NORGES HANDELSHØYSKOLE
Bergen, 20.06.2010

Inequality under Dictatorship and Democracy

Longitudinal Micro Data, Before and After the Fall of General Soeharto

by

Per Bjarte Ulvedal Nes

Supervisor: Erik Sørensen

Master Thesis, Department of Economics

NORWEGIAN SCHOOL OF ECONOMICS
AND BUSINESS ADMINISTRATION

ABSTRACT

Economic growth justified the autocratic New Order government of general Soeharto to the Indonesian public. The Asian financial crisis stalled growth and ended the New Order administration in 1998, then electoral democracy was instituted. This initiated a mass of policy changes, importantly including a large decentralization of fiscal and legislative power. This study explores the development of economic inequality in the tumultuous periods before and after the fall of Soeharto. The results show a decrease in inequality and converging provinces pre-crisis and for the whole period. However, in the post-crisis democratic period, income inequality increased, as did inequality between provinces.

ACKNOWLEDGEMENTS

I would like to thank my supervisor, Erik Sørensen, for useful guidance. In addition, I want to thank Anne Marie Anonsen Nes, Swati Sharma, Erling Faugstad, Sarah Anderson and Stig Arild Ulvedal Nes, for their contributions of ideas and comments throughout the past four months.

Bergen, June 2010

Per Bjarte Ulvedal Nes

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1 INTRODUCTION

Indonesia was ruled the autocratic administration called the New Order, under General Soeharto, for 32 years before the Asian financial crisis in 1998. This government was frequently accused of stifling dissent and refusing public scrutiny, as well as allowing no genuine political opposition or direct elections. The New Order administration ended after the financial crisis, with Soeharto's resignation. Control of Indonesia passed to an electoral democracy, with significant initial guidance from the International Monetary Fund. Numerous democratic reforms were implemented in the following years. Political power was decentralized, both from the presidency to parliament and political parties, and from national to local government. This study explores inequality in the tumultuous period from 1993 to 2007, using rich longitudinal micro data from the Indonesian Family Life Survey. This is particularly interesting because the periods before and after the crisis are at once quite similar and strikingly different. Both pre- and post-crisis Indonesia experienced high economic growth, and both the presiding regimes had explicitly stated goals of reducing economic inequality as well as poverty. However, their institutions are very different, in particular the concentration of regulatory and fiscal power. The different approaches may have yielded different results. By comparing the two periods, this study provides results which may shed light on what institutions are suited for inclusive growth, and who, if any, benefited from the transition to democracy. Discovering how inequality changed during the dictatorial rule of General Soeharto, and under a string of elected presidents, is the purpose of this study. Thus, under dictatorship and democracy, there are five aspects of inequality which will receive particular attention for comparison and contrast: (1) How much the levels of Indonesian economic inequality increase or decrease. (2) Which parts of the distributions are the primary drivers of change in inequality, if the rich or poor have the largest relative growth. (3) What major changes happened in contributions to inequality from different income sources and expenditure categories. (4) Whether change in inequality is limited to geographical pockets, or widely spread throughout Indonesia, whether there is large variation in within-province inequality. (5) How the inequality between provinces changes, whether province of residence is more or less important for position in the economic distribution.

A review of previous studies and UN-WIDER data shows that Indonesian inequality is either stationary with a Gini coefficient at a little below 0.40, or slightly declining from 1960 to the present. Many previous studies have relied on the Indonesian household survey (Susenas), which suffers under frequent changes in definitions and questionable reliability

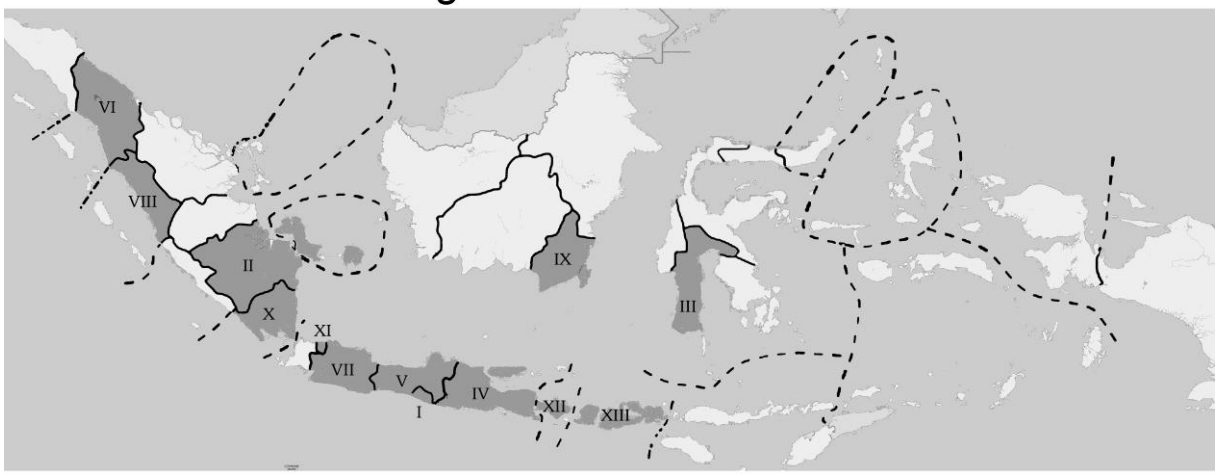
(Booth, 1993). Therefore, this study uses the Indonesian Family Life Survey, consistent longitudinal household level data with low attrition, and observations as recent as 2007.

