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INCOME INEQUALITY IN INDONESIA: WHICH ASPECTS CAUSE THE MOST?

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ABSTRACT

Introduction/Main Objectives: This study discusses the three main aspects of inequality: the level of education attained, urban-rural area, and gender. **Background Problems:** Inequality is one of the fundamental economic problems in Indonesia that has the potential to cause the non-optimal distribution of resources, economic instability, and may even lead to an economic crisis. **Novelty:** This study provide a new perspective on the differences in findings for the aspects of gender, education, and geographic factors on income inequality **Research Methods:** This study uses the Theil index for decomposition analysis and quantile regression analysis to analyze each class of income, particularly in the context of income inequality factors. **Finding/Results:** The findings show that, male workers in the lower class have a greater income than female workers. In addition, workers with an elementary school level experience higher inequality than workers with other levels of education do. Moreover, higher inequality occurs for urban workers in both the upper and lower classes, compared to workers in rural areas. From quantile regression analysis, the results show that, income inequality between men and women is reducing. The number of completed years has less influence compared to that in earlier periods, because more and more people enter education to increase their income. Lastly, urban workers have different incomes from rural workers, though the gap is reducing. It means both urban and rural workers have greater opportunities to earn a better income. **Conclusion:** Gender plays an important role in income inequality. The length of education has constantly affected income inequality as well. In the context of the area, urban workers normally have higher incomes.

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INTRODUCTION

The fundamental economic problem faced by Indonesia today is inequality, which causes the non-optimal distribution of resources, economic instability, and may even lead to an economic crisis (See Bordo & Meissner, 2012; Kumhof & Rancière, 2011). Wahyuni (2004) also found that all socio-economic variables i.e. expenditure per capita, the school enrollment ratio, average household size, population density, percentage of poor people, and revenue per capita contribute to the persistent inequality of the resources' distribution during the economic crisis. Several countries have managed to reduce economic inequality, including countries in East Asia and South Asia, as well as some industrialized countries. On the other hand, Indonesia is experiencing an increase in inequality.

This situation indicates that such wealth measures as income and consumption are concentrated with only a few people. The World Bank, in "Indonesia's Rising Divide," reported that Indonesia's level of inequality has been rising, with consumption of the richest 10% of Indonesians being equivalent to the consumption of the poorest 40% in 2002. This condition was even worse in 2014 as the same percentage equaled that of the poorest 54% of Indonesians.

The Indonesian government seeks to reduce inequality through various social assistance programs, particularly education and healthcare. The funding for such programs covers 25% of the state budget (APBN), or IDR 462 trillion. This study discusses urban inequality, in which the urban population is the key factor. Indonesia saw enormous urban population growth from 15% in 1960 to 54% in 2015. This study discusses the three main aspects of inequality: the highest level of education attained, urban-rural area, and gender. However, some of the preliminary findings, especially those concerning employment characteristics, are based on the statistical reports available in Indonesia.

From 2014 to 2016, the highest education level attained by most Indonesian workers was still the elementary school level. In 2016, the highest level of 59% of the workers was elementary school, while only 12% completed a high school education. Considering that situation, since June 2015, the Government of Indonesia has targeted a 12-year basic education program as the main goal for its national education program. By using the School Operational Assistance Program (BOS-Bantuan Operasional Sekolah) the government wants to ensure that all Indonesian citizens attain the junior high school level free of charge. By implementing the BOS program, the Goverment of Indonesia has set a target to achieve approximately 100% junior high school gross enrolment rate, or approximately 80% for the net enrolment rate (Sulistyaningrum, 2016).

The importance of education has been discussed previously. Reza and Widodo (2013) said that education for workers can increase economic growth. They found that a 1% increase in average education per worker will lead to about 1.56% increase in output. In line with Reza and Widodo, Hendajany et.al (2016) said that education is believed as the main source which affects a person's income, since education directly increases the productivity of a person. Regarding income, workers with a university education earn five times more money than those with an elementary school level education. Kharisma & Saleh (2013) said that the dispersion of income during the period from 1984 to 2008 generally fluctuated. This was caused by economic shocks such as the 1997 economic crisis, the Bali bombing, and a 2006 Yogyakarta big earthquake.

In relation to urban and rural areas, the income among workers is also different. Even in

2000, the regional disparity in rural areas explains about 6% of the income inequality (Wicaksono et al., 2017). A previous study by Suryadarma et al. (2006) also found systematic inequality between urban and rural areas by looking at the dimensions of income and consumption. They found that inequality in both areas increased between 2002 and 2004. However, the increase in income inequality was much greater in urban areas than in rural areas. Wahyuni (2004) also found that the Asian financial crisis in 1997 also afflicted most urban areas in various regions, and especially in Bali and Sumatra. The result was job losses in manufacturing industries. However, as people's skills, used in manufacturing industries, could not be applied in rural areas, this caused the income inequality to grow. The author uses IFLS data from waves 1 to 5, which capture workers' wages by their first and secondary types of work. In this study, income adjusts to the characteristics in the survey data, which show that variable income is a proxy for wages.

Attribution to gender is given great attention in this study. Despite the increase in male and female incomes, the nominal and real income differentials have been increasing instead of decreasing. This shows that unfair remuneration remains between men and women. Using the February 2020 Labor Force Survey, Chatani (2020) reports that gender pay gaps in Indonesia show that women earn 23% less than men on average. This could be due to their educational attainment and men dominating the high-paying jobs.

These three factors have been discussed in several past studies on income inequality. Several discussions on gender and income inequality have been carried out in case studies of developed or developing countries (Blackaby et al., 1997; Blau & Kahn, 2000; Wrochlich & Zucco, 2017; Olivetti & Petrongolo, 2008). For the factor of educational attainment, some arguments support the idea of the higher the education of workers, the less income inequality there is in society (O'Neill, 1995; Chu, 2000; Lemieux, 2006; Lin, 2007; Chongvilaivan & Jungsuk, 2016), but there have also been old discussions mentioning that education does not have a big influence in reducing income inequality (see Juhn et al., 1993).

As for geographic locations that indicate urban or rural areas, discussions on this topic mostly show that a large income inequality is generally caused by the income inequality between urban and rural areas (Yang, 1999; Fritzen & Brassard, 2005; Sicular et al., 2007). Most of the literature that specifically discusses these three main factors uses old data, especially for case studies in Indonesia, which are still limited. In addition, this study uses a longer period of analysis, which is from survey in 1993, 1997, 2000, 2007, and 2014. With such a period, this present study can enrich the empirical research, particularly the longitudinal studies. In addition, based on the empirical evidence from the finding, an affirmative action policy can be created to reduce inequality within groups. Following the United Nation Development Program (2013), affirmative action policies have been proven to reduce inequality within groups in such countries as India and South Africa. Based on this background, the research questions are: 1) How income inequality is decomposed according to the three aspects? 2) What are the characteristics of income inequality in Indonesia. Considering the analysis, this study aims to break down the income distribution issue and conduct in-depth research into urban inequality using the Theil index for the decomposition analysis, and quantile regression to analyze each class of income in the context of the inequality factors.

LITERATURE REVIEW

1. Income Distribution and Income Inequality

An analysis of income distribution may include two sides: National income or an aggregate measure and individuals or workers. In such an analysis, income is distributed based on (1) the consumer, (2) the type of industry, and (3) the type of payment. The analysis would then shift onto the labor factors, with productivity and the return rate of skills being the determinants of income distribution.

Individually or in terms of workers, the two main factors contributing to a discrepancy in earnings in the labor market are differences in productivity and the rate of return of skills (Borjas, 2013). If productivity differs among workers, their income distribution will also vary. On the other hand, if the return rate for skills increases, there will be an income gap between higher skilled and unskilled workers.

The trend of income distribution has been evolving. Becker (1994) analyzed income distribution within the human capital framework. This model shows that the accumulation of human capital is unique to a worker, resulting in a relatively distinct income. This condition is caused by demand and supply for the investment in human capital development. In addition, approaches to analyzing income distribution include (1) egalitarianism and (2) elitism.

The egalitarian approach assumes that the demand for human capital investment is the same, and inequality comes from the supply side. Therefore, everyone has the same opportunity to benefit from human capital investment. Becker (1994) also added that the opportunity gap could be caused by differences in the fund that the workers own.

In contrast, the elite approach to human capital assumes that the same supply conditions exist among workers, and the cause of inequality is the demand. Thus, the determinant of human capital is the workers themselves. When workers want to develop their human capital, the investment and rate of return of each worker will increase. Ultimately, the outcome or income of the worker will also rise.

According to Borjas (2013), income inequality exists worldwide, and instead of being symmetrical, the shape of income distribution is positively skewed. This implies that the income distribution has a mean which is more than the median. Economically speaking, this means that most of the population is in the normal or low-income group rather than in the high-income group. Several studies of human capital use this form of skewness due to its capability to explain income inequality among workers (see Hartog & Vijverberg, 2007; Berkhout & Webbink, 2010).

