

Regional Disparity in Economic Development: The Case of Agropolitan Cities in North Sumatera, Indonesia

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Abstract—This study aims to analyze: (1) economic development disparity among the Agropolitan cities in North Sumatera Province, Indonesia; (2) factors influencing disparity of income among the Agropolitan cities in North Sumatera Province, Indonesia over the 2012-2016 period. The disparity of economic development among the cities was measured using the Williamson Index, while the panel regression analysis was used to explore factors affecting income disparities among the cities. The study found that (1) the average of Williamson Index in the North Tapanuli City was higher than the other cities, while the lowest index was found for the Simalungun city; (2) Labor productivity, economic agglomeration, capital expenditure and gross fixed capital formation have a significant influence on income disparity

Keywords— Williamson's Index; panel data regression; development disparity; income disparity

I. INTRODUCTION

As one of 34 provinces in Indonesia, North Sumatera Province has 33 cities, divided into three regions with relatively different regional potentials and disparity levels. The East coastal region covers 12 cities; the West coastal region covers 12 cities, while the Agropolitan region covers 9 cities. Cities in the agropolitan region namely North Tarpaulin, Toba Samoset, Simalungun, Dairi, Karo, Humbang Hasundutan, West Pakpak, Samosir, and Pematang Siantar.

According to data from the Indonesian Central Bureau of Statistics (2015) found that in period 2012-2014, the highest economic growth in the North Sumatera Province was occupied by the west coastal region of 6.25 followed by the east coastal region of 6.10 and the lowest was the agropolitan region that is equal to 5.60. The agropolitan region has the lowest average economic growth in North Sumatera designated as a research location, aiming to enable the agropolitan region to increase its economic growth such as the east coastal and the west coastal. Gross Regional Domestic Product (GDP) per capita is one of the ways to measure the level of welfare of the population in a province. The greater GDP per capita of a province indicated the better level of people welfare. Likewise, if the GDP is smaller than the other cities, it shows the low level of people welfare. Urban regions with higher economic growth will face a growing burden due to the migration of the residents from the lower level region of economic growth.

This condition occurs because of the attractiveness of more employment opportunities in the urban regions. Urban regions continue to experience higher economic growth because of their potential resources and migration of workers from the rural regions as centers of growth with higher economic growth. This condition causes the growth center regions to continuously experience a higher accumulation of growth, supported by potential resources that have been moved from the rural regions.

TABLE I. GDP PER CAPITA OF THE AGROPOLITAN CITIES, 2014

<i>No</i>	<i>Cities</i>	<i>GDP per Capita (IDR)</i>
1	North Tapanuli	15.975.302,08
2	Toba Samosir	24.389.705,91
3	Simalungun	25.114.584,15
4	Dairi	18.567.807,86
5	Karo	29.602.056,17
6	Humbang Hasundutan	18.141.947,58
7	West Pakpak	14.358.561,12
8	Samosir	19.230.167,84
9	Pematang Siantar	30.994.487,33

Table I shows that in 2014, the highest average per capita GDP in the Agropolitan region was documented by the Pematang Siantar city amounting to IDR 30.994.487,33 , followed by the Karo city by IDR 29.602.056,17, and the Simalungun city by IDR 25.114.584,15, then the lowest was recorded by the West Pakpak city by IDR 14.358.561,12. Through Table I it has also been shown that there is a disparity in GDP per capita among cities in the North Sumatera Agropolitan region in 2014.

Productivity is a universal concept that creates more goods and services for human needs, using limited resources. Optimal work health can be achieved, among others, by adjusting among workload, work capacity, and additional burden due to the work environment. Achieving optimal health conditions, can realize high work productivity. The problem of the low productivity of the workforce is also one of the programs of the many work programs carried out by the government of North Sumatera. Because the program is interrelated that can support sustainable economic growth. Increased labor productivity will support employment opportunities. Increased employment opportunities will drive the rate of economic growth. For this reason, this indicator is interested in being studied. Furthermore, the results of a study conducted by Ginting (2015) found that GDP per capita and investment variables have a negative and significant influence on development inequality among regions, while the concentration of activities has a positive and significant influence on development inequality among regions in Indonesia.