The study begins with an introduction to Indonesia, the data and methodology employed. Then empirical results are presented. Levels of inequality and inequality sensitivity to changes in income sources and expenditure categories are presented for Indonesia as a whole. Further, the province variations in inequality levels and changes are explored. Finally the results are summarized and conclusions offered.

2 INDONESIA

The Republic of Indonesia is located in Southeast Asia and Oceania. It comprises of 17,508 islands and has a population of over 230 million people, making it the world's fourth most populous country. Its capital city is Jakarta and it is governed as a republic, by an elected legislature and president. There is large ethnic, linguistic and religious variation in Indonesia. But despite the large differences, the Indonesian national identity is strong, greatly aided by the shared national language Bahasa Indonesia. Figure 1 provides a map of the country which constitutes the context for this study, and shows the 13 provinces from which the data originates. The islands span more than 5000 kilometer, which is equivalent to the distance from Norway to Nigeria.

Figure 1 - Indonesia



I	Di Yogyakarta	V	Jawa Tengah	IX	Kalimantan Selatan
II	Sumatera Selatan	VI	Sumatera Tengah	X	Lampung
III	Sulawesi Selatan	VII	Jawa Barat	XI	DKI Jakarta
IV	Jawa Timur	VIII	Sumatera Barat	XII	Nusa Tenggara Barat
				XIII	Bali

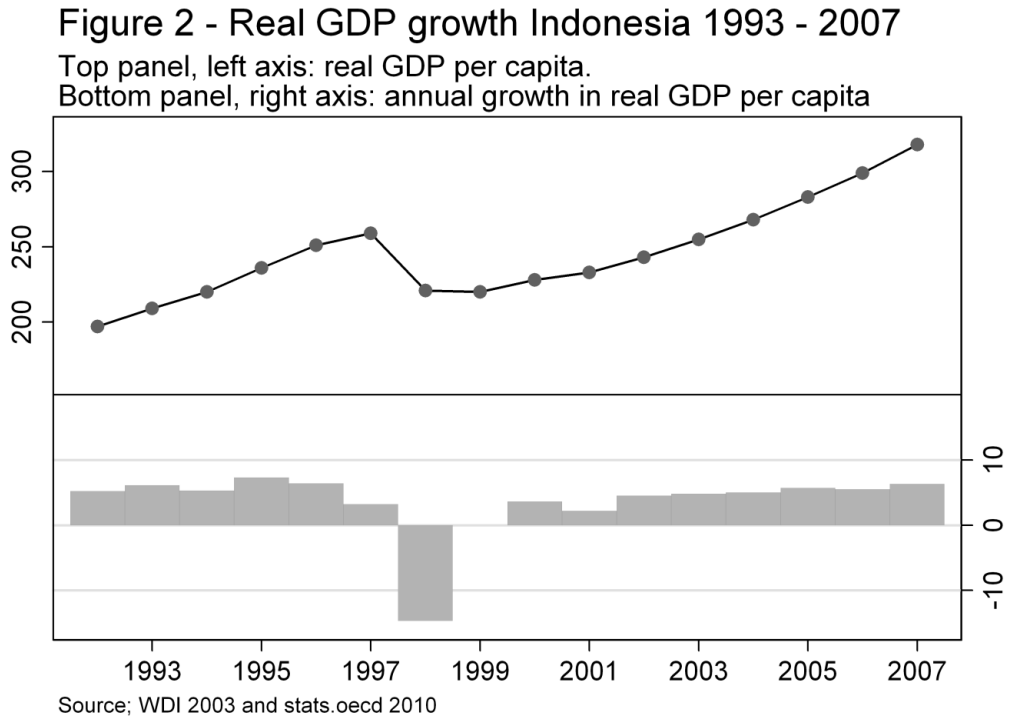
2.1 HISTORY

People have lived on these fertile plots of land since before recorded history. One of the first known specimens of Homo erectus was found in East Jawa. The fossils were found in

1891 and dated as more than 500,000 years old (Pope, 1988). Agriculture was mastered here by the Austronesian people, the ethnic ancestors of the majority of the current population, in around 2000 BCE. Since then, agriculture and trade have been major parts of the Indonesian economy. The first contact with Europeans happened when the Portuguese landed in Malaku but it was the Dutch who controlled most of what was to become Indonesia for the duration of the colonial period (Ricklefs, 1993). After World War II, control was wrested from the Dutch by nationalist leader Sukarno, with the help of international pressure. Sukarno ruled until 1968, when he was replaced by the New Order Administration of General Soeharto, who had gained the support of the US Government. This marked the beginning of the long Indonesian economic growth spurt, much attributable to the encouragement of foreign direct investment and trade (Vickers, 2005). Growth served as the justification for General Soeharto's regime, but it was not robust to the Asian financial crisis in 1998. Soeharto lost political control and was been replaced by a string of presidents, the latest of which is the peacefully elected reformist president Susilo Bambang Yudhoyono in 2004, consequently re-elected in 2009.

