Economic inequality and its impact on human development: insight of Banten Province 2011-2015

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Abstract. Development is a strategy to improve the welfare and quality of life. UNDP concept explained that economic and human development has interrelated relation. Meanwhile, economic development in a region often face inequality and may cause another impact to disparity on human development. This study has the objective to measure and explain the inequality on economic development and understanding its spatial-temporal correlation with human development by the time 2011-2015. The methods that use in this study are Williamson Index (WI), Location Quotient (LQ), Klassen Typology, and Pearson Correlation. The result shows there is inequality on economic development with WI 0.95 in 2011 and decreased in 2015 with WI 0.77. Inequality on economic development influenced by the different economic structure within regencies/municipals. In the context of temporal and spatial data, economic development has a strong correlation with human development in province level and regency level. The government should improve economics, health, and education infrastructure in all-region as an attempt to realize the equality and sustainability development in Banten Province.

1. Introduction
Regional development defined as a sustainable process to improve the economic welfare and the quality of life of the community. World Bank state the main goal of development is to improve the community welfare and improve the quality of human resources within a region [1]. The example of regional development activity is economic development [2]. Todaro defined that economic development has focused on decreasing poverty, inequality, increasing capital income, and decreasing unemployment [3]. Based on that definition, it can be concluded that economic development has goal to improving the quality human life.

Interrelation concept between economic and human development is already explained by United Nations Development Program (UNDP) through the concept of Trickle Down, Endogenous, Virtuous Circle, and Triangle Circle [4]. Trickle down concept explains that economic development will lead to human development, virtuous circle explains that human development will lead to economic development, and the triangle circle explains that economic and human development has interrelated relationships. Based on those concepts, economic and human development theoretically has correlation. Economic development that not followed by human development will be unsustainable [5].
Community welfare, which is the goal of development, is not an easy goal to achieve, one of the problems that arise is inequality. At the beginning of economic development, the distribution of income will be increasingly unequal and then at a certain point, it will be more equally distributed [6]. The inequality on economic development will give bad impact on a region, because it is not able to provide a Trickle down effect or multiplayer effect to other developments.

The inequality is generally found in provinces that have just gained autonomous rights. Banten Province is a new province in Indonesia which has just received its regional autonomy rights in 2001. The province is located on the western part of Java Island, bordering DKI Jakarta and West Java Province. Astronomically located between 507’50” -701’11” South Latitude and 10501’11” -10607’12” East Longitude. The province consists of 8 regencies and cities, namely Pandeglang Regency, Lebak Regency, Serang Regency, Tangerang Regency, Serang City, Cilegon City, Tangerang City, and South Tangerang City. Each of these districts/cities has different geographical characteristics which certainly has an impact on the differences in development that occur (Figure 1).

Research conducted by Yunisti shows the existence of a relationship between human development inequality and inequality in economic development in Banten Province year 2002-2010 [7]. Research from Hanif also shows the existence of similar conditions in Banten Province in 2005-2014, but tends to be declined [8]. One of the development imbalances is caused by the existence of economic basis that exists between regions in Banten Province, besides the variation in geographical conditions between regions is also contributes.

Based on the facts, researchers are interested to analyze the conditions of economic development inequality in Banten Province in 2011-2015 and looking at the temporal and spatial relation of economic development with human development. Research related to development inequality in Banten Province has basically been done, but various studies have only tried to see the variation temporal. Therefore, in this study more emphasis will be placed on spatial variations and the relevance of the region.

2. Method
This study uses secondary data published by Bureau of Statistic (BPS) Banten, involving data of per-capita Gross Regional Domestic Product (GRDP), GRDP by economic sector, GRDP growth, number of population, and human development indicators through Human Development Index (HDI). The inequality measured by Williamson Index and analyzed by Klassen Typology and Location Quotient. Moreover, to prove the interrelated relation between economic development and human development, we use Pearson Correlation analysis by using temporal and spatial data variation.
2.1. Williamson Index
The analysis of inequality on economic development by measuring Williamson Index is using GRDP per-capita for each regency/municipal. Basically, Williamson Index has same concept with measurement of Coefficient of Variation (CV), deviation standard divided with average value [9]:

\[ IW = \sqrt{\frac{\sum_{i=1}^{n}(Y_i - Y)^2 (f_i/n)}{Y}} \]  

(1)

Description:
Yi = GRDP per-capita for each regency/municipal
Y = average GRDP per capita in province
fi = population in regency/municipal level
n = population in province

The calculation of Williamson Index will produces value between 0 to 1, if the value is close to 1 it means inequality, but if the value close to 0 it means that there is equality in economic development. This method only provides an explanation of the distribution of per capita GRDP between districts in one province without explaining the magnitude of the distributed per capita GRDP with the regional average per capita GRDP [7].