Based on the causes of regional disparity among regions from year to year it tends to widen so it is reasonably suspected that the disparity in economic development is influenced by labor productivity, the concentration of regional economic activities, and government and private investment in the region and among regions. This is what underlies that research on the income disparity in the Agropolitan region of North Sumatera Province is very important.

The problems that will be examined in this study are formulated as follows:

- 1) What is the condition of economic development disparity with the GDP per capita approach to the 2010 constant prices in the cities in the North Sumatera Agropolitan region for the 2012-2016 period?
- 2) How great is the influence of labor productivity, economic agglomeration, government capital expenditure, and gross fixed capital formation on income disparity in the Agropolitan region of North Sumatera for the 2012-2016 period?

II. LITERATURE REVIEW

A. *Disparity in Economic Development*

Wie (1982) states that the disparity in income distribution from an economic point of view is divided into three types, namely: (1) disparity in income sharing among size distribution income groups; (2) disparity in income sharing among urban and rural regions; (3) disparity in regional income disparities. Furthermore according to Williamson (1965) states that disparity of development among regions with the center and among regions with other regions is a natural thing, because of differences in resources and the beginning of the implementation of inter-regional development. Kuznet (1955) states that among the social, economic and political factors that influence the U pattern, there are important factors, namely the centralization of capital in high income groups and the shift in population from the traditional agricultural sector to the modern industrial sector. Many follow-up studies have tried to refute or support the discovery of Kuznets. A decade after the Kuznet hypothesis, Williamson made a step by analyzing the relationship among income distribution and economic growth at the regional level in a country. Williamson (1965) became the first person to try to prove the U hypothesis upside down by using data among regions. Basing his analysis on the imposing experience in 24 countries during the 1950-1960 period, he proved that disparities among regions would have a negative influence on the sustainability of economic growth. Williamson also explained the hypothesis U inverted in the scope of the region that when per capita income increased, there would be an increase in regional disparities, then survive for a certain period and then decline. The implications can be derived that income inequality among regions is a consequence of development and will disappear by itself in line with the maturity of development itself. Williamson analyzed the four factors underlying the inverted U pattern in regional development namely natural resources, labor migration, capital transfer, central government policy. Williamson stated that the availability of different natural resources will lead to unbalanced regional growth in the early stages of development. Tarigan (2012) with an inverted U-hypothesis concludes that the power of economic law will balance disparities among regions.

B. *Labor Productivity*

According to Simanjuntak (2001) that the amount of supply of labor in society is the number of people who offer their services for the production process. Some of them are already active in their activities which produce goods and services called groups employed persons. Others are classified as ready to work and are trying to find work called job seekers / unemployed. The number of people working and job seekers is called labor force. According to Mankiw (2003) thought that increasing labor productivity is an essential factor in creating economic growth, because labor productivity reflects efficiency and technological progress. As a reflection of technological progress, increasing labor productivity is often considered to reduce employment

opportunities. Meanwhile, according to Bellante and Jackson (2000) that productivity will increase where usage of labor also increases. Increased use of labor will reduce the number of unemployment rates. Vice versa, if productivity has decreased, the use of labor will also decrease. Furthermore Sinungan (2000) states that one of the highest potential regions in increasing productivity is reducing ineffective working hours. The main opportunity in increasing human productivity lies in individual abilities, attitudes of individuals in work and management and work organizations. Each planning action to increase individual productivity at least includes the following three stages: (1) regarding the main macro factors for increasing productivity; (2) measure the importance of each factor and determine its priorities; and (3) planning a system of stages to improve the ability of workers and improve their attitude as the main source of productivity. Furthermore, according to Ervianto (2004) in order to obtain the desired level of productivity and minimize any risks that might occur and prioritize occupational safety and health, leaders must understand the capabilities and limitations caused by the conditions of the project site. The productivity program starts with measuring productivity that occurs at the project site. Without knowing the real situation on the field, it is difficult to plan a productivity improvement program. From the results of this measurement, evaluation can be done by comparing what happened to what should have happened. Evaluation results can be used to re-plan the level of productivity that will be achieved, of course, leads to improvement of what has happened.