2.2 RECENT ECONOMIC HISTORY

Currently, the Indonesian economy is the second largest in Southeast Asia, with a GDP of USD 932.1 billion. The main exports are oil, gas and electrical appliances, while main imports include machinery, equipment, fuels and foodstuffs.[1]



[1] CIA - The World Factbook, retrieved 2009-03-25

The backdrop for this exploration of economic inequality is the 14 year period from 1993 to 2007. Even with the severe financial crisis in 1998 the overall economy expanded by 61.5% in the 14 years from 1993 to 2007. If the economies of average households are mirrored in the national real GDP per capita figures, then we would expect a similar increase in household expenditures and incomes in the same period. However the actual numbers fall somewhat short of this, with an increase in mean real annual total household expenditures of 43.5 percent, while equivalent incomes increased 58.2 percent. Throughout the study, this period will be discussed as three distinct sub-periods for contrast and comparison, these three are 1993 to 1997, 1997 to 2000, and 2000 to 2007. The period from 1993 to 1997 was entirely under Soeharto's the New Order administration, and will be referred to as the pre-crisis period. The period between 1997 and 2000 contains the Asian financial crisis and change of governments, and will be referred to as the crisis period. The period between 2000 and 2007 was entirely under the control of democratic administrations and will be called the post-crisis period. Since they constitute the context of this study, some aspects of the economic and governmental changes in each period are presented below, largely based on Sato's (2003) work on the democratization of Indonesia.

2.2.1 PRE-CRISIS

By the middle of the 1990s, Indonesia had enjoyed over three decades of remarkable social, economic, and demographic changes. Per capita income had risen since the early 1960s, from around USD 50 to more than USD 1,100 in 1997. Massive improvements occurred in many dimensions of living standards of the Indonesian population. The poverty headcount measure, by the World Bank, declined from over 40 percent of population in 1976 to just 18 percent in 1996. Infant mortality fell from 118 per thousand live births in 1970 to 46 in 1997. Primary school enrollments rose from 75 percent in 1970 to universal enrollment in 1995 and secondary schooling rates rose from 13 percent to 55 percent over the same period. The total fertility rate fell from 5.6 in 1971 to 2.8 in 1997. This success story is mostly attributed to the oil booms of the 1970s and 1980s coupled with foreign and domestic export oriented investment. The ruling New Order administration was an institutionalized authoritarian rule, with Soeharto's *pembangunan* (development) as its national ideology. The politically directed development was meant to work toward the goal formulated in Soeharto's development trilogy "growth, stability and equity".

2.2.2 ASIAN FINANCIAL CRISIS

In the late 1990s the economic outlook began to change as Indonesia was gripped by the economic crisis that affected much of Asia. At the beginning of 1998 the local Indonesian Rupiah collapsed, causing a contraction of gross domestic product by an estimated 13 percent in 1998 and no growth in 1999. Some parts of the Indonesian economy were more vulnerable than others to the financial crisis. The rapid currency depreciation mounted public debt to USD 60 billion, imposing severe strains on the government budget (Robinson, 2009). The national accounts measure of personal consumption showed little decline, while gross domestic investment declined by 35 percent.

The political fallout was dramatic. The currency crisis cancelled much of the development achievements that had served as the justification for Soeharto's administration, tensions rose following the dried up investments, large rise in unemployment, and rampant price inflation. Finally public outrage and violent rioting ensued in Jakarta after the shooting of four student demonstrators in May 1998. The pressure against Soeharto finally led to his resignation on 21 May 1998, he was peacefully succeeded by his vice president, Bacharuddin Jusuf Habibie.

2.2.3 POST-CRISIS

On June 24th 1998, Indonesia and the International Monetary Fund reached an agreement on the Memorandum of Economic and Financial Policies. This was a substantial reform program for macroeconomic stabilization. The memorandum also included elimination of some policies which arguably served to enrich Soehartos's inner circle, such as the National Car Program and clove monopoly. There was also a reduction in the massive fuel subsidies, this increased the price of consumer fuels, initializing persistent double digit inflation. Between 2000 and 2007, GDP growth fluctuated between 4.5 percent and 5.5 percent per year and recovery ensued. The post-Soeharto period saw *pembanguan* (development) replaced by *reformasi* (reform), and a frequent change of power. In the subsequent three and a half years, Indonesia had three presidents, Bacharuddin Jusuf Habibie (May 1998), Abdurrahman Wahid (October 1999), and Megawati Soekarnoputri (July 2001). Many political reforms were introduced. Habibie opened the political system for more than three parties and political parties were no longer required to adhere to Soeharto's ideology. Wahid abolished the censoring Ministry of Information. The first direct presidential elections were successfully held in 2004. Susilo Bambang Yodhoyono was elected, and re-elected in 2009, kindling hope for more political stability. The post-crisis period can be summarized as both governmentally and economically tumultuous because of the rapid changes of administrations and the struggle in dealing with the after-shocks of the Asian financial crisis.