2.2. Location Quotient
This method is approach in a basic economic model to understand the activity sector that become the trigger of growth by measure the relative consistency or degree of specialization of the economic sector through a comparative approach. According to, LQ can be formulated as follows [10]:

\[ LQ = \frac{V_{ik}/V_{ip}}{V_{k}/V_{p}} \]  

(2)

Description:
Vik = GRDP sector i in regency k
Vip = GRDP sector i in province (reference)
Vk = Total GRDP in regency k
Vp = Total GRDP in province (reference)

Based on the result of LQ calculation, a sector can be determined with the following conditions:

- The value of LQ = 1, indicates that the growth rate of sector i in the study area k is equal to the growth rate of the same sector in the referenced area p.
- LQ value> 1, indicates that the growth rate of sector i in the study area k is greater than the growth rate of the same sector in referenced area p. Based on this value, sector i is the pre-eminent sector of the study area as well as an economic base that can be further developed by the study area k; and
- LQ value <1, indicates that the growth rate of sector i in the study area is smaller than the growth rate of the same sector in the economy of the reference region p. Based on this, sector i is not a leading sector of study area k and is not an economic basis and has the potential to be further developed in the study area k.

2.3. Klassen Typology
The Klassen typology is an analytical tool to describe the economic conditions of the region. This method divides the area by taking into account regional economic growth and the per capita income of the region. This method is important to see inequality between regency/cities in an area. Criteria used in the division of regency/city areas following conditions [11]:

Table 1. The Classification of Klassen Typology.

| GRDP Growth | Yi>=Y | GRDP | Yi<Y |
|-------------|-------|------|------|
| ri>=r       | Advanced and fast-growing region | Potential region or can still grow rapidly |
| ri<r        | Advanced region but depressed | The region is relatively lagging behind |

Source: Klassen 1965

Descriptions:
ri = regency / city GRDP growth
r = province GRDP growth
i = regency/city GRDP
s = province GRDP

2.4. Pearson Correlation
The relationship between two quantitative continuous variables is seen by this correlation test. This correlation test is a measure of the interrelated relationship between two variables. The Pearson correlation (r) coefficient value ranges from -1 to +1. The formula in look for r is:

\[ r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sqrt{\left( \sum x^2 - \frac{(\sum x)^2}{n} \right) \left( \sum y^2 - \frac{(\sum y)^2}{n} \right)}} \] (3)

The value of r that has been obtained is then tested for significance. Significance test uses the value of the t-test used to see whether the correlation coefficient of significance is different from the value of 0 so that it has sufficient evidence to say there is a relation between 2 variables. In this study, SPSS software was used to help correlate the value.

3. Results and Discussion
3.1 Economic Development Inequality in Banten Province
Banten Province is a new autonomous region in Indonesia, inaugurated through Law No. 23 of 2000, as a new autonomous region, the development performance becomes an important factor to be evaluated. In the development cycle of a region, Kuncoro state at the beginning of development in a region will be increasingly inequal and then will experience trade of becoming more equally distributed [6]. Research from Sukwika concluded that in national level, Banten is included in the advanced but depressed class, while Mahardiki state that developed regions are vulnerable to experiencing problems with regional economic inequality [13] [14].

Figure 2. Trend line of economic inequality in Banten Province 2011-2015
Source: Result of data processed (2019)
Based on Figure 2, there is a declining trend on inequality from 2011 to 2015. The results of calculation on economic inequality using the Williamson Index in 2015 amounted to 0.774, the value dropped from 2011 which was 0.95 (Figure 2). The condition of inequality can also be confirmed by the GRDP per capita by region. Based on the Figure 3, it is known that urban areas (Tangerang City, Tangerang Selatan City, Serang City, and Cilegon City) have a GRDP relatively higher than other regions (Lebak Regency, Pandeglang Regency, Serang Regency, and Tangerang Regency). Cilegon City has the higher GRDP comparing with other region, it may related to intensive industrial activity in this region.

![Figure 3. Average Gross Regional Domestic Product Per Capita by Region in Banten Province 2011-2015](image)

Source: Result of data processed (2019)

### 3.2 Economic Base Sector and Klassen Typology

Economic development inequality could be caused by differences in the base or leading sectors of each region. The leading sector is the sector that has the most influence on regional growth and is directly related to the demand for goods and services from outside the region. The leading economic sector in a region can be seen through the Location Quotient value.

| Regency/municipal      | Primary Sector | Secondary Sector | Tertiary Sector |
|------------------------|----------------|------------------|-----------------|
| Pandeglang Regency     | 6.45           | 0.24             | 0.97            |
| Lebak Regency          | 4.99           | 0.36             | 1.06            |
| Tangerang Regency      | 0.92           | 1.17             | 0.83            |
| Serang Regency         | 1.31           | 1.29             | 0.65            |
| Tangerang City         | 0.04           | 0.99             | 1.14            |
| Cilegon City           | 0.05           | 1.50             | 0.62            |
| Serang City            | 0.81           | 0.46             | 1.60            |
| Tangerang Selatan City | 0.04           | 0.52             | 1.66            |