On the other hand, the unequal distribution of income will lead to income inequality, which is mainly caused by the differences in the contributions made by workers toward company output, as stated in the human capital theory, as well as due to trading channels and industrial policy (Piketty, 2015; Bourguignon, 2015).

The first cause in the human capital theory is related to the contributions of the workers in the company. Such a contribution is generated by workers' distinct characteristics (educational attainment, gender, and skills). These differences result in productive and non-productive workers. Consequently, productivity becomes the basis of income inequality (Borjas, 2013). Furthermore, in terms of demand, the need for skilled labor has been increasing, leading to a greater gap in incomes between one region and another. The increasing demand for skilled labor encourages unskilled labor in rural areas to move to urban areas, seeking a more viable life and work. This migration has reduced income inequality in America (Piketty, 2015).

One of the causes of the demand for skilled labor is the developing methods of production, one of which is when some industries substitute machines for labor, a process known as mechanization. This indicates that even technological change can become one of the reasons for an increase in the demand for skilled labor (Acemoglu, 2002).

In the human capital theory, income inequality is also affected by the skill-biased factor. This theory suggests that unemployment will grow in areas with low-ability workers, without an increase in income inequality. Research using such a theory was extensively carried out during the period from 1980 to 2000. The skills of workers can be replaced by the ever-growing technology. In this context, the supply of skilled labor in America changed due to the composition of labor, including technology (Acemoglu, 1999).

Another cause of inequality is globalization, which is closely related to trading channels and a company's consideration when determining salaries. According to Bourguignon (2015), competition between industries within a country encourages the government to deregulate and liberalize more frequently in developed countries. The massive privatization of state-owned enterprises occurred in 1970 along with the issuance of pro-trade regulations.

Such a cause is coupled with the concept of the supply chain management in a company. This concept emphasizes the added value of a product. Therefore, companies should reduce costs to a minimum, including their labor costs, which can be achieved by subcontracting or outsourcing. This policy makes workers vulnerable to the risk of being laid off (Piketty, 2015).

On the other hand, different policies between companies become important factors in the income inequality among workers (Akerman, 2013). These include differences in the number of workers and types of companies, such as capital-intensive or labor-intensive. Owing to trade liberalization, income inequality among workers has been increasing, as competition forces companies to reduce prices to a minimum, thus sacrificing the salaries of the workers.

2. Previous Studies

This study focuses mainly on comparing three income inequality aspects: gender, educational attainment, and urban-rural areas. These three aspects make it possible to see each of the roles in inequality in society. For instance, income inequality between men and women is caused by factors such as individual characteristics and gender. The wage received by an individual can be considered as the sum of several elements: An element determined by the degree of career advancement, one related to gender and an element specific to the individual (Chantreuil & Lebon, 2015).

There are several discussions and different findings regarding gender income inequality from time to time. Blackaby et al. (1997) show that income inequality among male workers is relatively lower than among female workers. On the other hand, Blau and Kahn's (2000) research describes the sources of income inequality. Some of the factors which helped to reduce income inequality in America were the workers' skills and minimum sex discrimination.

In addition, diversity among industries has led to higher incomes for males and females. Wrochlich and Zucco (2017) find that gender is essential in shaping income inequality. Using a German case study, it was found that the median earnings in female-dominated occupations are lower than those in male-dominated professions. This can be the reason for differences and widen the income inequality between genders. Olivetti and Petrongolo's (2008) study shows that

income inequality has decreased in some regions, such as the United States, England, and Northern Europe. Olivetti and Petrongolo's (2008) findings also note that the gender pay gap across countries negatively correlates with the gender employment gap. On average, women have greater employment opportunities than men, but getting a higher income is still limited.

In addition to the gender factor in employment, educational attainment is also an aspect that affects income inequality. Lemieux (2006) researched education attainment factors, concluding that ability, education, and experience affect income levels, particularly when the research is differentiated based on education levels in the society. A study of education-related inequality in Indonesia was performed by Chongvilaivan and Jungsuk (2016), and shows income distribution in relation to the educational attainment of workers. There were seven levels of education, ranging from elementary school to university. The results show that education made a 13% contribution to income inequality in Indonesia.

In developed countries, higher education levels help reduce income inequality among people or different income classes. Lin (2007) found evidence that supporting higher average levels of schooling will result in lower income inequality. Likewise, Chu (2000) found that a higher level of education in the workforce causes an even distribution of income, while the greater the spread of the education level among the workforce, the greater the income inequality.

However, the counter-argument from Juhn et al. (1993) suggests that education does not directly affect the level of inequality. Instead, it is due to the return on the experience among the workers. The direction of the relationship between education and income inequality is not necessarily the same over time. Inequality can change in different directions (up, down, or remain unchanged) as the average level of education increases (Lin, 2007). Therefore, this critical aspect needs to be studied further using Indonesian cases and a specific timeline.

Furthermore, the aspect of the geographical area (rural and urban areas) also has a strong influence on the decomposition of income inequality in general. A study in China by Yang (1999) shows that increasing rural-urban income disparities have been the driving factor behind increasing overall inequality in China. Yang (1999) argues that this may be due to urban-biased policies and institutions, including restrictions on labor mobility and the welfare system.

Using new household survey data for 1995 and 2002, the study conducted by Sicular et al. (2007) shows that the urban and rural income gap in China contributes to the overall inequality in China. Another study by Fritzen and Brassard (2005), in the case of Vietnam, also shows a similar trend; they found that the increase in inequality in Vietnam during the period from 1993 to 1998 was due to a widening gap between the urban and rural sectors.

Research into the geographical factors of income inequality in Indonesia has been carried out several times. However, it still uses one time period or old data sources, so it cannot capture the overall trend in the level of inequality in the latest period. A previous study by Chongvilaivan (2016) explored decomposed inequality based on area status (urban and rural) and found that by 2014 income inequality between urban and rural areas in Indonesia had increased, with the urban areas showing greater inequality compared to the rural ones. Besides that, Akita and Pirmansyah (2011) showed that urban inequality rose from 1999 to 2005 due to income inequality among the regions. The main factor was the fact that patriarchs received higher levels of education. Furthermore, the expenses of the richest 10% were equivalent to that of the poorest 80%, and

most were involved in the trading, hotel and financial sectors.

Research into the income inequality component has been carried out before, but it is observed that most of these studies used old data, especially those carried out in Indonesia. This study uses panel data from Indonesian household surveys from 1993 to 2014 to fill the literature gap in the case studies of income inequality in Indonesia. This study also seeks to provide a new perspective on the differences in findings for the aspects of gender, education, and geographic factors on income inequality.

DATA AND METHODOLOGY

1. Data

This study used Indonesian Family Life Survey (IFLS) data produced by the RAND Corporation from wave 1 (1993) to wave 5 (2014) or from 1993, 1997, 1998, 2007, and 2014. IFLS provides a design to analyze the diversity of existing communities and to observe this over a long period of time (RAND, 2017).

In addition, IFLS has multiple indicators of household economic well-being, including consumption, income, assets, education, migration, health status, household decision-making, intergenerational mobility, and participation in community activities. As an initial wave, IFLS1 was performed in 1993 by RAND in collaboration with the Demographic Research Institute, University of Indonesia. Then, IFLS2 was run by RAND in cooperation with UCLA and the Demographic Research Institute, University of Indonesia. It was not until 2000 that Gadjah Mada University took part in IFLS3. In addition, IFLS4 and IFLS5, fielded respectively in 2007 and 2014, were conducted in collaboration with the Survey Meter Research Institute.

In relation to this study, IFLS was chosen because of its growing number of samples. IFLS 1 was distributed in 1993 with a sample of individuals living in 7,224 households, while IFLS 5 was distributed in late 2014 and early 2015 with a sample of 16,204 households and 50,148 individuals.

In terms of its representation, IFLS is capable of analyzing changes in the population and samples, which the high interview rates have demonstrated since IFLS 1. Starting from the first survey, almost 90.3% of households were reinterviewed up to IFLS 4 (RAND, 2017). Therefore, using IFLS data is advantageous in terms of its sample and population representation, compared to other data sets.

Using IFLS, this study can further analyze any interperiod income changes. One of the advantages of IFLS, which outweighs those of other data sets, is that the research is longitudinal, in which the same questions will be addressed to the same individuals in each survey period.

To analyze the background of events, this study also uses data from the manpower statistics of the Central Statistics Agency (BPS), which is derived from the National Labor Force Survey (SAKERNAS) data from the 2014 to 2016 reports. In addition, such reports are used to analyze the current state of employment in Indonesia, based on several aspects ranging from education and gender to urban-rural areas.

The variables to be analyzed in this study are described in Table 1.