C. Economic Agglomeration

Kuncoro (2007) defines agglomeration as the spatial concentration of economic activity in urban regions because of savings due to economies of proximity associated with spatial clusters of companies, workers, and consumers to minimize costs such as transportation costs, information, and communication. According to Tarigan (2012) the profit is located at the place of concentration or the occurrence of agglomeration due to economic of scale and economic of agglomeration factors. Economic of scale is an advantage because it can produce based on specialization so that production is greater and cost per unit is more efficient. While economic of agglomeration is profit because it is in place there are various needs and facilities that can be used by the company. Economic growth among regions is usually not same. There are regions with high economic growth rates but on the other hand there are also regions with low economic growth rates. Regional differences are seen income and economic growth will have an impact agglomeration, namely the centralization of economic activities in an region and there is no equitable distribution (Angelia, 2010). The concentration of economic activities among regions that is quite high will tend to encourage increased inequality of development among regions because the regional development process will be faster in regions with a higher concentration of economic activity. While the concentration of activities Low economic development process will run slower. Therefore, this inequality causes development disparities among regions. The concentration of economic activity that is high enough in certain regions will clearly affect the development inequality among regions. This economic concentration is reflected in agglomeration activities. Regional economic growth will tend to be faster in regions where there is a considerable concentration of economic activity. These conditions will further encourage the process of regional development through increased employment and community income levels. Likewise, if the concentration of economic activity in an region is relatively low, then it also encourages unemployment and low levels of community income. Agglomeration can be caused by several things. First, there are more natural resources in certain regions, such as petroleum, gas, coal and other mineral materials. Second, the prevalence of transportation facilities, both land, sea and air, also influences concentration economy. Third, demographic conditions (population) also influence because economic activities will tend to be concentrated where human resources are available with better quality (Syafrizal, 2008).

D. Government Capital Expenditures

Capital expenditures are budget expenditures used in order to obtain or add fixed assets and other assets that benefit more than one accounting period and exceed the minimum capitalization of fixed assets or other assets set by the government where the assets are used for daily operations. The amount of expenditure that is capitalized into fixed assets is all expenditures incurred until the assets are ready for use or acquisition costs. In Kusnandar research and Siswanto (2012) capital expenditure budget tailored to regional needs for facilities and infrastructure, both for the smooth implementation of the tasks for the government and public facilities. In accordance with the designation, capital expenditure is divided into 2 categories, namely public spending and apparatus spending. Public expenditure is capital expenditure whose benefits can be felt directly by the public, while spending on apparatus is capital expenditure whose benefits are felt directly by the government apparatus. Capital Expenditures as a component of Direct Expenditures on Regional Expenditures will be allocated by the regional government to fund development activities aimed at the public interest. This local government activity has resulted in the construction of various public facilities such as roads, bridges, telecommunications, electricity, school buildings, hospital buildings, markets, and various other public facilities that will be utilized by the community. Some types of public facilities will facilitate the accessibility of people in carrying out economic activities. In addition, the community can also use it for non-economic activities, especially in conducting social activities in various available public spaces.

