, but education policy was able to create more human resources distribution evenly so that it has encouraged higher growth, especially in less developed areas.

Developing regions that have good human capital can be seen from the system and the quality of education. So that it affects the quality of human resources in the long term, the reference to the next level of education is basic education. Using an ARDL cointegration analysis, Adeyemi (2016) found a negative long-term relationship between primary school enrolment, higher education, public spending on the health and economic growth. This shows that the government should put in place the necessary education and training policies to ensure the quality of schools for basic education. Since the basic education is a capital in regional development and an increase in human capital in a region in the long term reduced the level of inequality. Furthermore, Li (2016) found that the gap in basic education in an area was caused by the ineffective and unequal allocation of educational resources. In short, the basic education and human resource factors is capital in reducing income inequality.

Finally, Abdullah (2015) found that education was very effective in reducing income inequality, while secondary schools were more effective than primary and tertiary education. In this finding, there was controversy with previous findings, in this finding secondary education can reduce inequality. The existence of a high relationship between the Human Development Index encourages an increase in economic inequality, meaning that the positive impact of inequality is encouraging competition between regions to be better. This further indicates that an even distribution of the human development creates an equal distribution of people's welfare and at the same time reduces economic inequality in Indonesia.

### 2.3. Capital stock and income inequality

Capital stock that is measured by private investment differs in each province in Indonesia. Ettoumi et al. (2016) found that the influence of investment, both domestic and foreign, differs from one region to another depending on geographical location and regional economic structure. In the long run, it will show the gap between regions that are rich with poor regions. In similar vein, Ali et al. (2013) found that foreign direct investment (FDI) has a significant effect on GDP, then FDI increases regional economic growth with higher FDI levels likely to have higher GDP. Chen and Groenewold (2013) found that the impact of inequality of investment was very large between regions, but with the change in the allocation of investment in the region, it has a beneficial impact in reducing the income gap. Furthermore, Rivera (2013) explained that the level of development and market size has a direct relationship with FDI and therefore tends to increase inequality between regions. This study proved that the existence of equitable investment in each region have an impact on reducing inequality.

Investment influences economic growth, because investment can increase disparities between regions. Alexiadis (2014) showed that regional investment allocation has caused high aggregate growth rates accompanied by unequal income distribution between regions. Likewise, Ayu and Putri (2014) argued that investment has a significant effect on income inequality, a significant influence of government spending, investment and economic growth on income disparities directly or indirectly. By financing public investment in both infrastructure and human capital, natural resource revenues promote economic growth in several developing countries. Increased public capital leads an increase in labour productivity and private capital, and in turn, encourages more accumulation of productive factors so that growth and productivity can be financed (Agenor, 2012).

In a macroeconomic context, investment has a narrower meaning. Technically, it means as an expenditure stream that adds a stock to physical capital (Dornbusch et al., 2008). Investment is a flow, while capital is a stock. Capital stock includes fixed assets that are not only related to productive capacity, for example, factories, machinery, equipment, inventory, but also include consumption for the future, for example, residential fixed assets. An important limitation of the characteristics of fixed assets, namely the reflection of delayed consumption: someone invests in fixed assets because they expect goods and services in the future. According to (Dornbusch et al., 2008), investment can generally be divided into three types of investment expenditure. Firstly, business fixed investment, namely investment in physical capital goods (fixed capital) such as factories, machinery and other production equipment that support the production process. Secondly, residential investment comprises investment in housing of single-family buildings and the residence of many families. The housing investment theory begins with attention to the demand for existing house stock. The demand for house stock depends on the net real return obtained from owning the house. Finally, inventory investments consisting of raw materials, goods in the production process and finished goods stored by the company in anticipation of product sales.

The above reviewed studies show the importance of human development and capital stock in reducing the income inequality across the economic areas. Due to limited studies investigated the impact of human development and capital stock on income equality in the most populous country in the world, Indonesia, thus this study intends to provide the latest empirical evidence on the effects of human development and capital stock on income inequality across 33 provinces in Indonesia.

## III. Empirical Framework

This research focuses on the issue of regional income inequality in Indonesia. This study analyzes the relationships between human development and capital stock on income inequality in 33 provinces in Indonesia over the period from 2012 to 2017. To measure the human development, the Human Development Index (HDI) was used, while the capital stock was measured by the total accumulated investment, both domestic and foreign investments. Finally, to measure income inequality, the study used the Index introduced by Bonet (2006). This index is measured by taking the differences between the provincial income per capita and national income per capita. All the annual data used in this study were gathered from the Statistical Bureau of Indonesia.