Source: result of data processed BPS Banten (2019)

Based on the results Location Quotient (LQ) calculation using sectoral GRDP data in 2011-2015, the primary sector become leading sector in Pandeglang, Lebak, and Serang Regencies; the secondary sector become leading sector in Serang Regency, Tangerang Regency, Cilegon City; and tertiary sectors become leading sector in Lebak Regency, Tangerang City, South Tangerang City, and Serang City. Based on the leading sector analysis, it can be seen that there is a new regionalization into the North Banten Region (Cilegon City, Serang City, Tangerang City, Tangerang Selatan City, and
Tangerang Regency) which is dominated by the secondary and tertiary sectors and South Banten (Serang Regency, Pandeglang Regency, and Regency Lebak) which is dominated by the primary sector (Table 2).

Figure 4 shows the regionalization of the economic sector, where in the southern Banten region (Pandeglang and Lebak Regency) is excellent in the agricultural sector, while northern Banten is excellent on secondary and tertiary sectors. This difference is influenced by geographical conditions and the pace of infrastructure development. North Banten dominates the development of infrastructure, so that, many developing sectors are industry and trade, while South Banten has a rural character that is more suitable for the development of the agriculture, livestock, fisheries and forestry sectors. The sectoral specialization between regions provides benefits which enable interaction between regions in order to meet the needs of both agricultural or industrial products. However, the interaction of supply and demand can occur if there is a transportation network that facilitates the movement of goods and services [15].

![Figure 4. The distribution of pre-eminent sector in Banten Province](image)

Source: researcher (2019)

The differences in leading sectors between regions have resulted the differences in economic conditions in the regions (as we states in previous chapter). Table 3 and Figure 5 show that the Serang City and the Tangerang Selatan City are classified as fast-developing areas. This is because that two regions have a greater GRDP growth rate than the growth rate in province level, but their per capita income is lower than the province. Cilegon City is classified as an advanced but depressed class, this is because the per capita income is higher than the province but the growth rate is slower than the province. Meanwhile, Serang Regency, Lebak Regency, Tangerang Regency and Pandeglang Regency were included in the relatively disadvantaged class because the four regencies had lower growth rates and per capita income than the provinces. The region that included in the fast-developing regions is Tangerang City (Figure 5).
Table 3. Results of Classification Klassen Typology based on rate of GRDP and GDP per capita by Regency/City in Banten Province 2015.

| Y1>y | Y1<y |
|------|------|
| r1>r | Quadrant I Advanced and fast growing region (Tangerang City) | Quadrant II Potential region or can still grow rapidly (Serang City, Tangerang Selatan City) |
| r1<r | Quadrant III Advanced region but depressed (Cilegon City) | Quadrant IV The region is relatively lagging behind (Pandeglang Regency, Lebak Regency, Tangerang Regency, Serang Regency) |

Source: research measurement based on data from BPS Banten 2015

Figure 5. The distribution of economic growth in Banten Province 2011-2015
Source: researcher (2019)

The leading sectors in a region are related to the level of development of the region. Lebak Regency and Pandeglang Regency with economic structures dominated by primary structures in productivity are not too high compared to secondary and tertiary sectors. This is indicated by the value of GRDP per capita and the GRDP growth rate that is lower than the province, so that it classified as a relatively disadvantaged area. Even though Lebak Regency has two leading sectors like Serang Regency, but the second leading sector (tertiary sector) is not too competitive compared to other regions (Table 2). Tangerang Regency is also included in the class which is relatively left behind because it only has one leading sector, namely the secondary and it is not enough competitive sectors compared with other regions, it is proven by the lower secondary LQ value compared to Serang Regency and Cilegon City.

Serang City and Tangerang Selatan City are included in the fast-growing class because both have advantages in the tertiary sector, and these advantages are competitive compared to other regions. This can be seen from the tertiary sector LQ value which is relatively far greater than the other tertiary LQ values. Serang City as the capital of Banten Province has an advantage in terms of the economic...
development because the city is become center for trade investment and services in Banten Province. Meanwhile, Tangerang Selatan City is an area adjacent to the DKI Jakarta metropolitan area, so there is a spill-over effect of economic activities in DKI Jakarta, for example trade, services and transportation.