2. Analysis and Empirical Model

In analyzing income inequality, several references used the Theil index for the decomposition analysis (Chongvilaivan & Jungsuk, 2016). A large amount of empirical research into inequality benefits used the Theil index for two fundamental reasons (Cowell, 2015). First, Theil provided a better

Table 1. Description of Variables

Variable names	Description
Wage_y (IDR/year)	Wage/income in the last year (including benefits)
Wage_m (IDR/month)	Wage/income in the last one month (including benefits)
Agriculture	Dummy variable = 1 for working in the agriculture sector, = 0 for working in other sectors
Service	Dummy variable = 1 for working in the service sector, = 0 for working in other sectors
Manufacture	Dummy variable = 1 for working in the manufacturing sector, = 0 for working in other sectors
Private	Dummy variable = 1 for private-sector worker, = 0 for working in public-sector
Casual	Dummy variable = 1 for casual worker, = 0 for non-casual worker
Unpaid	Dummy variable = 1 for unpaid worker (informal), = 0 for formal worker
Male	Dummy variable = 1 for male, = 0 for female
Age (years)	Age of respondents
Province	Province where the respondent lives
Island	Category of large islands wherein respondent lives (1 = Sumatra; 2=Java and Bali-Nusa Tenggara; 3= Kalimantan; 4=Sulawesi and Papua)
Years_educ (years)	Years of education completed
Educ_level	Highest level of education attained (1=elementary school/equivalent, 2=junior high school/equivalent, 3=senior high school/equivalent, 4=university/equivalent)
Urban	Dummy variable = 1 for living in urban area, = 0 for rural area

description of welfare criteria. Second, risk factors have been included in the index, thus enabling it to provide more actual descriptions.

This study also used quantile regression analysis. Some studies have used quantile regression to analyze each class of income, particularly in the context of inequality factors (Appleton et al., 2014). Quantile regression has the advantage of a conditional distribution (Cameron & Trivedi, 2005). Such a benefit provides better added value than an OLS regression does.

In addition, the benefit of a quantile regression is apparent when an OLS regression can only provide a constant slope, whereas a quantile regression offers a slope change between the groups. This has made quantile regression a useful tool for explaining heterogeneity in a study (Cameron & Trivedi, 2005).

Conditional distribution is able to analyze how the percentile of a variable is influenced by the categorizing factors. When analyzing workers' incomes, for instance, the quantile regression can analyze the income percentile of workers with a low educational attainment as opposed to that of workers who have higher levels of education.

In the first part, the Theil index was used to analyze the changes that have occurred since 1993. In addition, this research also sought to consider the aspects of gender, education, and area. There are two types of Theil index: the Theil-T index and the Theil-L index. The difference lies in that one index draws between-group comparisons while the other does within-group comparisons. Theil index can be written with the following notation:

$$T = \sum_{j=1}^{m} y_j T_j + \sum_{j=1}^{m} y_j \ln\left(\frac{y_j}{p_j}\right) = T_w + T_B \quad (1)$$

$$L = \sum_{j=1}^{m} p_j L_j + \sum_{j=1}^{m} p_j \ln\left(\frac{p_j}{y_j}\right) = L_w + L_B \quad (2)$$

In which y_j represents the level of income in group j relative to the overall income, p_j is the share of the population as a ratio of the total population, and m is the total number of groups. This will generate T_w or Theil-within and T_B or Theil-between.

In the second part, the analysis of income inequality used the quantile method in Appleton et al. (2014). According to Cameron and Trivedi (2009), many econometric studies have emphasized the conditional mean when analyzing quantile regressions. The conditional mean is what a quantile regression attempts to capture using slopes that are different from OLS. The value of a slope indicates an estimation difference in the quantile of the data.

The quantile regression for this study is denoted as follows,

$$Q_\theta(y_{it}|X_{it}) = X'_{it}\beta_t(\theta) \quad (3)$$

$$\begin{aligned} Q_\theta(y_{it}|X_{it}) = {} & \beta_1 + \beta_2 age_{it} + \\ & \beta_3 years_{educ_{it}} + \delta_1 urban_{it} + \\ & \delta_2 male_{it} + \sum \delta_3 sector_{it} + \\ & \sum \delta_4 status_{it} + F_u^{-1}(q) \end{aligned} \quad (4)$$

Equation 3 shows simplification, whereas quation 4 indicates further elaboration. In Equation 3, Q_θ represents the quantile of log (wage) for each individual i in year t. Wage in this equation refers to the annual income of an individual from both his/her primary and secondary jobs. Meanwhile, β is the quantile coefficient and X' is the vector of explanatory variables (age, two dummy sectors, three dummy working status, dummy gender, years of education, and dummy location). These explanatory variables are used to control for other things that might affect the results, for example demographic factors such as age, gender, location of residence and length of education. On the other hand, it is necessary to control for other employment factors, such as the employment sector and working status.

On the other hand, $F_u^{(-1)}$ (q) indicates the function of the quantile distribution; as a result the Q_θ (y_{it} |X_{it}) condition will generate different values of q, or a certain quantile. The implication is that a different slope exists in the income quintile condition of the working individual.

The above models can analyze the factors contributing to income inequality between the quantiles by including worker and education factors. In addition, there are the factors of location (urban-rural) and the three industrial sectors: agriculture, manufacturing, and services.

DISCUSSION

1. General Description

The characteristics of workers are presented in Table 2 and give a general overview of the data used. According to Table 2, the urban population increased significantly, from 28% in 1993 to 59% in 2014. Such an increase was also caused by changes in the job sectors. In 1993, nearly half of the population worked in the agricultural sector. This condition changed in 2014 with only one fifth of them having a job in that sector. The remaining population worked in the service and manufacturing sectors.

In terms of their employment status, most of the workers were employed in the private sector One interesting point is that the number of casual workers increased between 2007 and 2014. The more diverse the work, the more choices the workers had. On the other hand, the percentage of unpaid workers or family workers decreased, indicating new types of employment absorption.

Table 2. Characteristics of Workers (in Percent)

Note	IFLS				
	1993	**1997**	**2000**	**2007**	**2014**
Male	48.6	46.4	48.9	46.8	46.8
Urban	28.4	51.2	55.3	56.6	59.8
Education Level					
Elementary School	78.9	72.7	27.8	23.8	20.6
Junior High School	11.9	11.7	17.6	17.4	16.5
Senior High School	9	11.38	36.9	38.5	39.3
University	-	4.1	17.6	20.1	23.5
Job Sector					
Agriculture	49.1	32.2	25.2	25.8	20
Manufacture	6.7	23.9	19.4	19.1	27.3
Service	44.1	43.8	55.2	55	52.6
Employment Status					
Independent Worker	40.4	36.7	31.3	26.2	27.2
Public-Sector Worker	15.3	7.3	8.5	9.3	8.6
Private-Sector Worker	32.8	41.4	42.4	34.9	39.4
Casual Worker	0.01	-	-	11.1	12.3
Unpaid Worker	11.3	14.4	17.6	18.3	12.2
Large Island					
Sumatra	11.4	20.5	20.5	20.7	21.4
Java and Bali-Nusa Tenggara	35.8	68	69.4	67.7	65
Kalimantan	2.2	3.9	4.1	4.7	4.6
Sulawesi and Papua	50.3	7.4	5.8	6.8	8.9

Source: Processed from IFLS wave 1, 2, 3, 4, and 5

Workers also had an annual income. Overall, it is clear that those working in the agricultural sector had the lowest average annual income compared to those in the other sectors. In addition, workers in the manufacturing sector received a higher income in the pre-crisis period. However, after the 1998 crisis, the service sector provided a higher income than the other sectors did, as a large number of workers moved to this sector. In addition, demand for labor in this sector was rising due to the larger variety of jobs and the development of dynamic sub-sectors, such as telecommunications and services.

Easterly (2001) defines the middle class as the population that is in quintiles 2, 3, and 4 in the distribution of consumption spending per capita or is in the percentile of consumption per capita that is between 20 and 80. For the Indonesian population, the World Bank defines that the middle income class in Indonesia consists of more than 40% of the population. Thus, from the overall proportion of income, workers can be classified into either the lower, middle, or upper classes (see Table 3).

Table 3 shows that the percentile of the lower-classes‘ income increased, but then it decreased since 2007. On the other hand, the concentration of upper-class income has reduced significantly from 63% to 38%; several studies have suggested that this was caused by the economic crisis. Meanwhile, the percentage of middle-class income relative to the total has steadily increased.

Table 3. Proportion of Income Based on Indonesian Household Percentiles

Household Percentile	Percentage of income to total (%)				
	1993	**1997**	**2000**	**2007**	**2014**
0 to 50	8.7	13.3	12.1	16	14.8
50 to 90	27.5	48.6	48.3	48.3	47.8
90 to 100	63.8	38.1	39.6	35.7	37.4

Source: Processed from IFLS wave 1, 2, 3, 4, and 5

Table 4. Calculation of Inequality Indicators

Indicator	Year				
	1993	1997	2000	2007	2014
Percentile Ratio					
p90/p10	23.4	25.2	31.2	17.3	20
p90/p50	2.7	3.2	3.3	2.8	3
p10/p50	0.1	0.12	0.1	0.1	0.1
p75/p25	4.5	5.2	5.9	4.1	4.5
Generalized Entropy					
GE(0)	1.1	0.67	0.74	0.5	0.6
GE(1)	1.9	0.5	0.6	0.4	0.5
Gini	0.71	0.54	0.56	0.5	0.52

Source: Processedfrom IFLS *waves* 1, 2, 3, 4, and 5

Further analysis shows that the increasing middle and upper percentiles, in the context of income proportion, have led to greater income inequality. This has certainly resulted in a very low proportion of income as perceived by the lower percentile. From 1993 to 2014, the proportion of lower-class income ranged from 8% to 14%. This seems very contradictory considering that, if combined, the proportion of the middle and upper classes reached 85% to 90%.

