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## **Decentralization Policy and Equality: A Theil Analysis of Indonesian Income Inequality**

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# **Decentralization Policy and Equality: A Theil Analysis of Indonesian Income Inequality**

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## **Abstract**

The decentralization policy has been implemented for almost 8 years in Indonesia. One of the main purposes of decentralization policy was to increase economic growth followed by equality. In this paper, we construct gini coefficient and Theil indices of sector income distribution to evaluate the trend of Indonesian income inequality during the implementation of the policy. We will analyze the equality between sector and within sector (e.g. agriculture, industry and services) both in the country and province level data. The output of this study is expected could answer the question whether there is a growth with equality during the implementation of decentralization both between and within sector.

**Keywords:** Decentralization, Inequality, Theil indices.

**JEL Categories:** JELCategory1, JELCategory2, JELCategory3, etc., as appropriate

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## **I. INTRODUCTION**

Decentralization (Otonomi Daerah) was first designed after the economic crisis in 1998. The politics and economics of Indonesia were substantially changed from highly centralized government into regional autonomy. Two Laws were designed, Law No. 22/1999 and Law No. 25/1999 as fundamental of decentralization. First, Law No. 22/1999 rules the regional governance which gives regions (districts and municipalities) full autonomy to administer the local people based on the people interest. Second, Law No. 25/1999 rules the fiscal arrangements (Seymour and Turner 2002). In 2004, these 2 laws were revised by Law No.32/2004 and 33/2004. In these new laws, province government is entitled as coordinating institution for the districts and municipalities (Swasono, 2007).

Decentralization is believed could bring the government closer to their people (Work, 2002). Therefore, the government is expected will know the needs of their people better and then will issue better policy. If the mechanisms run on the track, decentralization will improve the regions' economic performance and equality among people.

Concept of decentralization also implies that policy maker should no longer always impose one regulation for all provinces. In some cases, regulation should consider the different condition between provinces. Therefore, it is important to understand the character of each province. The implementation of policy or programs should be adjusted with the specific character of the region.

This study will analyze the trend of Indonesian income inequality during decentralization. Moreover, we will also analyze the source of inequality by analyze the spread of income in the sectors basis. Then, in the last section, we will compare the analysis in the province level with national level data.

This paper is organized as follows. After the introduction, the second section details the method of calculating Gini Coefficient and Theil Inequality Index. Next, the third section presents the overview of regional economic performance after the implementation of decentralization. Section 4 presents Theil inequality to analyze the inequality within and between sectors. Finally, conclusions are finally drawn in Section 5.

## II. DATA AND METHODOLOGY

Data that we used in this study is National Socio-Economic Survey from 2002 up to 2006. Two measures are used in the paper. First, gini coefficient to measure the people income inequality in national level, province level, and then we disaggregate into rural and urban area in both national and province level data. The classical formula of Gini coefficient is

$$Gini = \frac{\sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|}{2n(n-1)\bar{y}} \dots\dots\dots (1)$$

Where  $y_i$  and  $y_j$  are individual income or consumption with a mean of  $\bar{y}$ ,  $n$  is the total number of observations.

Next, we will use fixed effect estimation on panel data to analyze the effect of per-capita income on inequality (measured in gini coefficient). Fixed effect estimation is one of the methods in panel data to eliminate unobserved effect or commonly known as fixed effect ( $a_i$ ). Suppose we have a model with one explanatory variable, hence

$$gini_{it} = \beta_1 pcpin_{it} + a_i + u_{it}, t = 2002, 2003, \dots, 2005 \dots\dots\dots (2)$$

where  $gini_{it}$  is gini coefficient;  $pcpin_{it}$  is per-capita income;  $a_i$  is fixed effect;  $u_{it}$  is error and  $i$  is province. If we take the average of above equation over time, we will have:

$$\overline{gini}_{it} = \beta_1 \overline{pcpin}_{it} + a_i + \bar{u}_{it}, t = 2002, 2003, \dots, 2005 \dots\dots\dots (3)$$

Since  $a_i$  is constant over time, so if we subtract equation (3) from equation (2), we have

$$gini_{it} - \overline{gini}_{it} = \beta_1 (pcpin_{it} - \overline{pcpin}_{it}) + u_{it} - \bar{u}_{it} \dots\dots\dots (4)$$

$$\ddot{G}_{it} = \beta_1 \ddot{I}_{it} + \ddot{u}_{it}, t = 2002, 2003, \dots, 2005 \dots\dots\dots (4)$$

where  $\ddot{G}_{it} = gini_{it} - \overline{gini}_{it}$  and  $\ddot{I}_{it} = pcpin_{it} - \overline{pcpin}_{it}$ . Now the unobserved effect ( $a_i$ ) has disappeared.

This kind of transformation is also known as within transformation.

The second inequality measure in this paper is Theil inequality index to analyze the structural change for the distribution of income between and within various sectors of the economy. The formula of Theil index<sup>3</sup> can be written as

$$T = \sum_i w_y^i \left( (\log w_y^i) - (\log w_e^i) \right) \dots\dots\dots (2)$$

Where  $w_y$  is the percentage share of income;  $w_e$  is the percentage share of employment; and  $i$  is number of sectors.

### III. OVERVIEW OF REGIONAL ECONOMIC PERFORMANCE

After the implementation of decentralization, generally almost all provinces experience positive growth on their PDRB except for Papua. On average, the PDRB growth on almost all provinces increase by 3.49% up to 7.88% with the highest growth existed in Kalimantan Timur and Sulawesi Tenggara.