One quite clear change in the post-crisis period government is the decentralizing of both administrative and fiscal power initiated in 2001. According to Comola and Mello (2010), the process has been dubbed 'Big Bang decentralization' and its implementation is widely regarded as a successful. Many expenditure assignments were decentralized to local government, which now account for almost two thirds of consolidated government spending, nearly double the pre-decentralization share. The minimum wage is now set by province governments based on calculation of local cost of living indicators. This decentralization has exasperated differences between local governments, and Firman (2010) found that it resulted in fragmentation of regional development.

3 THEORY AND METHODOLOGY

Economics can be viewed as a practical application of consequentialist ethics; the field is built upon utilitarianism, and thus requires some form of hedonistic calculus to quantify human wellbeing. The measurement of human welfare is a field in its own right, and which proxies are appropriate for the utility of individuals is almost as much debated as whether such measurable proxies can exist at all. In short, what economists attempt to measure is alternately called utility, net pleasure, flourishing, eudaimonia and happiness; it should capture each person's ability to meet his personal preferences.

3.1 WELFARE INDICATORS

Utility is not directly measurable, thus the utility of different individuals cannot be compared accurately, nor can the collective utility across distributions or over time. Ideally we would like to compare quality of life or living standards, but this is certainly difficult to observe and arguably non-quantifiable, some measurable indicator will have to serve this purpose. The standard assumption is that utility, U, is an increasing and concave function of income or consumption, $U(y)$ $(U' > 0,\ U'' \leq 0)$. This seems quite acceptable. Arguably, expenditures have the closest theoretical link of the two, since it is directly tied to consumption. In so far as people are acting rationally, in accordance with their own preferences, expenditures are allocated toward heightening their utility. All the while, higher incomes increase the potential for purchase of goods and services, immediate or postponed. Serving as proxies for utility therefore, are survey responses about household incomes and expenditures, which have the agreeable quality of being measurable and comparable.

3.2 INEQUALITY

As is well known, not everyone is given equal means by which to satisfy their preferences. There is a finite amount of resources for distribution, and whether by serendipity or labor, some are more favorably endowed than others. This variance in outcomes is frequently the subject of debate, both public and private, and it is called inequality. Inequality represents a potential conflict between economic efficiency and feelings of justice and entitlement. The income people receive is not only a means toward acquiring more goods and services, but can be perceived as a tangible signal of societies valuation of their worth.

In the strictly utilitarian tradition, Atkinson (1970) argues that inequality must matters for total societal welfare. It follows from the assumptions about increasing but concave returns to income, and a desire to maximize welfare. For higher total welfare, W, distributions are ranked according to

$$W \equiv \int_0^{\bar{y}} U(y) f(y) dy \, .$$

In other words, total welfare is a function of the utility from income and its distribution. For any distribution of income, given a concave utility function, there will be a lower mean income with completely equal distribution, which gives the same level of total welfare. Thus any uneven distribution carries an alternative cost in terms of total societal welfare.

On a personal level, in a more controversial behavioral approach, Milanovic (2004) argues that the income of others can enter your own utility function. The marginal utility of increased income is not only a function of the level of your own income, but also how it will affect your position in the income distribution of your peer group. In other words your added utility from increased income is higher if the income of your peer group is increased less, thus increasing your relative affluence. If you identify yourself with a more affluent segment of society, a higher level is required for the same satisfaction to be derived from your income. This is one reason why inequality is important, because individuals care about the perceived justice inherent in the distribution of wealth.

There is also growing evidence that more equal societies do better on a range of scales from health indicators such as mortality (Lynch et al., 2000), to societal indicators like violent crime (Fajnzylber et al, 2002). Wilkinson and Picket (2009) claim that for each of eleven health and social problems: physical health, mental health, drug abuse, education, imprisonment, obesity, social mobility, trust and community life, violence, teenage pregnancy and child well-being, unequal rich societies do worse than more equal ones. These results

suggest that, after a certain level of economic development has been reached, primarily increasing equality rather than growth may lead to higher societal welfare and social cohesion. Shedding some light on how developments in inequality can happen is therefore a worthwhile exercise, and a supplementary aim for this study.

3.3 MEASURING INEQUALITY

Opinions about inequality are often laden with feelings about of what a just distribution should look like. And therefore, measures of inequality can tend to take the form of deviation from a particular authors favored distribution, which makes them highly subjective. Dalton (1920) emphasizes that any measurement of inequality involves judgments about social welfare. The question arises then; of how to reasonably and objectively measure inequality across populations and over time. Clearly the simple variance of a distribution tells us something about its spread, which is desirable, but is also dependent on the mean level of the distribution, which is not. Over time many measurements of inequality have developed, all of with some intuitive or mathematical appeal. When discussing their usefulness and adherence to objectivity, the benchmark is often the five inequality axioms.