2. Income Decomposition

In analyzing the income changes in Indonesia, this study will provide an initial overview of the income inequality in Indonesia. Table 4 shows several indicators of inequality and the changes which occurred from 1993 to 2014. These indicators include the percentile ratio and the generalized entropy that produce the Theil index (equations 3.3 and 3.4).

Based on the percentile ratio in Table 4, the proportion of income has only benefited the richest 10%. In fact, the average income of the richest 10% was 20-fold higher than that of the poorest 10% of the Indonesian population in 2014. In addition, the percentile ratio of p90/p10 increased during the period from 1993 to 2000, indicating that inequality persisted prior to the 1998 economic crisis, but after the reform era the inequality improved. However, the income proportion of the richest 10 percent continued to increase until 2014.

On the other hand, the middle-classes' income also experienced an increased proportion, compared to the lower class. The average income of the richest 10 percent, and of 50% of the population had increased from 2.7% in 1993 to 3% in 2014. From this change, the overall increased proportion of income occurred for the middle class. This increase reduced the income-based Gini ratio during the period from 1997 to

2007. The Gini ratio reached its lowest point in 2007. However, this condition had changed by 2014 when the Gini coefficient reached 0.52, due to the absence of income distribution among households.

For more in-depth analysis, the presented indicators also include the generalized entropy (GE) consisting of GE classes 0 and 1. GE (0) shows the Theil T index whereas GE (1) shows the mean log deviation or the Theil L index. Theil T is a measure sensitive to lower percentiles, while Theil L is sensitive to upper percentiles. Therefore, Theil T is capable of analyzing lower-class incomes, and Theil L can analyze upper-class ones.

In the lower percentiles, inequality decreased, but in 2000 or the period after the economic crisis, the lower class experienced wider income inequality. In addition, the Theil index at the upper percentiles was smaller than at the lower percentiles. This shows that, at the upper percentiles, inequality was less than at the lower percentiles.

Gender plays an important role in income inequality. In Appendix 1, for the male group, inequality in the lower percentiles was larger than inequality in the upper percentiles. This means that men in the lower class experienced an unequal distribution of income compared to men in the upper class. However, the inequality changed during the period from 2010 to 2014. In this period, men of the upper class experienced an unequal income distribution as opposed to those of the lower class.

In terms of education, income inequality decreased from 1993 to 1997. In the lower class in 1993, the highest inequality was experienced by workers who had only the elementary school level (Appendix 2 to 3). Yet, during 2014, workers who completed their university degrees experienced the highest income inequality because their nominal wages were more significant than those with lower levels of education. The characteristics of income inequality between the upper and lower classes, due to educational attainment remained the same, as evidenced by workers with an elementary school education contributing the most to inequality, compared to the other education levels.

The income inequality between urban and rural areas decreased during the period from 1995 to 2007 (Appendix 4). From 1993 to 1997, the highest income inequality was found among urban workers, especially those in the lower percentiles. However, the lowest income inequality occurred among those workers in the period from 2007 to 2014, due to urban reform and a wider range of work types. Various types of work mean better opportunities to earn a larger amount of money.

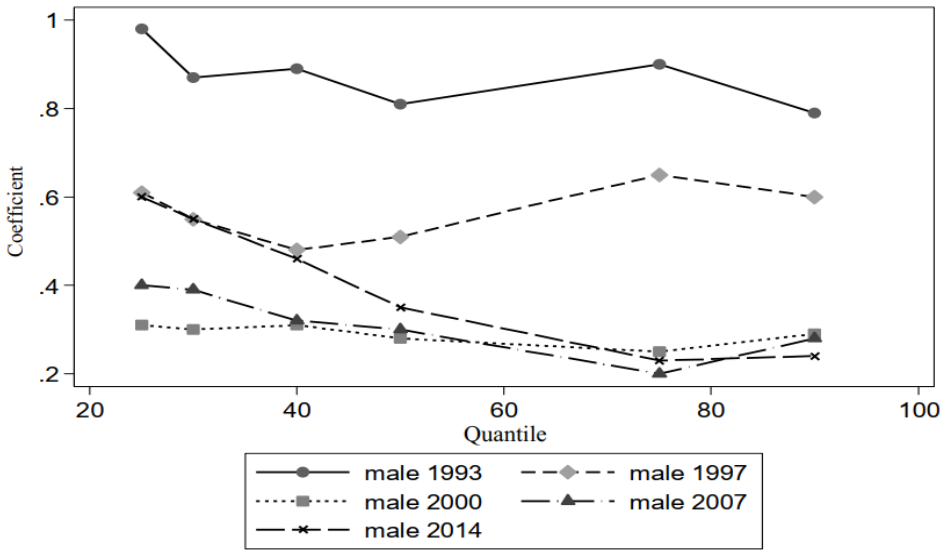
Based on the results of the decomposition (appendices 1 to 4), income inequality has been largely characterized by within-group inequality. It means, instead of being in between-groups, income inequality occurs within the group per se. Workers compete with each other, according to gender, educational attainment, and urban-rural attributions.

3. Inequality Analysis

Changes in income inequality because of gender occurred in two phases, before and after the economic crisis. Prior to the crisis, the annual income inequality between men and women was extremely high compared to after the crisis. In fact, middle- to upper-class males earned a better income than females, reaching the 90th percentile or upper class.

Figure 1 shows the changes in the coefficient by gender; after the crisis the middle to upper classes did not earn a higher income than the lower class. This means that gender equality

Figure 1. Changes in the Male Coefficient in Quantile Regression



Source: Processed from IFLS waves 1, 2, 3, 4, and 5

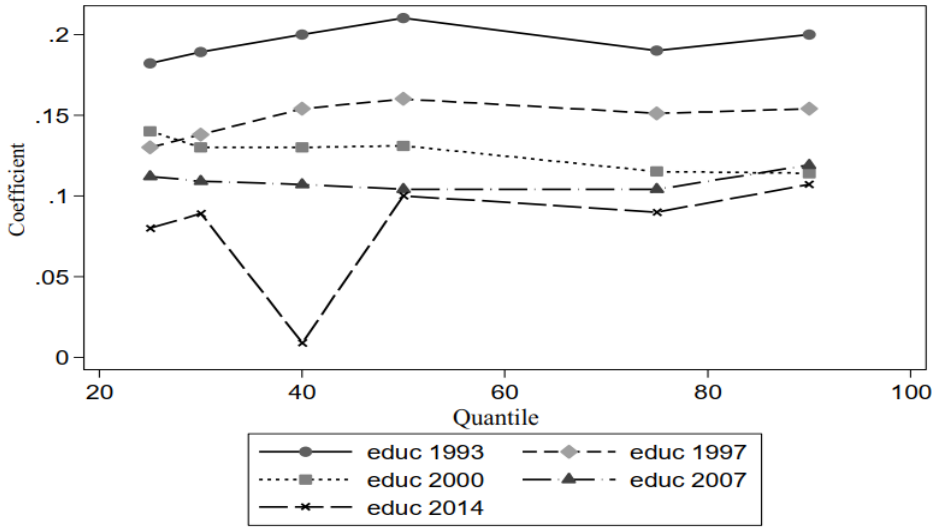
between men and women improved after the crisis. With the range of men's incomes being 20% to 30% higher, the income inequality between men and women became lower, indicating that women had a greater chance to earn equal incomes. Although some existing studies do not explicitly differentiate between before and after the crisis, these findings are consistent with Olivetti and Petrongolo (2008), and show that, on average, women tend to be more positively selected for work than men (more employers choose women over men) and there is a decreasing trend of income inequality between the genders.

In terms of education, the length of education has constantly affected income inequality due to the level of education aspect. In the upper quantiles, the length of education generally had a greater influence when compared with the lower quantiles, showing that the lower class had no access to open education. Interestingly, in 2014, the lower class apparently did not benefit directly from the increase to the years of education.

Figure 2 describes the changes in the length of education coefficient in the quantile regression. It is clear that the return on education has decreased from year to year. It means that, in the context of income inequality, education has not been a solution to obtaining income equality among the income quantiles. Therefore, income inequality was only experienced by workers in the upper quantiles. This is slightly different from the findings of Chu (2000) or Lin (2007) which explicitly explain that higher average levels of schooling will result in lower income inequality. The findings of this study provide a more detailed explanation regarding the contribution of educational attainment to overall income inequality, where income inequality was only experienced by workers in the upper quantiles.