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<sup>3</sup> The formula is adopted from Frankema and Marks (2005)

**Table 1**  
**PDRB (Non-migas) Growth for period 2003 - 2006**

Province	2003	2004	2005	2006	Average
NANGGROE ACEH DARUSSALAM	3.70	1.76	1.22	9.04	3.93
SUMATERA UTARA	4.94	6.00	5.52	6.24	5.67
SUMATERA BARAT	5.26	5.47	5.73	6.14	5.65
RIAU	8.17	9.01	8.54	8.66	8.59
JAMBI	5.55	6.48	6.25	6.13	6.10
SUMATERA SELATAN	5.74	6.79	6.91	7.31	6.69
BENGKULU	5.37	5.38	5.82	5.95	5.63
LAMPUNG	5.63	5.76	4.61	5.26	5.31
KEP. BANGKA BELITUNG	5.53	4.34	4.66	4.54	4.77
KEP. RIAU		7.42	7.16	7.16	7.24
DKI JAKARTA	5.41	5.70	6.06	5.92	5.77
JAWA BARAT	4.95	5.08	6.25	6.30	5.64
JAWA TENGAH	4.76	4.90	5.00	5.32	4.99
DI YOGYAKARTA	4.58	6.87	3.01	3.69	4.54
JAWA TIMUR	4.78	5.84	5.84	5.79	5.56
BANTEN	5.07	5.63	5.88	5.53	5.53
BALI	3.57	4.62	5.56	5.28	4.76
NUSA TENGGARA BARAT	3.90	6.07	1.79	2.19	3.49
NUSA TENGGARA TIMUR	4.57	4.77	3.42	5.08	4.46
KALIMANTAN BARAT	3.12	4.79	4.69	5.23	4.46
KALIMANTAN TENGAH	4.91	5.56	5.90	5.84	5.55
KALIMANTAN SELATAN	4.57	5.12	5.31	4.83	4.96
KALIMANTAN TIMUR	5.24	7.44	8.07	10.79	7.88
SULAWESI UTARA	3.18	4.26	4.93	6.14	4.63
SULAWESI TENGAH	6.21	7.15	7.19	7.43	7.00
SULAWESI SELATAN	5.25	5.32	-2.35	6.73	3.74
SULAWESI TENGGARA	7.57	7.51	7.31	7.68	7.52
GORONTALO	6.88	6.93	7.19	7.30	7.07
SULAWESI BARAT				6.99	6.99
MALUKU	4.32	4.44	5.08	5.56	4.85
MALUKU UTARA	3.82	4.71	5.10	5.48	4.78
IRIAN JAYA BARAT	7.06	6.29	6.83	7.36	6.88
PAPUA	-0.28	-22.53	36.40	-17.20	-0.91
INDONESIA	5.71	5.95	6.59	6.07	6.08

Generally, the value of gini coefficient fluctuated for almost all provinces and even increased significantly in 2005 compare to 2004. It was raised about 15 percent on average with the largest increase existed in Banten by approximately 44 percent larger than 2004 and made Banten as a province with largest income inequality.