(1) The Pigou-Dalton Transfer Principle
Rising inequality response to mean preserving increase in spread of distribution (Dalton, 1920, Pigou, 1913)

(2) Income scale independence:
Invariance to uniform proportional changes (Cowell, 2000)

(3) Principle of population:
Invariance to replications of the population (Dalton, 1920)

(4) Anonymity:
Independence from any other characteristic than the indicator whose distribution is measured

(5) Decomposability:
Overall inequality consistently related to constituent parts of the distribution, such as population sub-groups (Shorrocks, 1980)

The most commonly known measurement of inequality is the Gini coefficient, which satisfies all but the fifth of the inequality axioms. It is also an appropriate introduction to inequality because of its popularity and intuitively satisfying relationship with the Lorenz curve. The Lorenz curve (eg. figure 5) plots the proportion of the total income of the population that is cumulatively earned by the bottom x percent of the population. The area under the line of equality consists of two portions divided by the Lorenz curve, area A between the Lorenz curve and the line of equality, and area B as the residual.

If the Lorenz curve is represented by the function; $Y = L(X)$, the value of area B can be found by integration and the Gini coefficient, G, calculated as

$$G = 1 - 2\int_0^1 L(X)dX.$$

Because the Gini coefficient represents the ratio of the area that lies between the line of equality and the Lorenz curve, A, over the total area under the line of equality $A + B$, it must necessarily range between 0 and 1, where 0 denotes a state where everyone is equally endowed, called perfect equality, and 1 means a single individual receives all the earning, which represents complete inequality. A 45 degree line in the Lorenz diagram would thus represent perfect equality. There is a range of ways to calculate the Gini Coefficient, and some find the mean difference approach for calculating the Gini coefficient more intuitively satisfying. Corrado Gini pointed out in 1912 that the mean difference approach is equivalent to the geometric approach described above. Gini's absolute mean difference for a discrete distribution is defined as:

$$\Delta = \frac{1}{n^2}\sum_{i=1}^{n}\sum_{j=1}^{n}\left|y_i - y_j\right|$$

where $y_i$and $y_j$are variates from the same distribution. The absolute mean difference for a continuous distribution is defined similarly as the mean difference between any two variates of the same distributions:

$$\Delta = E\left|y_i - y_j\right|$$

where E is the mathematical expectation operator. The relative mean difference is defined as

$$\frac{\Delta}{\mu_y} = \frac{E\left|y_i - y_j\right|}{\mu_y}$$

So that the relative mean difference equals the absolute mean difference divided by the mean of the income distribution. This paper relies primarily on the Gini coefficient, mostly because of its intuitive appeal and popularity. However, as is well known (e.g., Cowell, 2000), the Gini coefficient is not decomposable, in the sense that the sum of "within-province inequality" and "between-province inequality" do not add up to "total inequality" if the provinces income ranges overlap.

When such decomposition is necessary for the analysis of within and between-province inequalities, measurements will deviate from the Gini coefficient and rather rely on the Theil Index. The Theil index meets all the requirements of the five axioms of inequality, which grants it membership in the Generalized Entropy, or GE, class of inequality measures. The GE class of inequality measures have the following general formula:

$$GE(\alpha) = \frac{1}{\alpha^2 - \alpha}\left[\frac{1}{n}\sum_{i=1}^{n}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right]$$

where n is the number of individuals in the sample, y_i is the income of individual i, $i \in (1,2,\dots,n)$ and $\bar{y} = (1/n)\sum y_i$, the arithmetic mean income. Shorrocks (1980) showed that the group of measurements which satisfy the fifth axiom of decomposability includes the three measures with $\alpha = 0, 1, 2$. These measured are called respectively, the mean log deviation, the Theil index and half the squared coefficient of variation.

3.4 ANALYZING INEQUALITY

There are several influences on inequality which can shed light on the different aspects of the development in Indonesia, to get a comprehensive picture of inequality this study looks at the changes in five aspects of Indonesian inequality in particular. (1) How much the levels of Indonesian economic inequality increase or decrease. This is determined by evaluating changes in common measures of inequality like the Gini coefficient and Theil Index. (2) Which parts of the distributions are the primary drivers of change in inequality, if the rich or poor have the largest relative growth. This is determined by a graphical assessment of diagnostic plots. (3) What major changes happened in contributions to inequality from different income sources and expenditure categories. This requires decomposition by factor components. (4) Whether there is large variation in within-province inequality. Revealing whether change in inequality is limited to geographical pockets, or widely spread throughout Indonesia. This is explored by comparing level of inequality across provinces. (5) How the inequality between provinces changes, revealing whether province of residence is more or less

important for position in the Indonesian distribution. This requires decomposition by population subgroups.

The methods required for (3) and (5) correspond to what Shorrocks (1982) calls the two broad categories of decomposition of inequality. Sensitivity to income sources and expenditure categories are determined by decomposing inequality by different components, while variation in within- and between-province inequality corresponds to decomposition by population subgroups. A brief introduction to these techniques follows.