E. Gross Fixed Capital Formation

According to Mankiw (2003) that investment is essentially the beginning of economic development activities. Investment can be carried out by the private sector, the government or cooperation among the government and the private sector. Capital investment is a way that can be done by the government and the private sector to promote economic growth and for the long term can raise the living standards of its people. Investment is also a major component in driving the economy of a country. In theory, investment increases will encourage trade volume and production volume which will further expand productive employment opportunities and means that it will increase per capita income while at the same time improving the welfare of the community. Investment is sourced from domestic investment and foreign investment. With the addition of investment both domestically and abroad, it can absorb labor. This is because in the production process goods and services increase which in turn absorbs the workforce. So that the workforce gets a salary, and the workforce has purchasing power. With more and more investment used to process the production of service goods, where labor can be absorbed more so that there is equal distribution of income per capita (Sukirno, 2003). Investment is every vehicle where funds are placed in the hope of being able to maintain or increase value or provide positive results (Elyani, 2010). Adhisasmita (2005) argues that investment or capital transfer (private and government) is a means for the cumulative process, pointing up in regions that have good fortune and point downward in regions that are not well-off. In urban regions that are experiencing development, rising demand will encourage income and demand, which in turn increases investment, and so on. In other regions where the development is very slow, the demand for capital for investment is low as a result of the low supply of capital and income that tends to be lower. The difference in these developments and the concentration of investment in established regions cause the occurrence of inequality or increasing inequality. Todaro (2003) says that the resources that will be used to increase income and consumption in the future are called investments. According to Samuelson and Nordhaus (1996), investment is an important thing in economic development because this investment is needed as a supporting factor in improving the production process. Thus investment is defined as expenditure or expenditure of investors or companies to buy capital goods and production equipment to increase the ability to produce goods and services available in the economy (Sukirno, 2003). Private investment (investment) variables may be proxies by the variable gross fixed capital formation, which includes the procurement, manufacture or purchase of new capital goods from domestic and new and used capital goods from abroad. Capital goods purchased or self-made are durable goods that are used for production and usually used for more than a year.

Based on the theoretical analysis described above and from various previous studies that support the theory, the following hypothesis is drawn: "There is a significant influence of labor productivity, agglomeration economic, government capital expenditure, and gross fixed capital formation on income disparity in Agropolitan regions in North Sumatera Province".

III. METHOD

This study used a panel data of 9 agropolitan cities in the North Sumatera province, Indonesia over five years, namely 2012-2016 Gross Regional Domestic Product (GDP) at constant prices in 2010 used to measure the economic growth, labor productivity (LP), economic agglomeration (EA), government capital expenditure (GCE), gross fixed capital formation (GFCF) and data on economic development disparity (DPE) of cities in the Agropolitan region of North Sumatera Province sourced from publications and databases The Central Statistics Agency and other agencies related to this research.

The first step, the study calculates Williamson Index to measure economic disparity. The Williamson index formulation is based on the GDP data of each region using the following formula (Safrizal, 2012):

$$V_w = \frac{\sqrt{\sum_{i=1}^n (y_i - \bar{y})^2 \left(\frac{f_i}{n}\right)}}{\bar{y}} \dots\dots\dots(1)$$

where V_w is Williamson Index, y_i is GDP per capita city i , \bar{y} is average GDP per capita of the agropolitan region, f_i is total population of the city i , and n is population of the agropolitan region.

In the next step, the study explores the effects of labor productivity, economic agglomeration, government capital expenditure, and gross fixed capital formation on economic disparity using the following Equation (1):

$$\text{LnID}_{it} = \text{Ln}\beta_0 + \beta_1 \text{LnLP}_{it} + \beta_2 \text{LnEA}_{it} + \beta_3 \text{LnGCE}_{it} + \beta_4 \text{LnGFCF}_{it} + \varepsilon_{it} \dots (2)$$

where LnID is Income Disparity, LnLP is Labor Productivity, LnEA is Economic Agglomeration, LnGCE is Government Capital Expenditure, and LnGFCF is Gross Fixed Capital Formation, ε_{it} is the error term, β_0 is the constant, $\beta_1 - \beta_4$ are the regression coefficients.

IV. FINDING AND DISCUSSION

A. Williamson Index

The state of economic development disparity using the Williamson Index in the North Sumatera Agropolitan region for the 2012-2016 period is shown in Table II. The highest level of economic development disparity in 2012 was found for the Karo city with the index of 0.0454, followed by the Toba Samosir city by 0.0421, while the lowest disparity is found for the Dairi city by the index of 0.0034.

