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Inequality across districts and cities in the Riau

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Abstract

This research aims to analyze the level of development inequality across regions in the Riau province. This research attempts to identify and analyze the factors that cause inequality as well as to formulate a development policy for reducing inequalities in that region. This study used Theil index and regression analysis. The results of analysis using the Theil index indicate the existence of inequality between different development regions in the Riau Province with the percentage 50%-70%. From the regression analysis, this paper found that some economic and social factors were the important factors of development inequality in the province such as human development index and infrastructure budgets.

Abstrak

Penelitian ini bertujuan untuk menganalisis tingkat ketimpangan pembangunan antarwilayah, mengidentifikasi dan menganalisis faktor-faktor yang menyebabkan ketimpangan pembangunan serta merumuskan kebijakan pembangunan daerah dalam mengurangi ketimpangan pembangunan antarwilayah di Provinsi Riau. Alat analisis yang digunakan dalam bentuk indeks Theil dan regresi. Hasil analisis dengan menggunakan indeks theil menunjukkan adanya ketimpangan pembangunan antar berbagai daerah di Provinsi Riau pada berbagai tingkatan. Penelitian ini menemukan bahwa sumber ketimpangan pembangunan berasal dari ketimpangan antar daerah pembangunan dengan persentase 50-70 persen dari total ketimpangan pembangunan. Analisis regresi menemukan bahwa indeks pembangunan manusia dan alokasi belanja infrastruktur sangat berpengaruh terhadap ketimpangan pembangunan antara wilayah di Propinsi Riau.

Introduction

The national and regional development policy has been drawn up in corridor planning of long term, medium term and short term. The long-term planning policy as set forth in Act No. 17 of 2007 about the 2005-2025 RPJPN (Long Term National Development Planning) stated that the direction of the regional development policy is an attempt to realize the equitable development and justice, while the long-term policy of the province of Riau arranged in PERDA (local government regulation) No. 9 in 2009 of RPJP (Long Term Development Planning) Riau Province 2005-2025 contained eleven points of development policy directions. The priority of the RPJP is in economics as follows: (1) to realize Riau Province as a center of economic activities; (2) to realize a sustainable and competitive economy; (3) to realize an independent and prosperity of Riau society; (4) to embody the balance of development between different regions; and (5) to realize the development cooperation among territories.

The decentralization of law opens opportunities for the region to be better and wisely in using potential to increase a prosperity and quality of local community's life. There are areas capturing these opportunities quickly and initiating to develop it, otherwise there are some areas obstructed

by various limitations that still exist, as stated by Matsui (2005). The great barriers often appear on limited understanding of local governments on the decentralization, regional capacity and gaps.

The Riau Province is one of areas that will serve a center of trade in the western part of Indonesia. Regional development needs to identify the regional potential and problems. The problems must be anticipated and the potential must be optimally employed.

The economic growth of Riau Province in the last ten years since 2003 fluctuated with the rate of 7.54 percent in 2003, of 8.13 percent in 2012 and the average growth is 7.67 percent. Meanwhile, the income distribution of the Riau Province based on the Gini index data in 2008-2012 generally increased from 0.310 to 0,400. This increase means the rising of inequality between individuals.

The economic development relates to economic growth and is accompanied by changes in output distribution and economic structures (Nafziger, 2006). Ideally, economic development will generate high economic growth while improving the welfare and income distribution.

Basically, inequality is due to different natural resources and demographic condition in each region, the impact of differences, the ability of a region to encourage the development process. So it is not surprising that there are developed regions and underdeveloped regions. Inequality of development can also be viewed vertically based on the differences in income distribution and horizontally based on the difference between the developed and underdeveloped regions (Sjafrizal, 2012).

According Sjafrizal (2012) there are several key factors that caused the inequality of development between regions: 1) the differences in the content of natural resources, 2) the differences in demographic conditions, 3) the lack of goods and services mobility, 4) the concentration of region economic activities, and 5) the development-fund allocation among regions.

The Riau provincial government considered that the main problem in context of economic inequality is related to production activities in mining sector, particularly oil and gas. The activity of oil and gas industry generally uses relatively high technology and therefore the low-skilled employment is limited. On the other hand, the link between oil and gas activities with local economic activity was also very weak and most of the revenue from these activities flowed out of the region. The implication is that the positive impact of oil and gas production activities on local economy is not great as expected.