3.4.1 DECOMPOSING BY FACTOR COMPONENTS

Shorrocks (1982) argues that the Gini coefficient can be decomposed by factor components. Under the weak restrictions that inequality contributions depends only on the distribution of the factor, and that the total distribution can be decomposed in such a way that the proportion of inequality contributed by each factor component is identical to the natural decomposition proportions obtained for any other index. This result is extended by Lerman and Yitzhaki (1985), who show that the Gini coefficient, G, for total inequality can be represented as

$$G = \sum_{k=1}^{K} S_k G_k R_k.$$

S_k represents the share of source k in total income, G_k is the source Gini corresponding to the distribution of income from source k, and R_k is the Gini correlation of income from source k with the distribution of total income (R_k = Cov{y_k, F(y)}/ Cov{y_k, F(y_k)}, where F(y) and F(y_k) are the cumulative distributions of total income and of income from source k). The relation among these three terms has a clear and intuitive interpretation (Stark, Taylor, and Yitzhaki, 1986); How much a constituent part of income or expenditure contributes to total inequality will depend on its share of total income or expenditure, henceforth budget share, the inequality within the constituent, henceforth source Gini, and how the income or expenditure source and the distribution of total income or expenditure are correlated.

This particular method of decomposition allows estimation of the effect from small changes in a specific component (Stark, Taylor and Yitzhaki, 1986). Consider a small proportional change in income from source k equal to $(e-1)y_k$ where e is close to 1 and y_k represents income from source k. It can be shown that the partial derivative of the Gini coefficient with respect to a percent change in e in source k is equal to

$$\frac{\partial G}{\partial e} = S_k(G_k R_k - G)$$

The percent change in inequality resulting from a small percent change in the component factor k equals the original contribution of source k to inequality minus source k's share of the total distribution.

$$\frac{\partial G/\partial e}{G} = \frac{S_k G_k R_k}{G} - S_k$$

This lends itself to interpretation as elasticity, revealing the influence on inequality from a small change in income generating ability of a source, or a change in the size of an expenditure category.

3.4.2 Decomposing by Population Subgroups

Shorrocks (1984) outlines the method for partitioning additive indexes of inequality in to within- and between –subgroup terms that depend only on the subgroup mean and population sizes if the inequality measure is also scale invariant and replication invariant. He finds that only the single parameter General Entropy class is admissible in this respect. When total inequality, I, is decomposed by population subgroups, the generalized entropy class can be expressed as sum of within group inequality (I_w) and between group inequality (I_b).

$$I = I_w + I_b$$

$$I_w = \sum_{j=1}^{k} w_j \, GE(\alpha)_j$$

$$w_j = v_j^{\alpha} f_j^{1-\alpha}$$

where f_j is population share and v_j income share of each group $j, j = 1,2, \dots, k$

$$I_b = \frac{1}{\alpha^2 - \alpha}\left[\sum_{j=1}^{k}\left(\frac{\bar{y}_j}{\bar{y}}\right)^{\alpha} - 1\right]$$

where $\bar{y}_j$ is the mean income of each group j. The parameter α in the GE class represents the weight given to distances between individual observations in the measured welfare indicator at different parts of the income distribution. For example the generalized entropy measure with $\alpha = 1$ is the Theil index,

$$GE(1) = \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\bar{y}}log\frac{y_i}{\bar{y}}.$$

Lower values of α are more sensitive to changes in the lower tail of the distribution. (Litchfield, 1999). The fact that the Theil index is decomposable into variation between and within subgroups in the population means that we can report how much of total inequality is attributable to differences between provinces, and how much is attributable to the variation within the provinces.[2] Cowell and Jenkins (1995) suggest the summary measure R_b,

$$R_b = \frac{I_b}{(I_b + I_w)}$$

which is simply the ratio of inequality 'explained' by between-group variation to total variation.

3.4.3 Inference on Inequality Measures

The results explored in chapter 4 involve levels of inequality that differ across regions and time. Bootstrapped standard errors are applied throughout the study when judging whether these differences in inequality are significant. Significance quantifies the degree of non-randomness in change, so in order to judge whether changes in inequality are significant, the magnitude of the change has to be compared to what may be called random, or standard, deviations.

The difficulty in finding standard deviations and conducting statistical inference for measures of inequality is that the measures are all non-linear functions of a random variable, so the interval estimates available from asymptotic theory may not be accurate, especially in small samples. They may also exceed the theoretical bounds of measures like the Gini coefficient. Mills and Zandvakili (1997) argue that standard errors for inequality measures can best be attained through bootstrapping, in other words identifying the variation by repeated random sampling with replacement from the original dataset. Bootstrapped standard errors is computationally simple, allows the same technique for all inequality measures and automatically takes in to account any bounds to a particular measure.

[2] Calculation of between-province and within-province inequality is carried out with the STATA subprogram 'ineqdeco' (STB-48: sg104) by Stephen P. Jenkins at the University of Essex..