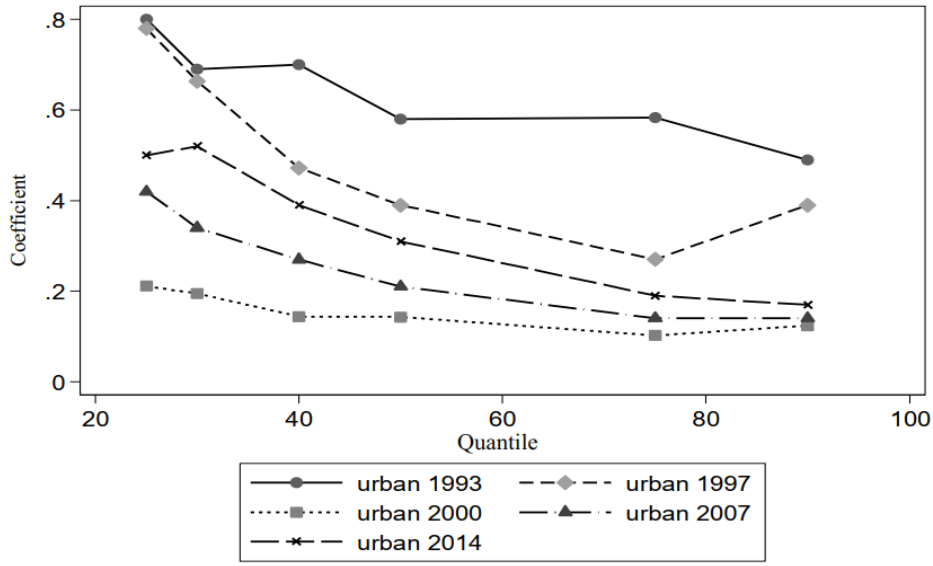
In the context of the area, urban workers normally have higher incomes, yet the trend shows that the incomes of those in the upper quantiles are not necessarily higher than those of urban workers in the lower quantiles. Consequently, both the lower and middle classes enjoy earning incomes in urban areas.

Figure 2. Changes in *Years_Educ in* Quantile Regression



Source: Processed from IFLS waves 1, 2, 3, 4, and 5

Figure 3. Changes in *Urban* Coefficient in Quantile Regression



Source: Processed from IFLS waves 1, 2, 3, 4, and 5

Figure 3 shows the changes between urban workers and workers in other areas. The graph indicates that regional inequality decreased from year to year. However, inequality was higher in 2014 than in 2000 and 2007, and the implication was that a greater income inequality exists between urban and rural areas. However, this finding is in line with the findings of several previous studies (Yang, 1999; Chongvilaivan & Jungsuk, 2016; Suryadarma et al., 2006).

Furthermore, this study also did a quantile regression analysis to analyze each income class. One factor that significantly affects income inequality in each data panel (in 1993, 1997, 2000, 2007, and 2014) is age. However, there is a change in the correlation between age and income before and after the crisis. For the years 1993 and 1997, age has a significant negative effect on each income quintile (appendices 5 and 6), while for 2000, 2007, and 2014, age had a

significant positive effect on each income quintile (appendices 7, 8, and 9).

The actual factors investigated were based on the human capital theory. Despite the urban-rural factor, this study also emphasizes other human capital factors of income inequality, such as education and gender. First, in terms of gender, income inequality between men and women has decreased. Women now have greater opportunities to earn a higher income. This is slightly different to what Becker (1985) stated about the human capital theory regarding income inequality between the genders. He noted that women were much more likely than men to work part-time and they usually temporarily withdrew from the labor market after having children. As a result, they had fewer incentives to invest in education and training that improved their earnings and job skills (Becker, 1985).

Second, in relation to education, the number of completed years has less influence compared to that in earlier periods because more and more people enter education to increase their income. The most recent trend is that education is considers as privileged by the upper middle class, thus leading to income inequality. This result is in line with what is believed about the human capital theory, where it may be that higher-ability or higher-income people opt for a more extensive education so that the positive coefficient on education in the wage equation is actually upward biased and widens the opportunity for income inequality (Blanden and Machin, 2010).

Third, urban workers have bigger incomes than rural workers, though the gap is getting smaller. It means both urban and rural workers have greater opportunities to earn a better income.

CONCLUSION

From the decomposition, this study uses income as a proxy for wages due to the characteristics of the household survey data set used. This study found that income inequality relating to gender, education, and area decreased before the economic crisis but increased afterward due to several factors. First, in terms of gender, male workers in the lower class had larger incomes than female workers received. Second, in terms of education, workers with elementary school levels experienced higher inequality than workers with other levels of education did. Third, in terms of area, higher inequality occurred among urban workers in both the upper and lower classes, compared to workers in rural areas. In addition, the decomposition analysis shows that income inequality is within the group by nature, which means that inequality occurs inside the group.

In particular, the upper class enjoys greater nominal incomes than the lower class, yet the regression coefficient indicates that the lower class actually gains more benefit from the characteristics of inequality. The first reason is higher returns on education for the upper class, and the second is the characteristics of male workers and urban workers, who have higher incomes compared to other workers with different characteristics. This study also controls for several other variables that affect income inequality such as age, employment sector (private/public), and main sector of work (such as agriculture, manufacturing, or services). In this context, age is the only factor that significantly affects income inequality in each data panel (in 1993, 1997, 2000, 2007, and 2014).

Efforts to reduce income inequality can include the mechanism of conditional cash transfers or a suitable fiscal policy (Bourguignon, 2015). In this case, the government has to make innovative efforts to reduce income inequality. From the analysis of Theil, the government should acknowledge that income inequality occurs within groups, but not between

groups. The paradigm of categorizing workers into urban-rural groups, or men and women, needs changing because income inequality occurs inside the same groups (within groups).

When inequality occurs within the same groups, it will significantly increase the potential for conflicts, especially if the groups have no political and economic bargaining power (Kuhn, 2013). In addition, the potential for conflicts will become greater if it concerns the average per capita income. This finding is consistent with Yusuf et al. (2013), who stated that inequality within urban-rural groups occurred after the crisis because urban-rural inequality existed in all the regions in Indonesia. In fact, inequality within groups has contributed greatly to the inequality in Indonesia.

On the other hand, within-group inequality will trigger potential horizontal conflicts due to unequal opportunities and income inequality faced by individuals within the group. However, there is no difference in the risks of inequality within groups and between groups. In addition, the quantile regression analysis suggests that the government should facilitate greater access, especially in affirmative action policies for women. Such policies will reduce income differentials between the sexes. With affirmative action policies, women have the same opportunity to earn a larger income.

Affirmative action policies will give equal access to opportunities to reduce inequality within groups. According to UNDP (2013), affirmative action policies have been proven to reduce inequality within groups in such countries as India and South Africa. In relation to education, the government has opened greater access to education, but the lower quantiles have not benefited from it because the quality of the education offered has yet to be attended to by the government; consequently, education is perceived as beneficial only to the upper quantiles. According to UNDP (2013), greater access to education will reduce the inequality of opportunity.

On the other hand, regional policies to reduce inequality will be difficult to implement because the number of urban workers will increase from year to year. Income inequality due to urban working areas is mostly experienced by the lower quantiles. It means that urban workers, especially those at the lower quantiles, have a greater percentage of income than upper-quantile workers do. To reduce inequality, the government can facilitate rural citizens who wish to migrate to urban areas, to have employable skills.

REFERENCE

Acemoglu, D. (1999). Changes in Unemployment and Wage Inequality: An Alternative Theory and Some Evidence. *American Economic Review*, 89(5), 1259–1278. https://doi.org/10.1257/aer.89.5.1259

Acemoglu, D. (2002). Technical Change, Inequality, and the Labor Market. *Journal of Economic Literature*, 40(1), 7–72. http://www.jstor.org/stable/2698593

Akerman, A., Helpman, E., Itskhoki, O., Muendler, M.-A., & Redding, S. (2013). Sources of Wage Inequality. *American Economic Review*, 103(3), 214–219. https://doi.org/10.1257/aer.103.3.214

Akita, T., & Pirmanyah, A. (2011). Urban Inequality in Indonesia. Working Papers University of Japan.

Appleton, S., Song, L., & Xia, Q. (2014). Understanding Urban Wage Inequality in China 1988–2008: Evidence from Quantile Analysis. *World Development*, 62, 1–13. https://doi.org/10.1016/j.worlddev.2014.04.005

Becker, Gary S. (1994). Investment in Human Capital: Rates of Return. Human Capital in Reference to Education (pp 59-160).

Becker, Gary S. (1985). Human capital, Effort and the sexual Division Labour. *Journal of Labour Economics*

Berkhout, P., Hartog, J. &Webbink, D. (2010). Compensation for earnings risk under worker heterogeneity. *Southern Economic Journal*, 76 (3), 762–790.

Bourguignon, F. (2015). The Globalization of Inequality. New Jersey: Princeton University Press.