Cilegon City has a higher per capita GRDP than the province, this is due to the high economic productivity in the area, where Cilegon City is one of the industrial agglomeration areas. The industrial sector that is developing in this area is a labour intensive industry, for example is Krakatau Steel which can absorb a workforce more than 5000 people. Tangerang City is an example of a leading city in the tertiary sector, it is because geographically this area is adjacent to the DKI Jakarta metropolitan area, where the concentration of regional to national level service sectors takes place in this region. The city of Tangerang, as a geographically adjacent city, has the effect of urban sprawl or city infiltration from DKI Jakarta due to the over-carrying capacity of the region to support economic activities. This has a good economic impact for the City of Tangerang, because economic investment and development will lead to this area.

3.3 Interrelation between Economic Development and Human Development

Many studies related to regional development conclude that the high economic development will lead to human development improvement. In this study, we will take a look that correlation by using temporal and spatial data. Economic development is represented by GDP per capita, while human development is represented by the Human Development Index (HDI). Based on Figure 6, it can be seen that there is a pattern of linearity in the trend of changes in GDP per capita with changes in the HDI value in aggregate in 2010-2015. The increase in the per capita GRDP of Banten Province will be accompanied by an increase in the provincial HDI. This condition indicates that economic development will trigger an increase in human quality, or conversely an increase in human quality will increase regional economic development.

![Figure 6. Graphic of GRDP and HDI in Banten Province](Source: research measurement based on data from BPS Banten)

Temporal variation in aggregate data of the provincial per capita GRDP with provincial HDI shows a linear and positive relationship. However, this relationship is not able to explain the relationship between these two variable in the level of regency/city. Therefore, to prove the presence or absence of a relation between economic development and human development for each region, a correlation test was used using the Pearson Correlation method with variants in the form of GRDP per capita per region and dati on human development indicators in each region.
Pearson correlation testing was carried out using GRDP per capita data for each district and HDI in the period 2011-2015. This test is intended to see the relevance of economic and human development at a more specific level and to see whether economic development in each district will have an impact on economic development and how are these related relationships.

| Regency/city          | Pearson Coefficient | Significancy |
|-----------------------|---------------------|--------------|
| Pandeglang            | 0.991               | 0.001        |
| Lebak                 | 0.979               | 0.004        |
| Tangerang             | 0.991               | 0.001        |
| Serang                | 0.975               | 0.001        |
| Tangerang City        | 0.985               | 0.002        |
| Cilegon City          | 0.967               | 0.007        |
| Serang City           | 0.969               | 0.007        |
| Tangerang Selatan City| 0.970               | 0.006        |

Source: measurement by researcher, 2019

Based on Pearson Correlation test using regional data, it can be conclude that GRDP per capita has strong correlation to HDI for all regency/city. Table 4 shows that all regencies have Pearson Coefficient positive and near 1. The results of this correlation test show that an increase in per capita GRDP in each region will have an impact on the increase in HDI in the region. This conclusion is consistent with conclusions at the aggregate level of the province, where an increase in per capita GRDP in the province also has an impact on increasing HDI in the province. However, it should be noted that the results of this statistical test only show statistical correlation, but do not show a causal relation between variables of economic development and human development. The relation of economic development and human development is expressed in a theoretical perspective through the mechanism of the *trickledown effect*, where economic development will increase the ability to provide facilities and infrastructure that support the improvement of the quality of education, health, and the economy of the community.

The relationship between economic development and human resource development can have two patterns, the first pattern of economic growth is increasing human quality and the second pattern of developing human quality is increasing economic growth [16]. Economic growth can provide resources for the government to improve health services, education, and the economy can improve human quality. At the micro level, a good economic condition of the community will provide the opportunity for the community to improve their quality of life. The second pattern, the development of human quality will have an impact on increasing labor productivity. This is also impacting on good economic productivity and increase economic growth. In the case of Banten, the first pattern seems to be more dominant, this can be seen from government programs that are promoting economic growth to be able to build more equitable public facilities.

In 2015, economic inequality in Banten Province is quite high, so there needs to be a development strategy so that equality in economic development is achieved. Economic development is very important to be equal because economic development can provide opportunities for improving the quality of human resources in Banten Province. Economic development strategies need to be carried out by taking into account the leading sectors in each region. The government needs to increase the leading agriculture sector in Lebak and Pandeglang Regencies, increase industrial labor absorption in Serang Regency and Cilegon City, and maintain tertiary sector performance in Tangerang Regency, South Tangerang City and Tangerang City.
4. Conclusion
Economic development in Banten Province has a high level of inequality, where the Williamson Index value for economic development reaches 0.95 in 2011 and 0.77 in 2015. Economic development shows that urban areas have higher development than rural areas. The regional economic base factor plays an important role in the progress of the economy. Economic development shows a relation with human development either temporally or spatially. At the provincial level, economic development is strongly associated with temporal human development, while in spatial variation it can be concluded that economic development has a positive impact on human development in all districts / cities. The causal relationship between economic development and human development that occurs can explained through the mechanism of the \textit{trickle down} effect where an increase in economic conditions will improve facilities and accessibility in an effort to increase human development.

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