4 DATA

This study uses data from the Indonesia Family Life Survey (IFLS) of the RAND Corporation.[3] IFLS is an on-going longitudinal household survey, with a sample which is representative of about 83 percent of the Indonesian population. The survey areas cover 13 out of the 33 provinces in Indonesia. The first wave of IFLS, aptly called IFLS1, was conducted in 1993/94 by RAND in collaboration with the Demographic Institute of the University of Indonesia in 1993. IFLS2 and IFLS2+[4] were subsequently conducted in 1997 and 1998 respectively. IFLS3 was fielded in 2000, while IFLS4 was fielded in 2007/2008 on the same 1993 households and their splitoffs.

4.1 SURVEY DESIGN

Since IFLS is a longitudinal survey, the sampling scheme for the first round primarily determines the sample in subsequent rounds. The IFLS1 sampling scheme stratified on provinces, then randomly sampled within provinces. Provinces were selected to maximize representation of the population, capture the cultural and socioeconomic diversity of Indonesia, and be cost-effective to survey given the size and terrain of the country. Within each of the 13 provinces, enumeration areas (EAs) were randomly chosen from a nationally representative sample frame used in the 1993 SUSENAS, a socioeconomic survey of approximately 60,000 households conducted by Statistics Indonesia (Badan Pusat Statistik).

The IFLS randomly selected 321 EAs in the 13 provinces, oversampling urban EAs and EAs in smaller provinces to facilitate urban–rural and Javanese–non-Javanese comparisons. Within a selected EA, field teams randomly selected households based on the 1993 SUSENAS listings of households obtained from the regional BPS office. In IFLS1, interviews were conducted with 7,224 households and detailed individual-level data were collected from over 22,000 individuals. In IFLS2, the goal was to locate and reinterview the 7,224 original households interviewed in IFLS1. If no members of the household were found in the 1993 interview location, the interviewer asked local residents where the household had gone. If the household was thought to be within one of the 13 IFLS provinces, the household was tracked to the new location and, if possible, interviewed there.

In IFLS1 7,224 households were interviewed, and detailed individual-level data were collected from over 22,000 individuals. In IFLS2, 94% of IFLS1 households and 91 percent

[3] The description of IFLS data in this section is summarized from the RAND Corporation website (www.rand.org/FLS/IFLS).

[4] The main purpose of IFLS2+ was to capture the immediate social impact of the Indonesian economic crisis that occurred during the year.

of IFLS1 individuals were reinterviewed. In IFLS3, 95.3 percent of IFLS1 households were recontacted and in IFLS4 the recontact rate was 93.6 percent. Among IFLS1 dynasty households, any part of the original IFLS1 households, 90.3 percent were either interviewed in all 4 waves or had died, and 87.6 percent were actually interviewed in all four waves. These recontact rates are as high as, or higher than, most longitudinal surveys in the United States and Europe. High reinterview rates were obtained in part because of extraordinary commitment to tracking and interviewing individuals who had moved or split off from the original IFLS1 households. High reinterview rates contribute significantly to data quality in a longitudinal survey because they lessen the risk of bias due to non-random attrition in studies using the data.

This paper uses both expenditure and income data from all four waves of IFLS. The data about household expenditures and household income was normally not reported by the same respondent. Expenditure data is part of the "Household Expenditures and Knowledge of Health Facilities" module, which is typically answered by a female respondent, either the spouse of the household head or another person most knowledgeable about household affairs. Income data is a part of the "Household Economy" module, which was typically answered by the household head.

Total household expenditure is an aggregate of (1) food expenditure, (2) non-food expenditure: frequently purchased goods/services,[5] (3) non-food expenditure; less frequently purchased good/services (including durables), (4) education expenditures and (5) housing expenditures. These aggregates are constructed by Firman Witoelar at the World Bank (Witoelar, 2009).

Total household income is aggregated as the sum of labor income,[6] farm business income,[7] non-farm business income,[8] and asset income.[9] These aggregates are created for the

[5] For each non-food item, IFLS1 asked whether the reported expenditure pertained only to the individual answering the question or the household as a whole. This way of asking about expenditures is not standard in budget surveys and was dropped in IFLS2, with the cost that 1993 non-food expenditures are not directly comparable with expenditures in later waves. IFLS2, 2+, 3 and 4 expenditures, however, are directly comparable. This is a potential problem, and a possible weakness. However this weakness is consistently overlooked by other authors and so it is assumed to be a small one.

[6] Labour income is equal to sum of annual total earnings of all household members, from their two most time-consuming occupations, whether that is as self-employed or salaried worker. Where annual earnings are unavailable monthly numbers are used to construct annual earnings.

[7] Farm business income equals the households' annual net profit from farming business and income from rent/lease/profit-sharing of farming assets. Net profit is controlled as equal to revenue minus expenditures where available. In cases where farming assets are only partially owned by the households their share of the rent/lease/profit-sharing is assumed equal to their ownership share.

purposes of this study. However, the income data carries slightly less weight than expenditures, since consumption/expenditure data is expected to be of higher quality (Deaton, 2004) and does not commonly contain observations equal to zero.