Blackaby, D. H., Clark, K., Leslie, D. G., & Murphy, P. D. (1997). The Distribution of Male and Female Earnings 1973-1991: Evidence for Britain. O*xford Economic Papers*, 49 (2), 256-272

Blau, Francine, D., & Lawrence M. Kahn. (2000). Gender Differences in Pay. *The Journal of Economic Perspective*, 14(4),75-99.

Borjas, George J. (2013). Labor Economics. New Jersey: McGraw-Hill.

Bordo, M. D., & Meissner, C. M. (2012). Does Inequality Lead to a Financial Crisis? *Journal of International Money and Finance*, 31(8), 2147-2161.

Cameron, A.C., & Trivedi, P. K. (2005). Microeconometrics: Methods and Applications. *Cambridge University Press*, New York.

Cameron, A. C., & Trivedi, P. K. (2009). Microeconometrics Using Stata. *College Station*, TX: Stata Press.

Chatani, K. (2020). Statistics: Gender pay gaps in Indonesia. *International Labour Organization (ILO)*. https://www.ilo.org/wcmsp5/groups/public/---asia/---ro-bangkok/---ilo jakarta/documents/publication/wcms_755543.pdf

Chantreuil, F., & Lebon, I. (2015). Gender Contribution to Income Inequality. *Economics Letters*, 133, 27–30. doi: https://doi.org/https://doi.org/10.1016/j.econlet.2015.05.009

Chu, H.-Y. (2000). The Impacts of Educational Expansion and Schooling Inequality on Income Distribution. *Quarterly Journal of Business and Economics*, 39(2), 39–49. http://www.jstor.org/stable/40473289

Chongvilaivan, A., &Jungsuk, K. (2016). Individual Income Inequality and Its Drivers in Indonesia: A Theil Decomposition Reassessment. *Social Indicators Research*, 126, 79–98. doi: https://doi.org/10.1007/s11205-015-0890-0

Cowell, F.A. (2015). Measuring Inequality. London: Pretince-Hall.

Easterly, W. (2001). The Middle-class Consensus and Economic Development. *Journal of Economic Growth*, 6(4), 317–335. http://www.jstor.org/stable/40216047

Fritzen, S., &C. Brassard (2005). Vietnam Inequality Report 2005: Assessment and Policy Choices, Mekong Economics Ltd. Synthesis Paper of the "DFID Drivers of Inequality in Vietnam" Project.

Juhn, C., Murphy, K. M., & Pierce, B. (1993). Wage Inequality and the Rise in Returns to Skill. *Journal of Political Economy*, 101(3), 410–442. http://www.jstor.org/stable/2138770

Hartog, J. &Vijverberg, W. P. (2007). On compensation for risk aversion and skewness affection in wages. *Labour Economics*, 14 (6), 938–956.

Hendajany, N., Widodo, T., &Sulistyaningrum, E. (2016). HUMAN CAPITAL VERSUS THE SIGNALING HYPOTHESES: THE CASE OF INDONESIA. In *Journal of Indonesian Economy and Business* (Vol. 31, Issue 2).

Kharisma, B., & Saleh, S. (2013). CONVERGENCE OF INCOME AMONG PROVINCES IN INDONESIA 1984-2008: A Panel Data Approach 1. In *Journal of Indonesian Economy and Business* (Vol. 28, Issue 2).

Kuhn, Patrick M., & Weidman, N.B. (2013). Unequal We Fight: The Impact of Economic Inequality Within Ethnic Groups on Conflict Initiation. *Draft Paper University of Princeton.*

Kumhof, M., &Rancière, R. (2011). Inequality, Leverage and Crises. *IMF Working Paper*.

Lin, C.A. (2007). Education expansion, educational inequality, and income inequality: evidence from Taiwan, 1976-2003. *Social Indicators Research*, 80(3), 601-615.

Lemieux, Thomas. (2006). Postsecondary Education and Increasing Wage Inequality. *American Economic Review*, 96(2), 196-199.

Olivetti, C., & Petrongolo, B. (2008). Unequal Pay or Unequal Employment? A Cross-

Country Analysis of Gender Gaps. *Journal of Labor Economics*, 26(4), 621-654.

O'Neill, D. (1995). Education and income growth: Implications for cross-country inequality. *Journal of Political Economy*, 103(6), 1289–1301.

Piketty, Thomas. (2015). Economics of Inequality. New Jersey: *Harvard Belknap Press.*

Reza, F., & Widodo, T. (2013). THE IMPACT OF EDUCATION ON ECONOMIC GROWTH IN INDONESIA. In *Journal of Indonesian Economy and Business* (Vol. 28, Issue 1).

Sulistyaningrum, E. (2016). Impact evaluation of the school operational assistance program (BOS) using the matching method. *Journal of Indonesian Economy and Business*, 31(1), 33-62.

Suryadarma, D., Widyanti, W., Suryahadi, A., & Sumarto, S. (2006). From Access to Income: Regional and Ethnic Inequality in Indonesia. Development Economics Working Papers 22547, *East Asian Bureau of Economic Research.*

Sicular, T., Ximing, Y., Gustafsson, B., & Shi, L. (2007). THE URBAN–RURAL INCOME GAP AND INEQUALITY IN CHINA. Review of Income and Wealth, 53(1), 93–126.

United Nations Development Program (UNDP). (2013). Humanity Divided: Confronting Inequality in Developing Countries. New York: United Nations Development Programme Bureau for Development Policy.

Yang, D. T. (1999). Urban-Biased Policies and Rising Income Inequality in China. *The American Economic Review,* 89(2), 306–310. http://www.jstor.org/stable/117126

Yusuf, A. A., Sumner, A., & Rum, I. A. (2014). Twenty Years of Expenditure Inequality in Indonesia, 1993–2013. *Bulletin of Indonesian Economic Studies,* 50(2), 243–254. https://doi.org/10.1080/00074918.2014.939937

Wahyuni, H. (2004). INEQUALITY OF DISTRIBUTION AND POVERTY INCIDENCE IN THE ADJUSTMENT PERIOD AND ANALYSIS OF ECONOMIC CRISIS IMPACT IN INDONESIA. In *Jurnal Ekonomi dan Bisnis Indonesia* (Vol. 19, Issue 3).

Wicaksono, E., Amir, H., & Nugroho, A. (2017). *The sources of income inequality in Indonesia: a regression-based inequality decomposition* (No. 667). ADBI Working Paper.

Wrohlich, K. (2017). Gender pay gap varies greatly by occupation. *DIW Economic Bulletin*, *7*(43), 429-435.

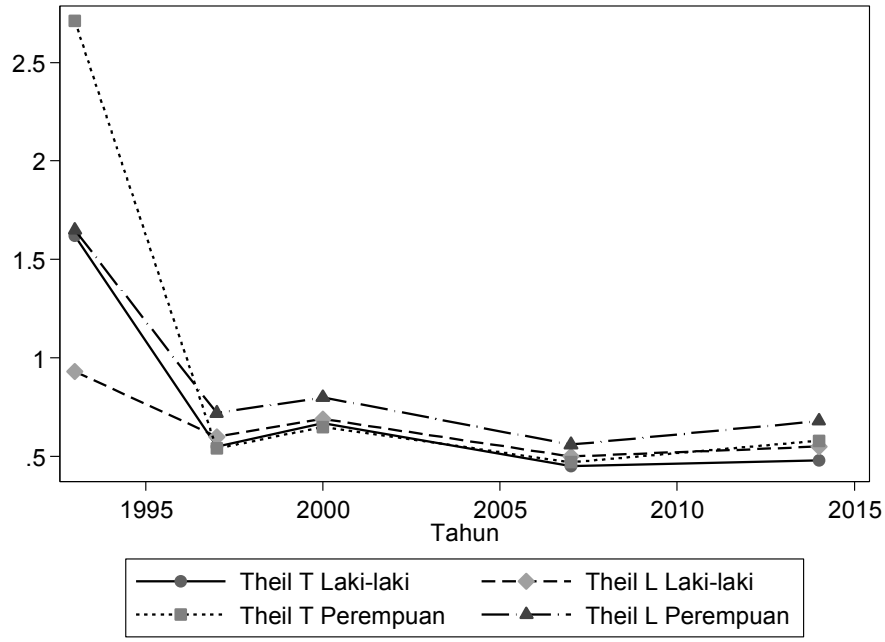
World Bank. (2005). Chapter 6: Inequality Measures. *Poverty Manual*.

World Bank. (2016a). Indonesia's Rising Divide. Jakarta: World Bank.

World Bank. (2016b). Poverty and Shared Prosperity 2016: Taking on Inequality. Washington, DC: World Bank.