Other conditions showing inequality of development (*disparity*) in the Riau province are that the center of economic activity in city area and district compared with autonomous regions, such as agriculture (plantations), service, trade, hospitality and education focused in Pekanbaru, Bengkalis and Indragiri Hulu in which the activity absorbs the resources of new expansion area (hinterland). The disparity between regions in the Riau Province generally can be seen from the quality or quantity of infrastructure and also service because the presence of infrastructure is one of contributing factor in the acceleration of development.

Development disparity in Riau province should be a consideration in development planning. The issue of economic disparities between regions is closely related to the programs of economic growth and social harmonization. When the economic disparities among regions get greater, a certain income level that shows an increasing gap will implicate the welfare conditions among regions.

From the description above the study onthe issue seeks to elaborate the inequality measured by the GDP development between districts/cities in Riau province and influencing factors and formulate development policies in response to these problems.

Arief et al., (2013) analyzed the long-term evolution disparity in Indonesia from inequality indicator namely Gini coefficient, revenue segment of groups, the ratio of decile dispersion, inequality of Theil index between regions, inequality income of certain regions and decomposition of inequality between and within groups. The estimates indicate that inequality in Indonesia has increased significantly. However, the increase in inequality dominated in last decade after Asian financial crisis or the era of political reform and democratization. Before the period, inequality was relatively stable and moderate. The amount of inequality increased and was surprising. In ten years up to 2012, the Gini coefficient and deciles dispersion ratio has increased by approximately 20% and 50% respectively. In addition, the increase of inequality approximately occurred throughout regional dimension, the urban-rural dimension, Java and non-Java.

Reuter (2004) discussed the development of intra-provincial disparities in China between 1989 and 2001. For this aim he analyzed the data of more than 200 cities in 25 provinces; these cities represented the urban China as a whole. A Theil index decomposition method was applied. The results showed that intra-regional disparities contribute significantly to total inequality, and the relative importance of these disparities increased in recent years. Thus, the regional component of interprovincial disparities compared with rural-urban disparity should not be ignored. However, by focusing on specific provinces it could be demonstrated that the pattern of inequality development is not identical within all provinces. The larger provinces, which also dominate the aggregated decomposition results, reconfirm the common perception on inequalities in China to be rather a problem of extreme wealth than of extreme poverty. On the other hand, smaller and poor provinces do clearly show an increase in inequality especially in the lower end of the income distribution, representing an increase in poverty. Furthermore, some of the results of inequality analysis tend to be very sensitive to the presence of outliers. Thus, the need for careful analysis on lower levels of aggregation is highlighted.

Akita (2003) calculates with the one-stage Theil and also its advance, the twɵ stage nested Theil decomposition. This study uses data from 1990 to 1997 in China and Indonesia. The results using the twɵ stage show that the intra-provincial component contributes 64% disparities in China and 50% in Indonesia. This figure is higher than the figure of disparities between provinces and between regions. Results of one-stage showed the components of the intra area in Indonesia donated 88% disparities in general whereas China has problems with regional disparities. Akita and Alisjahbana (2002) conducted a study on regional income inequality by comparing China and Indonesia. By using the Theil index, the results showed in China thati nequality increased from 0.230 in 1995 to 0.235 in 1997 and then increased again in 1998 to 0.249. As for Indonesia, the research was conducted in two periods of the years 1993-1997 (before the crisis) and 1997-1998 (during the crisis). Results of the study indicate a decline of inequality during the economic crisis.

Fujita and Hu (2001) analyzed the regional income disparity in China during the period from 1984 to 1994 by using Theil index with coastal-interior division of 30 provinces. They found that the overall regional inequality is quite stable, showing a slight decline in the 1980's. Overall a decrease was driven by decrease of intra-regional inequality; the latter is greater than inequality between regions until the last three years of the sample, 77%-43% of overall inequality

Azzoni (2001) conducted a study of inequality in 20 states in Brazil during the period 1939-1995 with Theil index approach. Overall regional disparities are

large enough to 1965 at which it began a steady decline. The state divided into 5 groups revealed that the inequality between regions (interregional) is the most important contributor to the overall regional disparities. In addition, the role of components between (inter) accounted for the increase in inequality in total ranging from 60% and ending at 87%.