**Table 2**  
**Gini Coefficient for Rural and Urban in period 2002 - 2006**

	2002			2003			2004			2005			2006		
	Kota	Desa	Total	Kota	Desa	Total	Kota	Desa	Total	Kota	Desa	Total	Kota	Desa	Total
NATIONAL	0.34	0.25	0.33	0.32	0.25	0.31	0.32	0.26	0.32	0.37	0.29	0.36	0.35	0.28	0.34
Nanggroe Aceh	0.25		0.25	0.28	0.21	0.28	0.30	0.23	0.28	0.00			0.32	0.26	0.31
Sumatera Utara	0.27	0.23	0.27	0.27	0.27	0.27	0.26	0.24	0.27	0.32	0.27	0.31	0.30	0.24	0.29
Sumatera Barat	0.27	0.24	0.27	0.26	0.15	0.27	0.29	0.24	0.29	0.31	0.29	0.32	0.30	0.28	0.30
Riau	0.30	0.23	0.30	0.27	0.49	0.30	0.29	0.25	0.30	0.33	0.28	0.32	0.31	0.26	0.31
Jambi	0.28	0.23	0.25	0.26	0.13	0.24	0.26	0.22	0.24	0.32	0.28	0.31	0.34	0.26	0.29
Sumatera Selatan	0.30	0.21	0.28	0.26	0.15	0.25	0.26	0.23	0.26	0.31	0.25	0.29	0.34	0.24	0.31
Bengkulu	0.29	0.26	0.30	0.27	0.19	0.27	0.30	0.22	0.29	0.35	0.25	0.31	0.32	0.24	0.29
Lampung	0.31	0.25	0.26	0.32	3.12	0.29	0.30	0.24	0.28	0.41	0.28	0.36	0.31	0.28	0.31
Kep. Bangka Belitung	0.28	0.20	0.41	0.24	0.11	0.24	0.25	0.24	0.26	0.31	0.30	0.31	0.28	0.24	0.27
Kepulauan Riau										0.33	0.29	0.34	0.34	0.24	0.35
DKI Jakarta	0.41		0.30	0.32		0.32	0.37		0.37	0.41		0.41	0.40		0.40
Jawa Barat	0.31	0.23	0.29	0.30	0.74	0.30	0.31	0.24	0.30	0.35	0.27	0.35	0.33	0.27	0.34
Jawa Tengah	0.30	0.24	0.38	0.28	0.25	0.27	0.28	0.23	0.28	0.31	0.26	0.31	0.30	0.25	0.30
D I Yogyakarta	0.39	0.27	0.31	0.35	0.19	0.35	0.38	0.26	0.38	0.39	0.30	0.41	0.36	0.29	0.37
Jawa Timur	0.32	0.25	0.32	0.29	0.26	0.28	0.29	0.24	0.30	0.35	0.27	0.34	0.32	0.27	0.32
Banten	0.30	0.22	0.29	0.30	0.23	0.31	0.28	0.22	0.30	0.45	0.24	0.43	0.31	0.26	0.33
Bali	0.30	0.24	0.29	0.28	0.27	0.27	0.27	0.23	0.27	0.33	0.27	0.32	0.32	0.27	0.32
Nusa Tenggara Barat	0.30	0.25	0.28	0.30	0.19	0.28	0.30	0.26	0.28	0.35	0.28	0.33	0.33	0.28	0.32
Nusa Tenggara Timur	0.28	0.23	0.31	0.26	0.19	0.26	0.29	0.24	0.29	0.36	0.28	0.34	0.36	0.27	0.34
Kalimantan Barat	0.33	0.24	0.26	0.31	0.16	0.29	0.30	0.24	0.30	0.33	0.26	0.32	0.31	0.26	0.30
Kalimantan Tengah	0.27	0.24	0.30	0.24	0.22	0.24	0.26	0.23	0.26	0.30	0.24	0.27	0.28	0.23	0.26
Kalimantan Selatan	0.29	0.26	0.32	0.30	0.12	0.29	0.28	0.25	0.29	0.32	0.29	0.32	0.32	0.26	0.32
Kalimantan Timur	0.31	0.24	0.28	0.32	0.21	0.31	0.35	0.30	0.34	0.35	0.31	0.35	0.35	0.28	0.35
Sulawesi Utara	0.26	0.26	0.29	0.29	0.52	0.30	0.24	0.22	0.26	0.30	0.31	0.32	0.28	0.26	0.29
Sulawesi Tengah	0.34	0.25	0.27	0.29	0.22	0.26	0.29	0.27	0.29	0.31	0.28	0.31	0.37	0.28	0.34
Sulawesi Selatan	0.28	0.23	0.28	0.28	1.22	0.26	0.30	0.24	0.28	0.35	0.27	0.32	0.32	0.27	0.32
Sulawesi Tenggara	0.27	0.25	0.24	0.28	0.21	0.27	0.27	0.25	0.28	0.32	0.30	0.32	0.33	0.27	0.31
Gorontalo	0.25	0.23	0.22	0.26	0.17	0.30	0.27	0.27	0.31	0.38	0.31	0.36	0.31	0.29	0.32
Sulawesi Barat													0.29	0.31	0.31
Maluku	0.23	0.20	0.23	0.22	0.14	0.24	0.22	0.22	0.25	0.30	0.26	0.29	0.27	0.25	0.29
Maluku Utara	0.22	0.20	0.22	0.27	0.12	0.28	0.20	0.21	0.27	0.31	0.26	0.32	0.27	0.23	0.29
Irian Jaya Barat													0.26	0.25	0.29
Papua	0.23	0.23	0.23	0.26	0.17	0.34	0.26	0.31	0.32	0.33	0.36	0.41	0.29	0.31	0.36

The income inequality level has not much improved after the implementation of the decentralization. Since the first year in which the policy took place, instead of having lower income inequality level, gini coefficient fluctuated and even rose substantially in 2005. This might be occurred because local government did not have good coordination with central government. The local busied with their income generating activity and cause national program such as poverty alleviation program left behind. Moreover, the increasing oil price was also indicated as one of the main reasons of the significant rising gini coefficient in 2005.

Now, we will use fixed effect estimation to analyze whether the inequality is affected by income. In the model estimation, we use the cross section weights and white heteroskedasticity term in order to eliminate the heteroskedasticity problem. Table 3 suggests that income per-capita is statistically significantly at 1 percent significance level. The sign and magnitude of PCPIN coefficient means that 1 percent changes in the per-capita income is expected to change

inequality (measured in gini coefficient) by 0.7 percent in the same direction. This condition implies that Indonesia is still in the early stage of development following the concept of Kuznets' inverted U-curve (Ogwang, 1995).

**Table 3**  
**Fixed Effect Estimation**

Dependent Variable: GINI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PCPIN	0.763251	0.206436	3.697277	0.0003
Weighted Statistics				
R-squared	0.615134	Mean dependent var		-1.619292
Adjusted R-squared	0.517286	S.D. dependent var		0.629027
S.E. of regression	0.103888	Sum squared resid		1.273542
F-statistic	6.286663	Durbin-Watson stat		2.181139
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.575957	Mean dependent var		-1.211685
Sum squared resid	1.403181	Durbin-Watson stat		1.902033

#### IV. INEQUALITY ANALYSIS

In this chapter, we will analyze the source of inequality by using Theil inequality indices. We will only focus on provinces with the most severe inequality during 5 years analysis. The method that we use to choose the provinces is simple by choosing the provinces that dominantly appear as 7 provinces with highest gini coefficient during 2002 up to 2006.