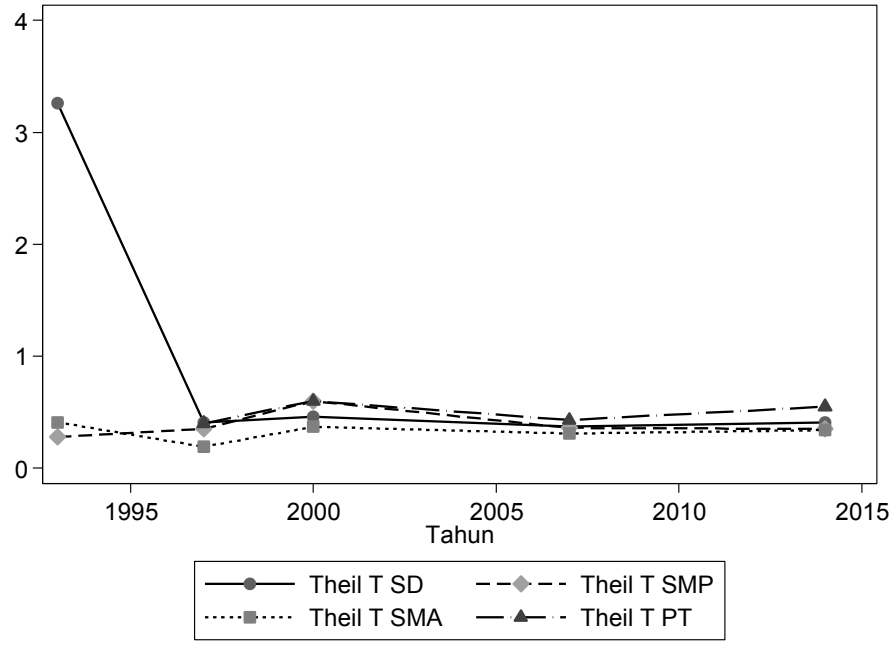
APENDICES

Appendix 1. Changes in Theil index by gender



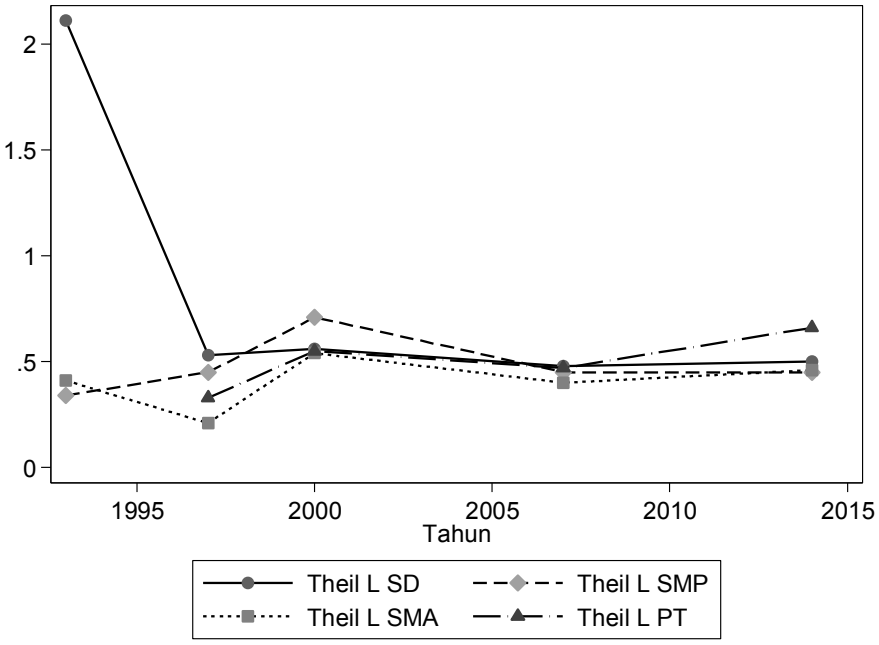
Source: Processed from IFLS wave 1, 2, 3, 4, and 5

Appendix 2. Changes in Theil T index by education



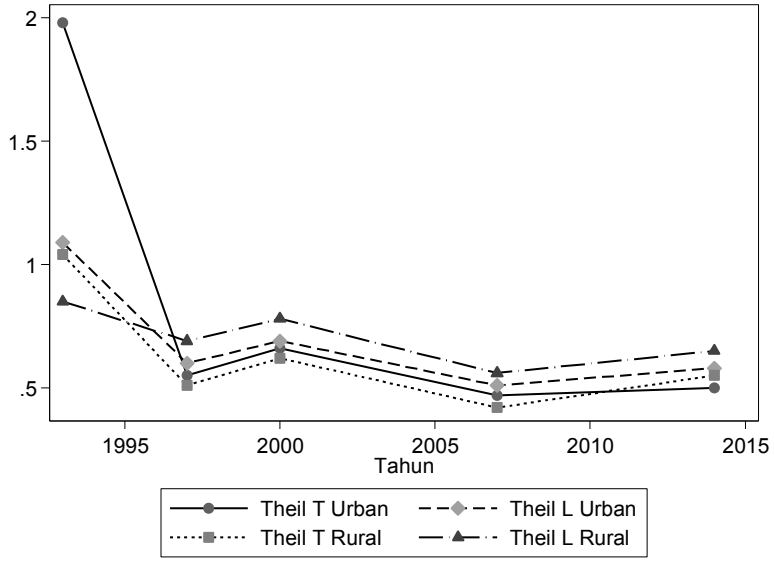
Source: Processed from IFLS wave 1, 2, 3, 4, and 5

Appendix 3. Changes in Theil L index by education



Source: Processed from IFLS wave 1, 2, 3, 4, and 5

Appendix 4. Changes in Theil index by region



Source: Processed from IFLS wave 1, 2, 3, 4, and 5

Appendix 5. Quantile regression IFLS 1 (1993)

Dependent Variable: Log (*wage_y)*	(1) OLS	(2) QR25	(3) QR30	(4) QR40	(5) QR50	(6) QR75	(7) QR90
age	-0.0380***	-0.0352***	-0.0330***	-0.0347***	-0.0411***	-0.0258***	-0.0290**
	(0.00861)	(0.0117)	(0.0103)	(0.00983)	(0.00866)	(0.00909)	(0.0118)
male (= 1 if male)	1.037***	0.988***	0.870***	0.894***	0.814***	0.901***	0.796***
	(0.147)	(0.200)	(0.176)	(0.168)	(0.148)	(0.155)	(0.202)
years_educ	0.192***	0.182***	0.189***	0.202***	0.214***	0.197***	0.205***
	(0.0277)	(0.0376)	(0.0332)	(0.0316)	(0.0278)	(0.0292)	(0.0380)
private (= 1 if private worker)	-0.539***	-0.494**	-0.515***	-0.446***	-0.524***	-0.394**	-0.401**
	(0.145)	(0.197)	(0.174)	(0.165)	(0.146)	(0.153)	(0.199)
unpaid (=1 if unpaid worker)	0.287	0.106	-0.215	0.713	0.362	0.245	-0.371
	(0.692)	(0.941)	(0.830)	(0.790)	(0.696)	(0.730)	(0.952)
urban (=1 if located in urban)	0.764***	0.805***	0.696***	0.709***	0.580***	0.583***	0.490***
	(0.126)	(0.171)	(0.151)	(0.144)	(0.126)	(0.133)	(0.173)
manufacture (=1 if manufacturing worker)	-0.226	-0.505	-0.500	-0.226	-0.446	0.0497	-0.245
	(0.376)	(0.512)	(0.451)	(0.429)	(0.378)	(0.397)	(0.518)
service (=1 if service worker)	0.458***	0.476**	0.429**	0.381**	0.320*	0.307*	0.257
	(0.168)	(0.228)	(0.201)	(0.191)	(0.168)	(0.177)	(0.230)
Constant	6.434***	5.757***	5.924***	6.111***	6.806***	6.523***	7.262***
	(0.579)	(0.787)	(0.694)	(0.661)	(0.582)	(0.611)	(0.796)
Observations	398	398	398	398	398	398	398
R-squared	0.425						

*Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*

Appendix 6. Quantile regression IFLS 2 (1997)

Dependent Variable: Log(*wage_y)*	(1) OLS	(2) QR25	(3) QR30	(4) QR40	(5) QR50	(6) QR75	(7) QR90
age	-0.0332***	-0.0442***	-0.0387***	-0.0272***	-0.0249**	-0.0176**	-0.0208*
	(0.00760)	(0.00987)	(0.0106)	(0.0104)	(0.00964)	(0.00770)	(0.0113)
male (= 1 if male)	0.708***	0.619***	0.559***	0.484***	0.514***	0.651***	0.609***
	(0.111)	(0.145)	(0.155)	(0.152)	(0.141)	(0.113)	(0.165)
years_educ	0.163***	0.136***	0.138***	0.154***	0.160***	0.151***	0.154***
	(0.0153)	(0.0199)	(0.0213)	(0.0209)	(0.0194)	(0.0155)	(0.0227)
private (= 1 if private worker)	-0.411***	-0.508***	-0.490***	-0.491***	-0.411***	-0.381***	-0.245
	(0.112)	(0.145)	(0.155)	(0.152)	(0.141)	(0.113)	(0.166)
unpaid (=1 if unpaid worker)	0.0825	0.229	0.161	-0.00349	-0.154	-0.388	-0.0208
	(0.476)	(0.618)	(0.662)	(0.650)	(0.604)	(0.482)	(0.707)
urban (=1 if located in urban)	0.640***	0.784***	0.664***	0.472***	0.391***	0.277***	0.392***
	(0.0982)	(0.127)	(0.137)	(0.134)	(0.124)	(0.0995)	(0.146)
manufacture (=1 if manufacturing worker)	0.334**	0.214	0.372**	0.361**	0.455***	0.733***	0.506***
	(0.131)	(0.170)	(0.182)	(0.179)	(0.166)	(0.133)	(0.195)
service (=1 if service worker)	0.583***	0.414**	0.598***	0.464**	0.563***	0.727***	0.616***
	(0.134)	(0.174)	(0.186)	(0.183)	(0.170)	(0.136)	(0.199)
Constant	13.68***	14.17***	13.94***	13.70***	13.65***	13.57***	14.12***
	(0.480)	(0.622)	(0.667)	(0.655)	(0.608)	(0.486)	(0.712)
Observations	476	476	476	476	476	476	476
R-squared	0.550						