Akita et al. (1999) in "Inequality in the Distribution of Household Expenditures in Indonesia: A Theil Decomposition Analysis" investigated the contribution of regional disparities on the national total inequality of household expenditure by outlining the national inequality into components within and between provinces. This is done by applying the Theil Inequality Decomposition Techniques with household expenditure data from the National Socioeconomic Survey. While inequality between provinces contributes to 12-14% of total inequality among urban households and 7-8% among rural households, urban-rural inequality contributes to 22-24% of the total national inequality Kuznets curve drawn according to SUSENAS 1993 shows a peak value of 0.27 Inequality (using Theil index T) as part of urban households reached 53.2%; this division is much larger than the actual urbanization rate of 32.1%. Due to further urbanization the total inequality will increase, even if the other conditions remain stable.

Methods

This study used secondary data time series periods from 2003 to 2012, obtained from various reports and compilation of data and other forms of publications, such as the Central Bureau of Statistics and the regional development agency. The area under study is an existing District Municipality in the Riau province except Meranti District.

Specialization Index

An analysis of Specialization Index is one way to measure the behavior of overall economic activity. The analysis of Specialization Index is analytical techniques that complement and/or reinforce the results of the analysis of LQ. IS analysis techniques indicate whether a region tend to have *diversification* or *specialization*. If a region has a diversified activity it means that the region does not have a specific base activity. Otherwise if an area has a specialized activity it means that the region tends to have a certain base activity.

The method of calculating index of regional specialties (IRS) as applied by Kim (1995) to analyze regional specialties in United States is as follows:

$$SI_{jk} = \sum_{i=1}^{n} \left| \frac{E_{ij}}{E_j} - \frac{E_{ik}}{E_k} \right|$$

Note:

SI_{jk} = Specialization Index district/city j and k
E_{ij} = GDP sector i in district/city j
E_j = Total GDP district/city j
E_{ik} = GDP sector i in district/city k
E_k = Total GDP district/city k

Measurement criteria according to Kim is "when the specialization index value close to zero then the two regions j and k do not have specialized, and when approaching the value of two then both regions j and k have specialized". The middle limit between zero and two are one, therefore the specialization index value greater than one can be considered as a sector/subsector which has specialization. To know the high and low degree of specialization among regions uses the average value of the entire region specialization index.

Ratio of Infrastructure Expenditure

Infrastructure is represented by the ratio of infrastructure expenditure which is the ratio between direct expenditure budgets for infrastructure with a total GDP that has directly and indirectly impact for public con-

veniences in accessing infrastructure; small ratio values describe the availability of good infrastructure and are mathematically written as follows

$$RIE_i = \frac{Direct\ Expenditure\ (APBD)_i}{Total\ GDP_i}\ x\ 100\%$$

With: i = district/city in Riau province

Theil Index

Theil index (Theil, 1967, in Fujita and Hu, 2001) is used to decompose the total disparity into disparities between and within regions. Theil index equation is written as follows (Fujita and Hu 2001):

$$I = \sum_{i=1}^{n} y_i\, log\, \left(\frac{y_i}{x_i}\right)$$

Note:

I = Total Inequality (Theil index).

y_i = GDP district/city i/provincial GDP.

x_i = Population District/ Provincial Population.

$y_i log \left(\frac{y_i}{x_i}\right)$ = Inequality Partial

Theil index assessment criteria; Theil Index Value limited in the interval of [0; log (n)] (n = number of regions), value of 0 reflects the impeccable distribution of development.

Region development classification based on Spatial Planning (RTRW) of Riau Province consists of four region developments (RD):

a. Region Development I consists of Rokan Hulu and Rokan Hilir.
b. Region Development II consists of Bengkalis and Dumai.
c. Region Development III consists of Siak, Kampar, Pekanbaru, and Pelalawan.
d. Region Development IV consists of Indragiri Hulu, Indragiri Hilir, and Kuantan Singingi.

The total of inequality area can be decomposed into inequality regions development (between) and inequality within developing regions (within), with the following equation:

$$I = I_0 + \sum_{g=1}^{4} Y_g I_g$$

$$I_0 = \sum_{g=1}^{4} Y_g \log\left(\frac{Y_g}{X_g}\right)$$

$$Y_g = \sum_{i \in S_g} y_i;\ X_g = \sum_{i \in S_g} x_i$$

$$I_g = \sum_{i \in S_g} \frac{y_i}{Y_g} \log\left(\frac{y_i/Y_g}{x_i/X_g}\right)$$

Note:

I_0 = Inequality between regions development (between)

$\sum_{g=1}^{4} Y_g I_g$ = Inequality within regions development (within)

y_i = GDPdistrict i /GDPprovince ;

x_i = Population district i/Province Population.