TABLE II. ECONOMIC DISPARITY AMONG THE AGROPOLITAN CITIES

No.	City	2012	2013	2014	2015	2016	Average
1	North Tapanuli	0.0328	0.0320	0.0528	0.0504	0.0533	0.04426
2	Toba Samosir	0.0421	0.0418	0.0031	0.0003	0.0030	0.01806
3	Simalungun	0.0192	0.0207	0.0004	0.0083	0.0036	0.01044
4	Dairi	0.0029	0.0034	0.0369	0.0334	0.0356	0.02244
5	Karo	0.0454	0.0419	0.0299	0.0335	0.0271	0.03556
6	Humbang Hasundutan	0.0246	0.0244	0.1024	0.0306	0.0328	0.04296
7	West Pakpak	0.0261	0.0264	0.0242	0.0238	0.0247	0.02504
8	Samosir	0.0194	0.0208	0.0220	0.0192	0.0206	0.02040
9	Pematang Siantar	0.0225	0.022	0.0315	0.0362	0.0317	0.02878
	Average	0.0235	0.0233	0.0303	0.0235	0.0232	0.0248

Then in 2014 the highest level of economic development disparity was occupied by Humbang Hasundutan City of 0.1024, followed by North Tapanuli City of 0.0528, and the lowest was Simalungun City of 0.0004. Furthermore in 2016, the highest level of economic development disparity in North Tapanuli City was 0.0533, followed by Dairi City at 0.0356, and the lowest was still occupied by Simalungun City at 0.0036.

B. Factors Affecting the Income Disparities

The following Table III shows the estimation results of the influence of labor productivity variables (LP), economic agglomeration (EA), government capital expenditures (GCE), and gross fixed capital formation (GFCF) on Income Disparity (ID) in 9 cities in the Agropolitan region in North Sumatera from 2012-2016. As observed from the table 2, three variables were found to be significant, namely labor productivity and capital expenditure of local governments have a positive influence while the concentration of economic activity has a negative influence on income disparities in the 9 cities in the Agropolitan region. Furthermore, there is one variable that has a positive effect but not significant, which is economic disparity in terms of gross fixed capital formation. Variable concentrations of economic activity have the greatest influence (-0.651) and the smallest effect was given by the government capital expenditure (0.062) on income disparity of Agropolitan region in North Sumatera Province.

The findings of this study support the research conducted by Yeniwati (2013) in West Sumatra Indonesia, that economic agglomeration and investment have a positive and significant effect on regional income inequality; but contrary to the results of research conducted by Ginting (2015) for the Indonesian region, that capital expenditure has a negative influence on income inequality

TABLE III. FACTORS AFFECTING INCOMEDISPARITY IN THE AGROPOLITAN CITIES

Variables	ID (Yit)			Prob.
	Coefficient (β)	Standard Error	T-Statistics	
C	10.89595	1,003459	10.85839 **	0.0000
LP	0.481526	0.096073	5.012073 **	0.0000
EA	-0.650892	0.258746	-2,515566 *	0.0171
GCE	0.062144	0.018334	3.389437 **	0.0019
GFCF	0.006518	0.011623	0.560814	0.5788

IV. CONCLUSION

Based on the results of the research and discussion that has been done, some conclusions can be drawn as follows : the average disparity in economic development with the data period 2012-2016 year higher in Tapanuli Utara, followed Humbang Hasundutan and the lowest is the city of Toba Samosir and Simalungun in North Sumatera Agropolitan region; and there is a positive and significant influence on labor productivity, concentration of economic activities, capital expenditure of local governments, and gross fixed capital formation on disparity in economic development in the Agropolitan region of North

Sumatera. City regional governments in the Agropolitan region of North Sumatera Province must try to increase government capital expenditure and private investment (gross fixed capital formation) so that there is an increase and even distribution of development and a decrease in disparity among cities.

The limitation of this study is that it only uses a period of 5 years and involves 4 dependent variables. Future researchers are expected to use a longer period of time and involve more dependent variables.

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