If we take out provinces that are always in the 7 provinces with highest gini coefficient at least for four years period, we will have DI Yogyakarta, DKI Jakarta, Kalimantan Timur and Papua. DI Yogyakarta and DKI Jakarta represented west region of Indonesia and Kalimantan Timur and



Papua represented east region of Indonesia. Within 7 provinces with highest gini coefficient, west region of Indonesia was more dominant than east one with the constant comparison 4 : 3.

**Table 4**  
7 provinces with highest gini coefficient for period 2002 - 2006

Rank	2002	2003	2004	2005	2006
1	Bangka Belitung	DI Yogyakarta	DI Yogyakarta	Banten	DKI Jakarta
2	Jawa Tengah	Papua	DKI Jakarta	DI Yogyakarta	DI Yogyakarta
3	Jawa Timur	DKI Jakarta	Kalimantan Timur	Papua	Papua
4	Kalimantan Selatan	Kalimantan Timur	Papua	DKI Jakarta	Kepulauan Riau
5	Nusa Tenggara Timur	Banten	Gorontalo	Gorontalo	Kalimantan Timur
6	DI Yogyakarta	Sulawesi Utara	Jawa Barat	Lampung	Jawa Barat
7	DKI Jakarta	Jawa Barat	Banten	Kalimantan Timur	Nusa Tenggara Timur

In the more specific analysis, Table 5 shows that the income inequality in urban worse than rural for all period, except for Papua. This condition also occurred in many other provinces and national level data. It might be due to the natural centralization of economic activity that is usually in the city (urban). People prefer to move and try to find a job in the city since there are many types of jobs served by the city both skilled and unskilled. As a result, the city crowded with migrants and those who are not lucky enough would stay in slum area and create poverty problem in the city.

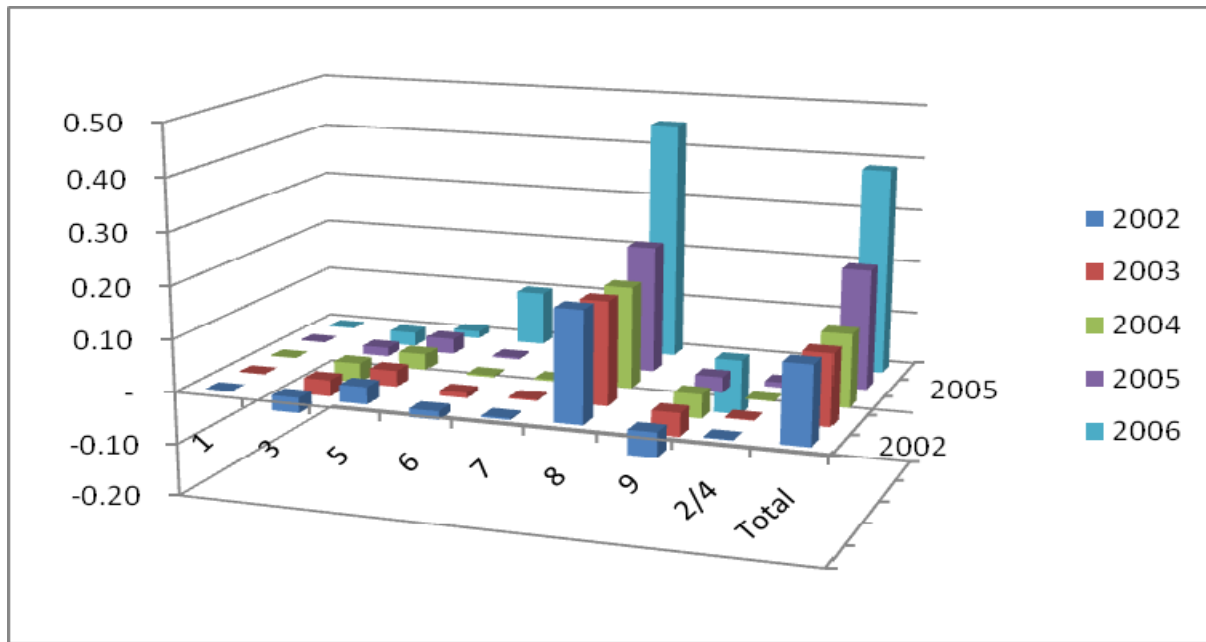
**Table 5**  
Urban and rural gini coefficient for period 2002 - 2006

	2002		2003		2004		2005		2006	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
DKI Jakarta	0.41		0.32		0.37		0.41		0.40	
DI Yogyakarta	0.39	0.27	0.35	0.19	0.38	0.26	0.39	0.30	0.36	0.29
Kalimantan Timur	0.31	0.24	0.32	0.21	0.35	0.30	0.35	0.31	0.35	0.28
Papua	0.23	0.23	0.26	0.17	0.26	0.31	0.33	0.36	0.29	0.31

Next, we will use their index to analyze the source of inequality in four provinces with highest gini coefficient at least for four years period (2002-2006). We divided sectors into 9 groups i.e. Agriculture, Fishery and Forestry; Manufacture; Construction; Trade, Hotel and Restaurant,

Transportation and Communication; Banking and Real Estate; Services; Mining, Electricity, Gas and Oil.