The Theil index decomposition can be obtained by percentage of inequality development region and inequality within development region. Thus, it can be seen a major source of inequality, whether it comes from the inequality between regions development, or within regions development. In this analysis, the data used is GDP at constant prices in 2000, and the population of each district/city in 2003 until 2012 to know a tendency source of inequality from 2003 until 2012.

The Determinants of Development Inequality

In order to analyze the factors that influence the development inequality between regions in Riau Province it used grouped indicators by economic aspects (regional specialties and government expenditure), and Social (Human Development Index) as an approach to the inequality between re-

gions. It is thought that the formed function resembles regression equation with the total inequality of development in Riau Province is influenced by regional specialties variables (RS), ratio of infrastructure expenditure (RIE), and human development index (HDI). The variables have the greatest value of the regression coefficient and are considered to have an important role of disparities in the region of Riau Province. Despite the general form of the equation:

$I = \{RS, RIE, HDI\}$

Linear equation regression models (OLS) can be formulated in the following models

$$I = \alpha + \beta_1 RS + \beta_2 RIE + \beta_3 HDI + \varepsilon$$

Note:
I = Total Inequality development (Theil Index)
RS = Regional Specialization
RIE = ratio of infrastructure expenditure
HDI = human development index
α = constant/Intercept
$\beta_1 \beta_2 \beta_3$ = regression coefficient/coefficient parameter
ε = Error Term

Before testing the hypothesis (F-test, t test, and R^2), the first models were tested in order to fulfill the BLUE requirements (Best Linear Unbiased Estimator) tested with classical assumption, autocorrelation test, multicollinearity test, and heteroscedasticity test.

Result and Discussion

The analysis of inequality level of development that occurred between regions in Riau Province is conducted by using the Theil Index Analysis tool. Basically, the values of developments between Index Williamson and Theil Index have the same direction. As for the advantage Theil index, it is able to explain the causes of inequalities between regions, whereas index Williamson shows tha size of the real value of inequality region.

To analyze the level of inequality development in Riau province by the Theil index can identify the inequality development sources both between and within the regions development. The results of the analysis Theil index by using the data of 2003-2012 GDP at constant prices 2000 in Riau Province are presented in the Table 1.

Table 1: Trend Theil index value in Riau Province Year 2003-2012

Year	Theil Index
2003	0.0101
2004	0.0099
2005	0.0101
2006	0.0174
2007	0.0179
2008	0.0185
2009	0.0142
2010	0.0101
2011	0.0103
2012	0.0110

The expansion of Theil index showed the highest inequality, and otherwise if the index is smaller, the inequality is also getting smaller or more evenly. The table above shows the results of Theil index analysis, the inequality of development in Riau Province, periods of 2003 to 2012 and the total value of inequality development fluctuated. In 2003 to 2008 there was an increase (*divergence*) of the 0.0101 to 0.0185 and it showed the regional expansion that occurred in Riau province does not indicate the distribution of development and conversely an increase in inequality of development among regions due to the beginning of expansion sources of financing regional development is derived from aid center and the lack of resources exploration in the regions. Over the development process, the following years until 2012 tend to decreased (*convergence*) to 0,011.

When the phenomenon above is related to economic growth that happened in the same year, then it is similar to Neo-

classical hypothesis that the beginning of economic development will be followed by an increase in inequality. The short term study resulted in the observation period namely short-term category, while the perfection of U curve inverted to neo-classical hypothesis needs a long-term observation.

The decomposition value of Theil index on the table 2 shows that inequality in Riau Province on period of 2003-2012 is more influenced by the inequality within development region (RD III and RD IV). In RD IV, Indragiri Hulu and Indragiri Hilir have trends of major contribution to the inequality within development region in Riau province. In other words, the economic growth in the RD IV is followed with higher inequality. In RD III, Pekanbaru City has the largest contribution to inequality trends in the region as well as the overall development because Pekanbaru city is the central activity of the province.