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 7. Quantile regression IFLS 3 (2000)

Dependent Variable: Log(*wage_y)*	(1) OLS	(2) QR25	(3) QR30	(4) QR40	(5) QR50	(6) QR75	(7) QR90
age	0.0348***	0.0392***	0.0366***	0.0318***	0.0279***	0.0228***	0.0227***
	(0.00112)	(0.00187)	(0.00154)	(0.00137)	(0.00108)	(0.000960)	(0.00124)
male (= 1 if male)	0.329***	0.312***	0.308***	0.318***	0.284***	0.256***	0.290***
	(0.0233)	(0.0390)	(0.0322)	(0.0286)	(0.0227)	(0.0201)	(0.0259)
years_educ	0.135***	0.149***	0.137***	0.130***	0.131***	0.115***	0.114***
	(0.00360)	(0.00602)	(0.00498)	(0.00441)	(0.00350)	(0.00310)	(0.00401)
private (= 1 if private worker)	-0.403***	-0.672***	-0.618***	-0.542***	-0.372***	-0.146***	0.0551
	(0.0333)	(0.0557)	(0.0460)	(0.0408)	(0.0324)	(0.0286)	(0.0370)
unpaid (=1 if unpaid worker)	-0.744***	-1.072***	-0.992***	-0.976***	-0.741***	-0.475***	-0.335***
	(0.0752)	(0.126)	(0.104)	(0.0921)	(0.0731)	(0.0647)	(0.0837)
urban (=1 if located in urban)	0.184***	0.211***	0.195***	0.144***	0.143***	0.102***	0.124***
	(0.0249)	(0.0416)	(0.0344)	(0.0305)	(0.0242)	(0.0214)	(0.0277)
manufacture (=1 if manufacturing worker)	0.341***	0.387***	0.355***	0.383***	0.280***	0.225***	0.196***
	(0.0334)	(0.0559)	(0.0463)	(0.0410)	(0.0325)	(0.0288)	(0.0372)
service (=1 if service worker)	0.307***	0.348***	0.257***	0.270***	0.219***	0.185***	0.207***
	(0.0334)	(0.0558)	(0.0462)	(0.0409)	(0.0325)	(0.0287)	(0.0372)
Constant	11.85***	11.17***	11.63***	12.13***	12.46***	13.21***	13.43***
	(0.0751)	(0.126)	(0.104)	(0.0921)	(0.0731)	(0.0647)	(0.0836)
Observations	11,478	11,478	11,478	11,478	11,478	11,478	11,478
R-squared	0.287						

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 8. Quantile regression IFLS 4 (2007)

Dependent Variable: Log(*wage_y)*	(1) OLS	(2) QR25	(3) QR30	(4) QR40	(5) QR50	(6) QR75	(7) QR90
age	0.0296***	0.0319***	0.0299***	0.0282***	0.0262***	0.0228***	0.0225***
	(0.00104)	(0.00160)	(0.00149)	(0.00115)	(0.00109)	(0.000844)	(0.00129)
male (= 1 if male)	0.338***	0.402***	0.392***	0.329***	0.305***	0.205***	0.282***
	(0.0196)	(0.0302)	(0.0281)	(0.0217)	(0.0206)	(0.0159)	(0.0244)
years_educ	0.113***	0.112***	0.109***	0.107***	0.104***	0.104***	0.119***
	(0.00337)	(0.00522)	(0.00486)	(0.00374)	(0.00356)	(0.00274)	(0.00421)
private (= 1 if private worker)	-0.185***	-0.298***	-0.309***	-0.259***	-0.230***	-0.157***	-0.108***
	(0.0275)	(0.0425)	(0.0395)	(0.0304)	(0.0289)	(0.0223)	(0.0343)
casual (= 1 if casual worker)	-0.951***	-1.243***	-1.183***	-0.991***	-0.910***	-0.645***	-0.494***
	(0.0430)	(0.0665)	(0.0619)	(0.0477)	(0.0454)	(0.0350)	(0.0537)
unpaid (= 1 if unpaid worker)	-0.527***	-0.846***	-0.813***	-0.660***	-0.461***	-0.349***	-0.398***
	(0.0610)	(0.0943)	(0.0878)	(0.0676)	(0.0643)	(0.0496)	(0.0761)
urban (= 1 if located in urban)	0.257***	0.423***	0.344***	0.274***	0.214***	0.141***	0.143***
	(0.0224)	(0.0347)	(0.0323)	(0.0248)	(0.0236)	(0.0182)	(0.0280)
manufacture (=1 if manufacturing worker)	0.208***	0.136**	0.196***	0.191***	0.246***	0.231***	0.289***
	(0.0424)	(0.0656)	(0.0611)	(0.0470)	(0.0447)	(0.0345)	(0.0530)
service (=1 if service worker)	0.0329	-0.0564	-0.0121	-0.0147	0.0321	0.0722**	0.0973*
	(0.0417)	(0.0645)	(0.0600)	(0.0462)	(0.0440)	(0.0339)	(0.0520)
Constant	13.40***	12.92***	13.18***	13.57***	13.85***	14.42***	14.54***
	(0.0746)	(0.115)	(0.107)	(0.0826)	(0.0786)	(0.0607)	(0.0930)
Observations	10,890	10,890	10,890	10,890	10,890	10,890	10,890
R-squared	0.282						

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 9. Quantile regression IFLS 5 (2014)

Dependent Variable: Log(*wage_y)*	(1) OLS	(2) QR25	(3) QR30	(4) QR40	(5) QR50	(6) QR75	(7) QR90
age	0.0233***	0.0222***	0.0220***	0.0189***	0.0168***	0.0172***	0.0211***
	(0.00104)	(0.00169)	(0.00134)	(0.00137)	(0.00105)	(0.000855)	(0.000969)
male (= 1 if male)	0.420***	0.602***	0.556***	0.460***	0.350***	0.239***	0.249***
	(0.0205)	(0.0334)	(0.0265)	(0.0272)	(0.0207)	(0.0169)	(0.0192)
years_educ	0.0913***	0.0850***	0.0892***	0.0936***	0.101***	0.0969***	0.107***
	(0.00342)	(0.00558)	(0.00443)	(0.00454)	(0.00346)	(0.00283)	(0.00320)
private (= 1 if private worker)	-0.199***	-0.209***	-0.193***	-0.273***	-0.307***	-0.220***	-0.158***
	(0.0302)	(0.0493)	(0.0391)	(0.0401)	(0.0305)	(0.0250)	(0.0283)
casual (= 1 if casual worker)	-0.936***	-1.118***	-1.010***	-0.924***	-0.898***	-0.646***	-0.459***
	(0.0452)	(0.0736)	(0.0584)	(0.0598)	(0.0456)	(0.0373)	(0.0423)
unpaid (= 1 if unpaid worker)	-0.438***	-0.559***	-0.655***	-0.663***	-0.532***	-0.382***	-0.335***
	(0.0953)	(0.155)	(0.123)	(0.126)	(0.0963)	(0.0787)	(0.0892)
urban (= 1 if located in urban)	0.331***	0.509***	0.524***	0.395***	0.310***	0.197***	0.171***
	(0.0232)	(0.0378)	(0.0300)	(0.0307)	(0.0234)	(0.0191)	(0.0217)
manufacture (=1 if manufacturing worker)	0.237***	0.323***	0.289***	0.216***	0.195***	0.163***	0.118***
	(0.0269)	(0.0438)	(0.0348)	(0.0356)	(0.0272)	(0.0222)	(0.0252)
service (=1 if service worker)	0.201***	0.307***	0.263***	0.192***	0.146***	0.114***	0.0362
	(0.0244)	(0.0398)	(0.0316)	(0.0324)	(0.0247)	(0.0202)	(0.0229)
Constant	14.29***	13.55***	13.73***	14.38***	14.79***	15.44***	15.59***
	(0.0771)	(0.126)	(0.0998)	(0.102)	(0.0779)	(0.0637)	(0.0721)
Observations	13,272	13,272	13,272	13,272	13,272	13,272	13,272
R-squared	0.180						

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1