**DKI JAKARTA**



- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1 Agriculture, Fishery and Forestry | 7 Transportation and Communication   |
| 3 Manufacture                       | 8 Banking and Real Estate            |
| 5 Construction                      | 9 Services                           |
| 6 Trade, Hotel and Restaurant       | 2/4 Mining, electricity, gas and oil |

**Figure 1**  
**Theil Inequality Index for DKI Jakarta**

Figure 1 shows that the highest inequality for all period is in banking and real estate sector. In this sector, the value of Theil index is almost double in 2006 compare to 2005. In this sector, high inequality occurred due to the structure of the sector itself. It is not only commercial bank that included in Banking and Real Estate sector, but also microfinance (e.g. Bank Perkreditan Rakyat/BPR) and non-bank financial institution.

Sector with the second largest inequality in 2006, was Trade, Hotel and Restaurant sector in which the value of Theil index has increased dramatically about ten times larger than the

previous year. Here, the large inequality occurred because in trade sector, informal sector was more dominant than formal sector.

Two sectors that are mentioned above were essential sector for DKI Jakarta. Banking and real estate sector contributed more than 30 percent to total PDRB DKI Jakarta and become the largest sector for period 2002 - 2005 and Trade, Hotel and Restaurant sector contributes about 26 percent to total PDRB DKI Jakarta.

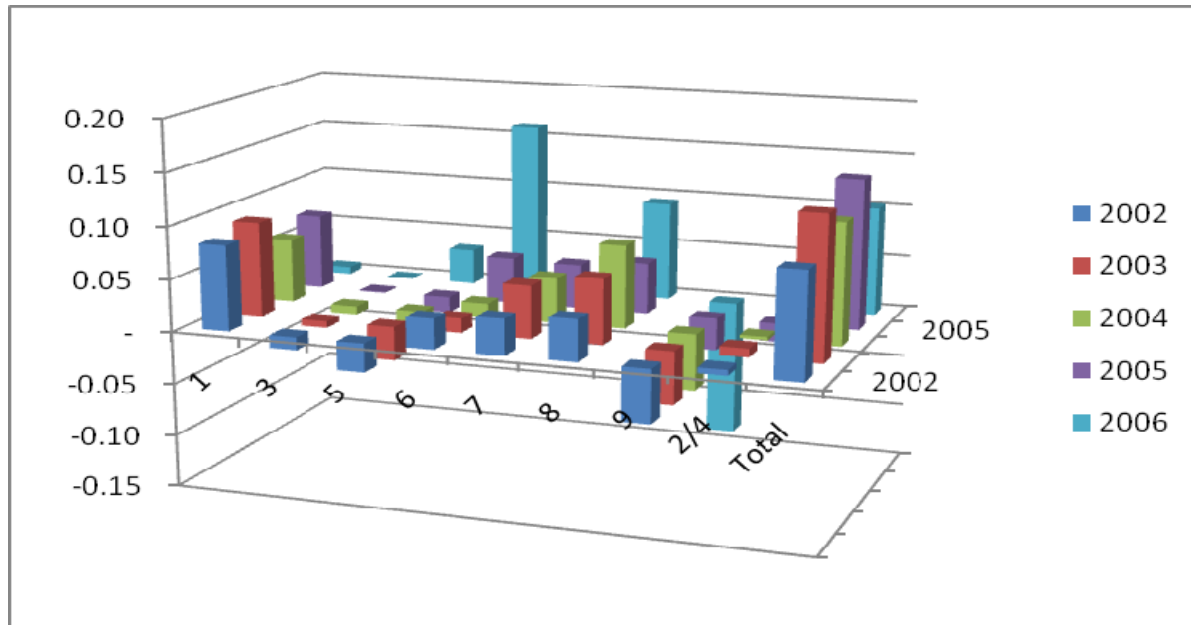
On the contrary, Services sector has consistently negative their index in all period and even worse in 2006 in which its value rose almost four times larger than the previous year. According to the formula, their index will negative if the percentage share of employment larger than percentage share of sector's output. In other words, it implied the low productivity of labor in services sector. Table 5 shows the evidence of this problem. Even the labor productivity in services sector was not the lowest one since 2004, but its value is relatively very small compare to other sectors. It was accounted one tenth smaller than the sector with the highest labor productivity.

Between sectors Their shows worse inequality between sector and inequality increased significantly after 2004. It was dominantly contributed by Banking and Real Estate sector. After that in 2006 Trade, Hotel and Restaurant sector made the inequality worse relative to the previous year.

**Table 6**  
**Labor Productivity for DKI Jakarta**

Sector	2002	2003	2004	2005	2006
Agriculture, Fishery and Forestry	108.9	64.4	32.3	34.3	24.0
Manufacture	74.5	76.1	71.4	79.4	94.7
Construction	228.3	228.9	235.6	196.7	239.4
Trade, Hotel and Restaurant	91.4	103.1	112.5	103.4	112.5
Transportation and Communication	97.2	104.5	128.5	139.1	148.7
Banking and Real Estate	479.5	467.0	471.5	592.9	377.3
Services	44.5	48.1	47.6	54.3	45.2
Mining, electricity, gas and oil	73.8	70.9	86.4	3.3	83.7
Total	108.9	115.0	116.6	99.6	121.8

**DI YOGYAKARTA**



- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1 Agriculture, Fishery and Forestry | 7 Transportation and Communication   |
| 3 Manufacture                       | 8 Banking and Real Estate            |
| 5 Construction                      | 9 Services                           |
| 6 Trade, Hotel and Restaurant       | 2/4 Mining, electricity, gas and oil |

**Figure 2**  
**Theil Inequality Index for DI Yogyakarta**

In DI Yogyakarta, we can identify four important sectors in term of inequality based on their index value. These four sectors are Agriculture, Fishery and Forestry; Trade, Hotel and Restaurant, Transportation and Communication; Banking and Real Estate. However, we can exclude Agriculture, Fishery and Forestry and Transportation and Communication because in

2006, the theil index values for these two sectors shrink significantly. As a result, two sectors that have high theil index are almost similar with the sectors in DKI Jakarta. These empirical findings imply that the inequality problem in DKI Jakarta and DI Yogyakarta is almost similar and the reason of large inequality in both sectors is also the same.