Furthermore, when seen from the whole district/city without regional grouping, the regions play a role in increasing Inequality level of Development in Riau Province and consist of six regions Pekanbaru City, Indragiri Hilir, Indragiri Hulu, Kuantan Singingi, Siak, and District Pelalawan. It is based on the positive value of contribution or total decomposition of Theil index; so it can be concluded that the source of Inequality of Development in Riau Province is also derived from the inequality between districts/cities.

Based on description that source of inequality in the development of Riau Province within the regions development and between regions development, this case might be seen in Table 3.

Table 2: Decomposition Theil Index, 2003-2012

RD	District city	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
RD I	ROHIL	-0.0033	-0.0032	-0.0028	0.0001	-0.0050	-0.0071	-0.0046	-0.0060	-0.0061	-0.0064
	ROHUL	-0.0067	-0.0063	-0.0061	-0.0061	-0.0072	-0.0077	-0.0101	-0.0114	-0.0114	-0.0119
	Total	**-0.0099**	**-0.0095**	**-0.0090**	**-0.0060**	**-0.0122**	**-0.0148**	**-0.0147**	**-0.0174**	**-0.0175**	**-0.0183**
RD II	DUMAI	-0.0020	-0.0023	-0.0027	-0.0020	-0.0008	-0.0008	-0.0007	-0.0011	-0.0010	-0.0009
	BENGKALIS	-0.0147	-0.0151	-0.0167	-0.0224	-0.0218	-0.0215	-0.0165	-0.0076	-0.0076	-0.0075
	Total	**-0.0167**	**-0.0173**	**-0.0194**	**-0.0245**	**-0.0226**	**-0.0222**	**-0.0172**	**-0.0087**	**-0.0086**	**-0.0084**
RD III	SIAK	0.0104	0.0098	0.0089	0.0095	0.0097	0.0099	0.0068	0.0053	0.0052	0.0048
	PELALAWAN	0.0111	0.0102	0.0074	0.0075	0.0069	0.0064	0.0068	0.0050	0.0047	0.0037
	PKU	0.0055	0.0050	0.0105	0.0122	0.0159	0.0182	0.0140	0.0123	0.0139	0.0159
	KAMPAR	-0.0075	0.0073	-0.0068	0.0062	-0.0063	0.0059	-0.0092	0.0109	-0.0111	0.0115
	Total	**0.0194**	**0.0178**	**0.0200**	**0.0230**	**0.0263**	**0.0286**	**0.0184**	**0.0117**	**0.0127**	**0.0129**
RD IV	KUANSING	0.0042	0.0050	0.0054	0.0070	0.0068	0.0070	0.0067	0.0058	0.0057	0.0057
	INHU	0.0121	0.0122	0.0118	0.0135	0.0127	0.0128	0.0105	0.0091	0.0088	0.0085
	INHIL	0.0010	0.0017	0.0013	0.0043	0.0069	0.0071	0.0106	0.0096	0.0093	0.0106
	Total	**0.0173**	**0.0190**	**0.0185**	**0.0248**	**0.0264**	**0.0269**	**0.0278**	**0.0245**	**0.0238**	**0.0248**
	Total Theil	**0.0101**	**0.0099**	**0.0101**	**0.0174**	**0.0179**	**0.0185**	**0.0142**	**0.0101**	**0.0103**	**0.0110**

Table 3: Percentage Source of Inequality in Riau Province, 2003-2012, (%)

Source of Inequality	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Inequality Between Regions Development	50.41	53.61	61.02	67.17	69.07	70.48	64.67	60.57	59.09	59.52
Inequality Within Regions Development	49.59	46.39	38.98	32.83	30.93	29.52	35.33	39.43	40.91	40.48

The decomposition of inequality sources in Riau province shows that in 2003-2012 the main source inequality comes from development between development regions that contribute to more than 50-70% of inequality total in Riau province, whereas inequality between in region development (within) contributes to only 30-50 percent.

In 2003 to 2008 the source of inequality derived from between regions inequality within regions development amounted to 49.59 per cent and declined to 29.52 percent in 2008 and continued to increase until the year 2012 to 40.48 percent. Instead, the source of inequality derived from the inequality between development regions contributes to the inequality in total visible opposite to the inequality within regions development. In the peeriod of 2003 to 2008, the source of inequality derived from the inequality between the development areas has increased from 50.41 percent to 70.48 percent, then the next period it declined to 59.52 percent in 2012. Thus, during the period 2003-2012 the main source of inequality in Riau Province was derived from inequality between regions development.