To measure the effects of human development and capital stock on income inequality across 33 provinces in Indonesia, the following multiple panel regression model is used:

$$INEQUAL_{it} = \beta_0 + \beta_1\_HD_{it} + \beta_2 CS_{it} + e_{it} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

where *INEQUAL*, *HD*, and *CS* indicate the Income Inequality, Human Development, and Capital Stock, respectively. $\beta_0$ is the Intercept, $\beta_1$, and $\beta_2$ are the estimated regression coefficient, $i$ is the province in Indonesia, $t$ indicates the time period, and $e$ is the error term.

The panel regression method comprises the common effect model, fixed effect model, and the random effect model. To select the best panel regression models to be adopted in this study, the Chow test and Hausman test were conducted.

## IV. Findings and Discussion

The regression results from the common effects model (CEM), fixed effect model (FEM), and random effect model (REM), the Chow test, and Hausman test are presented in Table 1. After testing the results of regression and selecting the best model, the Chow test results showed that the fixed effect model (FEM) is a better model to be used as compared to the common effect model (FEM), as indicated by the result of significance of the Chow and Hausman tests. Thus, the best model to examine the effects of human development and capital stock on income inequality across 33 provinces in Indonesia in this study is the FEM.

**Table 1:** The Effect of Human Development and Capital Stock on Income Inequality

| **Variable** | **Estimated Coefficient** | **Std.Error** | **t-Statistic** | **Prob.** |
|---|---|---|---|---|
| Constant | 2.4731 | 0.2218 | 11.1481 | 0.0000 |
| HD | -0.0324 | 0.0033 | -9.7937 | 0.0000 |
| CS | -0.0072 | 0.0015 | -4.9787 | 0.0000 |
| Adjusted $R^2$ = 0.4481; F- Stats = 79.1786; P-value = 0.0000 | | | | |

As observed for Table 1, the study found that both human development (HD) and capital stock (CS) simultaneously and significantly affected the inequality income (INEQUAL) at the 1% level of significance. This indicates that to overcome the income inequality across the provinces, the government should take into consideration the factors affecting the human development and capital stock as these factors affecting the income inequality. It is extremely important to reduce income inequality in the country to prevent reduction of public trust in the government which would in turn threaten the integrity of a country. This would certainly disrupt the production process and economic activity of a country. Therefore, the income gap is extremely vital to be overcome by the government.

Table 1 also showed that both human development and capital stock partially and significantly have a negative impact on income inequality in Indonesia. This indicates that the improvement of human development would reduce the income inequality in the country. To reduce the income gap, the government should enhancing economic growth in all provinces with the lower income and comprises many poor people.

This finding is consistent with research conducted by Ye et al. (2017) who documented a dynamic evolution from unbalanced development to balanced development so as to reduce regional inequality. Furthermore, the human development has a significant effect on income inequality in Indonesia. This happens because human capital itself would create communities in the area to be more advanced in carrying out economic activities. Human development could reduce inequality across the Indonesian provinces. This finding also in accordance with the finding of Shahpari and Davoudi (2014) who found that the increasing human capital and physical capital have reduced income distribution so that it become more evenly distributed.

Furthermore, Table 1 also showed that the increment in capital stock reduced significantly the income inequality in Indonesia as well. This means that private investment that varies across the provinces contributed towards reduction to income inequality nationwide. In provinces that experienced higher development, rising demand has encouraged income and demand, which in turn increased investment in the form of private investment. This finding is consistent with the research conducted by Trinh (2016) who found that foreign investment in Vietnam tended to reduce the income gap.

## V. Conclusion

This study explored empirically the effect of human development and capital stock on income inequality across 33 provinces in Indonesia over the period from 2012-2017. For this purpose, the study adopted annual data of human development index, capital stock, and inequality index. Using the multiple panel regression of the fixed effect model, the study found that both human development and capital stock affected significantly and negatively income inequality in Indonesia nationwide. These findings imply that, to reduce the income inequality nationwide, the government of Indonesia should focus on improving the dimensions of human development index by allocating more budgets on economic, educational, and health sectors. Additionally, the government should provide conducive environment for the domestic and foreign investors to attract more investment in the country.

Further studies on the income inequality should focus not only on the human development and capital stock, but it should also incorporate more determinants, both from micro- and macro-economic perspectives. Longer data period is advisable to provide more robust finding. Finally, the study of income inequality across the ASEAN countries could also provide a greater international picture on income inequality, thus provides more comprehensive policy recommendations for efforts to reduce income inequality within the ASEAN economic community.

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