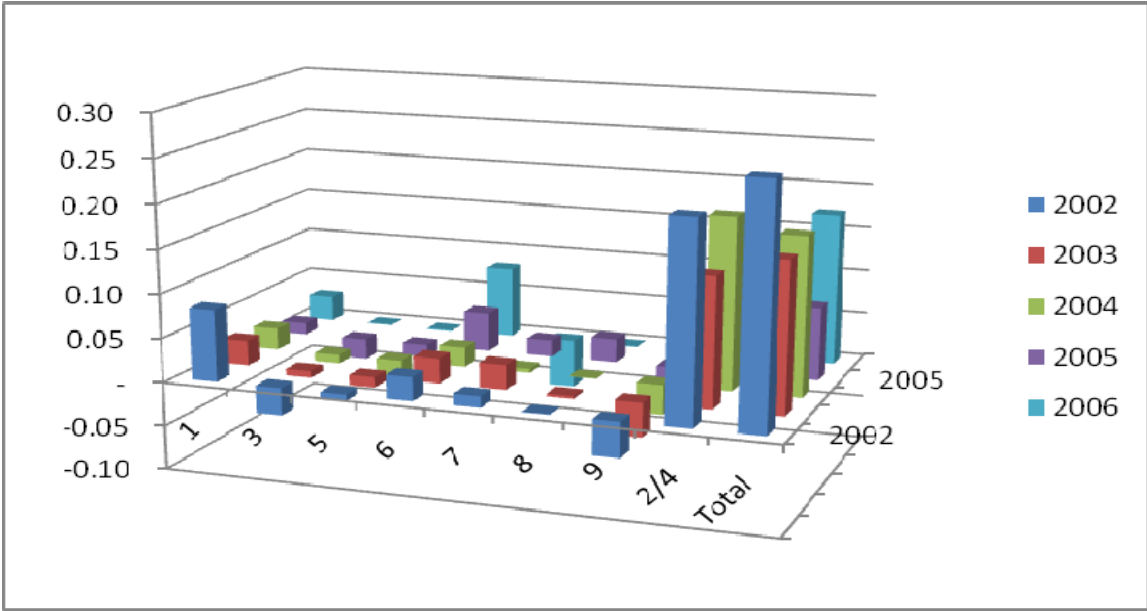
Similar with DKI Jakarta, the theil index for services sector is also consistently negative and also increased substantially in 2006 by more than four times larger relative to 2005. Table 7 shows the low labor productivity for services. Indeed, it was not the lowest one but again, the value was significantly small.

**Table 7**  
**Labor Productivity for DI Yogyakarta**

Sector	2002	2003	2004	2005	2006
<b>Agriculture, Fishery and Forestry</b>	59.6	80.8	56.2	49.3	90.2
<b>Manufacture</b>	19.4	24.8	23.3	20.1	23.3
<b>Construction</b>	9.6	10.4	13.4	13.3	12.6
<b>Trade, Hotel and Restaurant</b>	32.4	31.9	30.8	33.5	26.7
<b>Transportation and Communication</b>	55.5	93.9	63.4	54.5	63.6
<b>Banking and Real Estate</b>	64.0	128.8	194.0	65.6	41.6
<b>Services</b>	12.1	14.0	12.7	13.4	12.1
<b>Mining, electricity, gas and oil</b>	47.1	87.2	41.0	1.7	33.8
<b>Total</b>	23.2	27.3	26.4	20.4	24.3

### **KALIMANTAN TIMUR**

In the next two provinces, Kalimantan Timur and Papua, the structure of economy were different compare to the previous two provinces. The sector with the highest contribution to the both Kalimantan Timur and Papua PDRB was Mining, Electricity, and Gas.



- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1 Agriculture, Fishery and Forestry | 7 Transportation and Communication   |
| 3 Manufacture                       | 8 Banking and Real Estate            |
| 5 Construction                      | 9 Services                           |
| 6 Trade, Hotel and Restaurant       | 2/4 Mining, electricity, gas and oil |