The following estimates data will discuss the statistical and economic analysis from results of the regression equation influencing regional specialties (RS), the ratio of infrastructure expenditure (RIE), and the human development index (HDI) which is independent variable on the inequality of development in Riau Province from Theil index (T) by using dependent variable multiple regression analysis approach with Ordinary Least Square (OLS). According to multicollinearity test, heteroscedasticity test and autocorrelation test, the result is free from violations of classical assumption and it can be concluded that the model used to analyze the factors that influence the development inequality already is eligible BLUE (Best Linear Unbiased Estimator).

After research data tabulation and classical assumption test, then it established a model to observe factors that are thought to influence inequalities between the development regions in Riau Province during on periods of 2003-2012. Based on calculations using multiple linear regression equation with SPSS (Statistical Package Social Science) facilities, the results of multiple linear regressions are can be seen in Table 4.

The estimation result of equation regression model gets the coefficient determination value of R^2 as 0.865. This value can be interpreted that 86.5% changed in the level of inequality development between regions in Riau Province as measured by the Theil index and it can be explained or caused by region specialization, the ratio of infrastructure expenditure and the human development index while the remaining as 13.5%, is caused by other variable beyond model. After testing both statistically and selection of model, this part will discuss the obtained regression result and analyze the influence of each of independent variable on dependent variables in the regression model.

Table 4: The Summary of Multiple Linear Regression Result – OLS

Variable	Coefficient	t-stat	Prob (t-stat)
Intercept	-0,0933	-1,659	0.148
RS	0,3821	2,600	0.041*
RIE	0.0003	2,900	0.027*
HDI	-0.0022	-3,110	0.021*
R^2	0.865		
F-stat	12,791		
Prob (F-stat)	0.005*		

Note: * is significant at 0.05 level of significance.

The Influence of Regional Specialization on Inequality

Value ratio of region specialization in each district/city varies and indicates that there is an area at the center of activities in each regions development (RD). In terms of the trend during 2003 to 2012 years, the ratio generally increased in each region and, based on research results, it is significant as one of the main sources that influence the inequality of development in Riau province with a probability value of t-statistics for 0,041 then at a significance level of 5% or the 95% confidence level; the variable of specialization areas significantly affects the inequality of development in Riau Province. The Regression coefficient is 0.3821 and its positive value which increase in value by 1 unit of region specialization will lead to increase development inequality between regions (as measured by the Theil Index) 0.3821 from coefficients (*ceteris paribus*).

The analysis result showed that the region specialization is one of the main sources that can boost inequality of development between regions in Riau Province. This is in line with Sjafrizal (2012) who stated one of factors that influence the inequality of development is the concentration of high economic activity in certain region and to solve it needs the development growth center that spreads by embracing the concept of concentration and decentralization resulting in the spread of development activities. Thus, in order to overcome the existing imbalances it could be increasing the value of leading sectors and strengthening linkages between sectors in the respective district/city. The increase the value of leading sectors will increase the value of GDP and GDP per capita .

Region specialization occurred in Riau province is dominated by Pekanbaru City and Dumai, and the city became the center of activity of each development region. Dumai city located in the coastal areas of Riau province in this case gives more value to exports and imports as well as Pekanbaru city which is located in the midst region of Riau province or surrounded around five districts that make Pekanbaru city as a regional center of the hierarchy. When linked with the Spatial Plan, the both cities of Riau province become the central development region (RD) II and III. Meanwhile, regions in development areas I and IV become the center of development areas.

Moreover, the fact showed that the development of specialization of each district gives positive relationship between agriculture (plantations), industry and services. In this case, seed plantation commodities are palm oil and rubber produced by regions still traded in raw materials and has been treated. Commodity-based industries locally except the oil palm and rubber slowly grew and hadly progressed because most of the regions in Riau Province depend on the oil and gas sector. The development industries have abackward and forward linkage and the largest multiplier effect for regional economy. Trading activity is dominated by migrants with goods originating from outside of the region (basic materials and textiles). Likewise, the development of service sector tends to ignore the strengthening of local economy and does not accommodate sectors micro, small and medium.

Furthermore, there is a low access to economic infrastructure services, namely financial institution that acts as a means of investment in the region. This is explained by Tambunan (2003) who stated that uneven distribution of investment can be considered as one of the main factors that lead to the development or growth of economic inequality within and between provinces. The lack of investment activity in an area can create economic growth and the level of per capita income in region is low, because there are no productive economic activities such as manufacturing, especially thatrelated to the seed sector.

The Influence of Infrastructure on Inequality

In essence, Ratio Infrastructure expenditure (RIE) is the ratio of direct expenditure incurred by the government to the regional gross domestic product (GDP), which aims to perceive the direct and indirect impacts for public convenience in accessing of infrastructure. Thus, if the ratio infrastructure expenditure is valuable, then society both directly and indirectly has access to the infrastructure, such as adequate infrastructure and vice versa. If RIE's number is large, there is an adversity for society to access directly and indirectly the infrastructure which indicates that a rea does not have adequate infrastructure yet.

The Coefficient ratio of infrastructure expenditure (RIE) is 0.0003 and positive. It means that the increasing in ratio by 1 unit of infrastructure expenditure will boost the development of inequality (as measured by the Theil index) between districts/cities from the coefficient of 0.0003 (*ceteris paribus*). Based on the results of partial significance test, a variable ratio of infrastructure expenditure has a probability value of t-statistics for 0027 then at a significance level of 5% or the 95% confidence level variables significantly influence the inequality of development between regions in the Riau Province.

The ratio of infrastructure expenditure is one of development inequality impacts between regions in Riau Province. Furthermore, the ratio of infrastructure expenditure indicates the availability of infrastructure such as roads, bridges, electricity, irrigation and water resources. Based on Table 5 by type of road surface, the lower percentages of existing asphalt category in Riau Province which amounted to 35.51 percent and the rest is dominated by non-asphalt category. A large percentage of non-asphalt is the dominant access in rural areas and this can lead to disruption of the distribution of raw materials in rural areas. In fact there are villages that are hard to reach or isolated as a result of geographical conditions. This is a challenge for local governments to accelerate infrastructure development to open isolated regions.

The good conditions and equalization existing infrastructure in Riau Province will improve transportation access between districts/cities in Riau province then it will impact on improving the interaction patterns and increasing investment that occurred in the area. The growth of this investment will boost the capacity of local economy that is able to increase the GDP of each district/city. However the investment in Riau Province is unstable and dominates regions that have supporting facilities.

Table 5: Length of Road According to Government Level and Surface, 2012 (Km)

NO	DISTRICT/CITY	Type of Surface				TOTAL
		Asphalt	Concrete	Gravel	Soil	
1	Kuantan Singingi	398.39	-	1411.84	185.75	1995.97
2	Indragiri Hulu	302.42	13.99	868.87	551.77	1737.05
3	Indragiri Hilir	1319.34	-	175.66	487.50	1982.50
4	Pelalawan	438.38	286.97	578.27	1049.95	2353.57
5	Siak	763.97	316.41	979.64	820.18	2880.19
6	Kampar	986.42	-	926.89	253.53	2166.84
7	Rokan Hulu	410.38	-	1499.96	230.03	2140.37
8	Bengkalis	315.76	552.25	23.88	426.69	1318.58
9	Rokan Hilir	699.84	488.52	292.93	829.76	2311.05
11	Pekanbaru	1420.02	-	306.99	931.49	2658.50
12	Dumai	381.35	435.26	175.94	803.97	1796.52
	TOTAL	**9,767.33**	**2,236.22**	**8,020.04**	**7,485.32**	**27,508.92**
	Percentage (%)	**35.51**	**8.13**	**29.15**	**27.21**	**100**

Source: Department of Public Works Riau Province, 2013

The Influence of Human Development Index on Inequality of Development

The balance of human development index value increased during years of 2003-2012 in all regions in Riau Province and it can be used as an affecting factor that influences inequality decline. It's also supported by the results of study whose regression coefficient of human development index variable has negative value at -0002, which means that the increase in human development index value by 1 unit will decrease the development inequality by 0.002 of the coefficient (*ceteris paribus*). The variable of the human development index significantly is one of main sources that influenced the decreasing of development inequality between regions in Riau province with probability value of t-statistic as 0.0034 which is smaller than 0.05. Then at the significance level of 5% or the 95% confidence level, H_0 is rejected and Ha is accepted which means that the human development index variable significantly influences the inequality of development in Riau Province.