**Figure 3**  
**Theil Inequality Index for Kalimantan Timur**

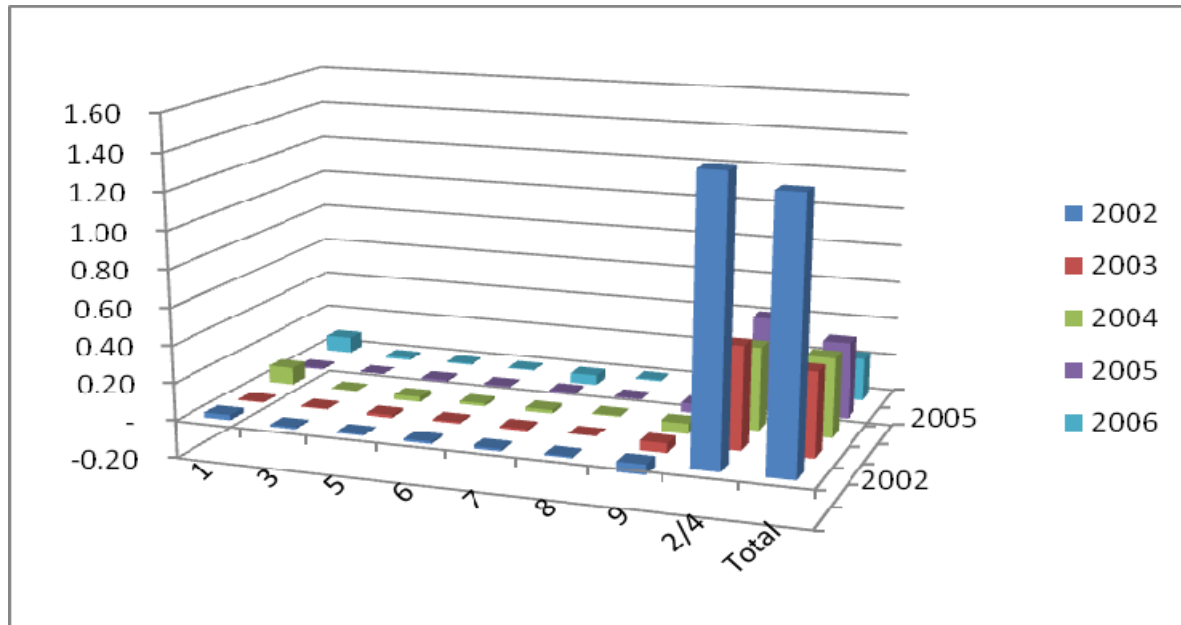
In Kalimantan Timur, 3 sectors that have large inequality are Mining, Electricity, and Gas; Trade, Hotel and Restaurant; and Agriculture, Fishery and Forestry. Mining, Electricity, and Gas is the most important sector in term of their contribution to PDRB (more than half of PDRB comes from this sector).

The similarity between Kalimantan Timur and the previous two provinces (DKI Jakarta and DI Yogyakarta) was in the services sector. The service sector in Kalimantan Timur is also consistently negative. The low labor productivity was again the cause of the negative value. Table 3.5 shows the substantially low productivity in services sector. It was only one fifth than the sector with the second lowest labor productivity.

**Table 8**  
**Labor Productivity for Kalimantan Timur**

Sector	2002	2003	2004	2005	2006
Agriculture, Fishery and Forestry	195.0	116.7	112.7	83.9	124.5
Manufacture	36.8	68.2	64.6	42.2	89.0
Construction	50.8	51.9	34.6	41.6	52.3
Trade, Hotel and Restaurant	95.9	119.7	108.6	131.4	136.1
Transportation and Communication	89.1	157.0	86.9	105.2	104.9
Banking and Real Estate	66.3	68.4	80.2	227.8	57.2
Services	7.7	10.1	12.0	14.6	12.9
Mining, electricity, gas and oil	367.6	236.1	323.5	91.8	198.2
Total	64.5	78.4	78.2	67.9	89.1

**PAPUA**



- |                                     |                                      |
|-------------------------------------|--------------------------------------|
| 1 Agriculture, Fishery and Forestry | 7 Transportation and Communication   |
| 3 Manufacture                       | 8 Banking and Real Estate            |
| 5 Construction                      | 9 Services                           |
| 6 Trade, Hotel and Restaurant       | 2/4 Mining, electricity, gas and oil |

**Figure 4**  
**Theil Inequality Index for Papua**

The last province in our analysis is Papua. Geographically, Papua is in the Eastern Region of Indonesia and mining is the most dominant economic activity in the province. The contribution of the Mining, Electricity, and Gas sector is accounted more than half of its PDRB. Figure 4 shows the theil index for nine sectors in Papua. The most significant sector was Mining,

Electricity, and Gas sector that has Theil index about 1.46 in 2002 and then decreased significantly to 0.30 in 2006.

The between sectors Theil have the similar trend with Mining, Electricity, and Gas sector. It was really high in 2002 and then dropped significantly in the year after and reach the lowest level in 2006.

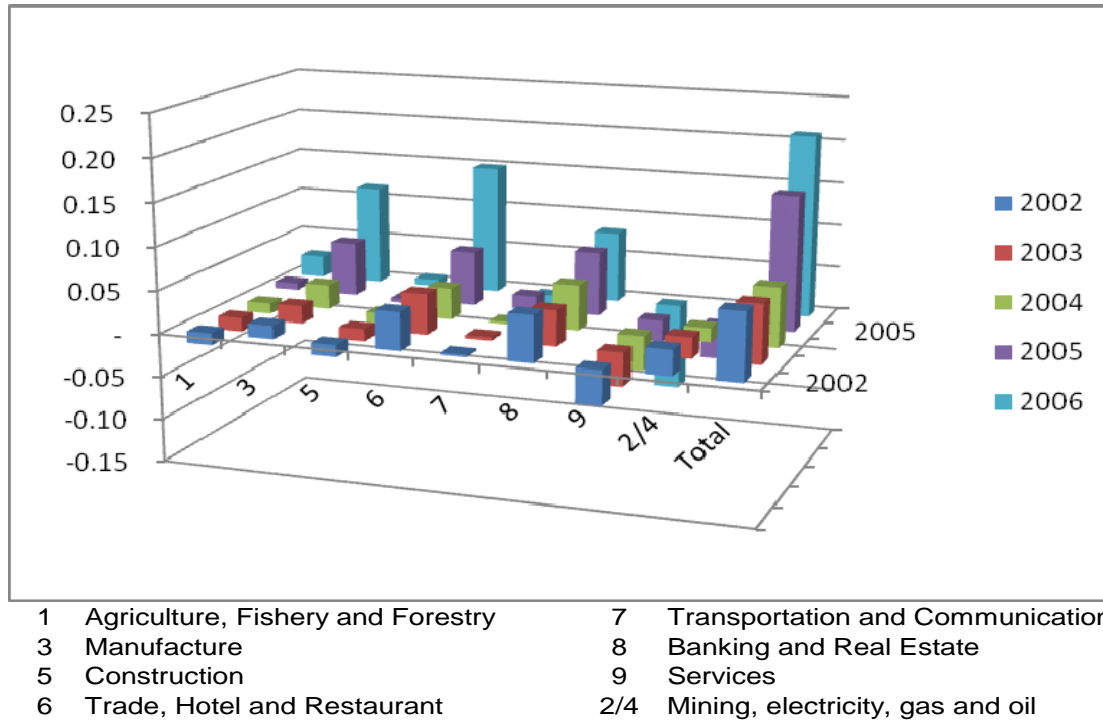
Five sectors experienced consistently negative theil index, i.e. Manufacture; Construction; Trade, Hotel and Restaurant; Transportation and Communication; and Services. All these sectors have lower productivity compare to other three sectors and the lowest labor productivity was occurred in services.

**Table 9**  
**Labor Productivity for Papua**

Sector	2002	2003	2004	2005	2006
<b>Agriculture, Fishery and Forestry</b>	193.8	124.8	306.5	79.0	390.1
<b>Manufacture</b>	32.0	77.4	76.3	75.7	54.1
<b>Construction</b>	75.1	51.5	28.7	50.4	65.5
<b>Trade, Hotel and Restaurant</b>	56.3	81.3	49.3	66.4	135.0
<b>Transportation and Communication</b>	42.6	64.2	37.2	48.0	102.3
<b>Banking and Real Estate</b>	13.5	121.4	261.6	28.3	124.5
<b>Services</b>	11.6	15.9	16.3	10.9	22.0
<b>Mining, electricity, gas and oil</b>	16307.9	866.5	584.3	534.1	8743.1
<b>Total</b>	119.7	134.4	92.9	90.9	160.0



**National Level Versus Province Level**



**Figure 5**  
**Theil Inequality Index for National Level**

If we calculate Theil Inequality Index in the national data level, sectors that have large inequality are manufacture; Trade, Hotel and Restaurant; Banking and Real Estate. This looks consistent with DKI Jakarta and DI Yogyakarta condition. However, if we compare it with Kalimantan Timur and Papua, we will have completely different result. In these two provinces, Mining, Electricity and Gas sector was the most substantial sector in term of inequality.

**Table 10**  
**Labor Productivity for National Level**

Sector	2002	2003	2004	2005	2006
<b>Agriculture, Fishery and Forestry</b>	33.8	36.1	37.7	36.9	33.3
<b>Manufacture</b>	46.2	53.4	56.6	55.4	61.0
<b>Construction</b>	24.5	26.7	25.7	27.6	28.7
<b>Trade, Hotel and Restaurant</b>	71.0	81.8	71.4	72.8	73.2
<b>Transportation and Communication</b>	45.2	52.1	49.5	56.8	61.4
<b>Banking and Real Estate</b>	142.7	117.2	148.9	178.4	147.8
<b>Services</b>	16.6	18.7	18.2	18.6	18.2
<b>Mining, electricity, gas and oil</b>	141.7	128.0	96.4	5.4	120.0
<b>Total</b>	40.6	44.9	44.8	32.8	46.0

One sector that consistent both in national level and province level data is services which has negative Theil index. Again, it might be caused by the low labor productivity in services sector. The labor Productivity in services sector was below 19 in all period and made services sector as the sector with lowest labor productivity.

## **V. CONCLUSION**

To sum up, during decentralization implementation, almost all provinces have positive growth except Papua in the period 2003 up to 2006. However, decentralization did not help much on the income inequality. Gini coefficient analysis give us evidence that during the decentralization, gini coefficient fluctuated and even rose substantially in 2005 both in national level and province level.

Four Provinces that have severe inequality in terms of gini coefficient for the period 2002 up to 2005 are DKI Jakarta, DI Yogyakarta, Kalimantan Timur and Papua. These provinces represent both West region and East Region of Indonesia. In more specific analysis, inequality level in urban is always bigger than rural in these four provinces. The similar trend is also existed in national level data.

DKI Jakarta and DI Yogyakarta have similar characteristic in term of Theil Inequality index in which Trade, Hotel and Restaurant sector and Banking and Real Estate sector have the largest inequality. Meanwhile, in Kalimantan Timur and Papua, Mining, Electricity and Gas was the most substantial sector in term of inequality. One sector that looks consistent in all four provinces was services sector; Theil inequality index for service sector was always negative.

If we measure Theil Inequality index in national level data, the results cannot capture the difference between West and East region of Indonesia. In national level data, the inequality problem is only identified in Trade, Hotel and Restaurant sector; Banking and Real Estate sector. These means the policy that are based on national level data might be not suitable for East region which are represented by Kalimantan Timur and Papua.

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