The human development index value of each region in Riau Province showed that there is no significant difference from year to year. It indicates no gap in terms of human development in Riau Province. This fact relates to each region's performance that prioritizes the human development in terms of both planning and implementation at the stage of development. Furthermore, high levels of education will boost people of district/city to migrate to the capital of province in order to observe better living. Therefore the high levels of education tend to increase development inequality (*brain drain*) in the regions from which they come.

Another thing that triggered the high value of HDI in some districts/cities is the availability of educational and health facilities that are adequate and easy accessible for society. This condition is synergy with research conducted by Brata (2002) revealing that there is a two way relationship between human development and regional economic development in Indonesia. The quality of human development supports economic development and otherwise good economic performance supports the human development.

Furthermore, Sylwester (2002) said that country concerning with *public education* (educational percentage to GNP) has low level of development inequality. The increasing of education level will improve human resources quality that in turn will impact physical modal and labor worker being more productive. So, both productivity, physical modal and labor worker will increase and later increase the economic growth and decrease the development inequality.

Analyzing factors that influence the inequality of development between regions in Riau Province in 2003-2012 exhibit Human Development Index (HDI) as the factor that significantly decreases the inequality of development, while region specialization and infrastructure significantly increase the development inequality. Based on the results of the analysis, it generates a policy to local governments in order to overcome the inequality of development between regions in Riau Province:

The variable of region specialization significantly encourages the increasing inequality of development. It means that if the higher concentration of economic activity is in a region the inequality of development will continue to increase as happened in Riau Province that specialization region is dominated by the city of Pekanbaru and Dumai, as the centers of activity for each area of development. To overcome that case needs the development of growth centers that spread the development activities. To anticipate inequality can be done by increasing the value of the leading sectors and strengthen linkages between sectors in the respective district/city and the govern-

ment needs to improve regional economic development based on seed resources.

In fact most of the regions in Riau province still rely on oil and gas sectors. Agricultural sector (plantation) is a seeded sector in Riau Province when oil and gas sector was excluded. The agricultural sector is dominated by the plantation which is supported by the results of palm oil and rubber, but some areas such as Kuantan Singingi, Indragiri Hilir and Rokan Hulu are not coordinated in plantation and processing. The government should prioritize the sector and the district and provincial governments are required to cooperate in improving seed resources.

The variable ratio of infrastructure expenditure has significantly effect in increasing inequality of development. The ratio of infrastructure expenditure (RIE) is related to the regional gross domestic product (GDP) and it is used to observe directly and indirectly the impact of public convenience in accessing infrastructure. Thus, if the ratio of infrastructure expenditure is valued, the society directly and indirectly does not have any difficulty in accessing existing infrastructure and vice versa if the RIE is large, the RIE is directly and indirectly difficult to access the infrastructure for society.

In fact, the physical infrastructure such as roads in the district is in low quality and there are villages that are difficult to reach and isolated. This is a challenge for local government to accelerate the development of infrastructure as well as equity sustainably. The better condition and equity will improve the accessing of transportation infrastructure between regions and then will have an impact on improving the interaction patterns and increased investments to support the local economy.

The variable Human Development Index (HDI) has a significant effect on reducing the inequality of development between regions in Riau Province. It can be used as a policy for the government to increase the quality of human resources. The quality of human development would support the economic development and otherwise the good economic performance supports the human development. The human development index value of each region in Riau Province shows no significant difference and tends to flatten. The influence of high HDI value can be seen from the availability of infrastructure, education and health facilities that are adequate and easily accessible by the society. Furthermore, equalization must be accompanied by tendency such as facilities located in urban areas, while rural areas still are lack of the facilities in terms both of physical and human resources.

Conclusion

The inequality of economic development between regions in Riau Province during the period 2003 to 2012 has fluctuated. In 2003 to 2008 there was an increase (divergence) of the figure amounted to 0.0185 and 0.0101. In the next year until the year 2012 it declined (*convergence*) to 0,011. Sources of inequality of development based on analysis of Theil index (*within and between*) for the period 2003-2012 are derived from the inequality between development regions with a percentage of 50-70% of total inequality of development in Riau Province. The results of the regression analysis found a negative effect of human development index or it decreased significantly towards inequality of development. Specialization and ratio of infrastructure expenditure encourage positive effects or they significantly increase the inequality of development between districts/cities in Riau Province. To overcome the problem of inequality in Riau Province, the policy that can be implemented in the following regional planning is improving the regional economic development based on resource-based leading sectors, promoting sustainable infrastructure development and improving the quality of human resources.

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