The aggregation of all expenses and incomes results in total household expenditure and incomes. This study chooses to construct per capita expenditure and incomes, by dividing the total household expenses and incomes of every wave by the household size in the same year.[10] Per capita numbers capture the effect of large households necessarily spending a higher amount than a smaller one create equal living standards for its members.

4.2 DEFLATION

In order to convert nominal Rupiah values into real values based on Jakarta December 2000 price levels, temporal and spatial adjustment of values are carried out using the temporal and spatial indexes assigned to each household. Two sets of deflators are used, both of these constructed by Witoelar (2009). The first set of deflators is the temporal deflators using December 2000 as the base. The second set of deflators is the spatial deflators using Jakarta as the base. The local Rupiah values are inflated to December 2000 prices levels by multiplying the nominal value with the temporal inflator. Indonesia has experienced price inflation from 1997 to 2000, thus the real value of 1997 income/expenditure in local prices is higher than the nominal value after applying the temporal inflator.

The local Rupiah values are further converted into Jakarta-area prices by dividing with the spatial deflator. The real value will be higher than the nominal value in areas/locations with prices which are lower than Jakarta after applying the spatial deflator. In summary, the household expenditure was first deflated by multiplication with the temporal deflator and it was then deflated again by dividing it with the spatial deflator.

4.2.1 TEMPORAL

For temporal deflation, the Tornquist index created by Witoelar (2009) is applied where available, and complemented by OECD consumer price index numbers. The desirable

[8] Non-farm business income is aggregated by the same method as farm business income.

[9] Asset income is the sum of rent/lease/interest/profit-sharing in assets not related to farming business and non-farming business; houses, vehicles, jewelry, stocks, land etc. Again it is assumed that the households share in profit-sharing is equal to their ownership share in each asset.

[10] In IFLS a household is defined as a group of people whose members reside in the same dwelling and share food from the same cooking pot.

qualities of the Tornquist price indices for comparing temporally separated distributions are established by Balk and Diewert's (2001) axiomatic approach to price indexes.

The Tornquist index is created for each household based on the month and year of the household interview and the location (province, urban/rural status) of the household. The indicator adjusts for price changes within the household's location from the date of interview to December 2000, creating real local Rupiah amounts (base to December 2000). Urban households are assigned the Tornquist deflator based on price data for the nearest city and rural households are assigned the Tornquist deflator based on price data for their province of residence. The Tornquist indices were constructed separately for urban and rural prices. By considering consumption shares from both years, the Tornquist index allows for the fact that households will substitute away from expensive items, such as rice, towards cheaper ones as relative prices change. This substitution will mitigate the welfare impact of price changes that should in principle be accounted for in a cost of living index. Other indices such as Laspeyres do not account for such substitution. In the 70 households where the Tornquist index was unavailable in 1997 the temporal deflator is set equal to the mean value of the Tornquist index for this year.

4.2.2 SPATIAL

Prices differ across space, the cost of living is not the same in urban and rural areas, nor across provinces. The differences can for example be caused by varying access to locally produced and/or internationally traded goods. The use of nominal income or expenditure data would ignore the fact of systematic differences in prices of goods and services. Therefore, in addition to deflating nominal Rupiah amounts temporally, it is also necessary to adjust for spatial price differences. The spatial deflator variable is the ratio of the location (province, urban/area) poverty line (in December 2000 prices) to the Jakarta poverty line. Thus, it converts the local December 2000 values into Jakarta December 2000 values (Strauss et al., 2004).

4.3 OUTLIER TREATMENT

Outliers, being observations which deviate extremely from the majority of observations, can occur by chance or fault in large data sets, and are judged as unreasonable if they appear too extreme to logically belong in the distribution, this typically occurs due to faulty data gathering or input. IFLS includes observations which appear to be faulty, and since inequality measures typically are quite sensitive to changes in the tails of distributions it is important to address this issue so that a few dubious observations do not end up determining the trend of

the whole dataset. The income and expenditure data is treated for outliers as follows; before summing the income sources which equal total household income, all income sources are treated individually by *winsorizing*. The same is done for the five categories of household expenditure. After this, eyes-on-data is applied and large deviations such as negative incomes or expenditures are eliminated.[11] The winsorizing process is applied by ordering the variables X is such that $X_1 \leq \cdots \leq X_n$ and a new variable Y is generated identical to X except that the h highest values are replaced by the next value counting inwards from the extremes: $Y_1, \ldots, Y_h = Y_{h+1}$, $Y_n, \ldots, Y_{n-h+1} = Y_{n-h}$. Outlier treatment introduces a possible bias, if the most extreme expenditure values are overrepresented in one year; the inequality measurement for this year will be reported as 'too low'. Since real expenditures have risen over time the inequalities in the last waves are likely to be corrected more downward than the earlier waves by this method of outlier treatment. Choosing how many observations to treat involves some subjective judgment about what values can be considered reasonable, and is therefore somewhat arbitrary. Total household incomes has about 37'000 observations while expenditures has 38'000, and treating 0,1 percent of this number gives satisfactory results as judged by simply looking at the post-treatment data and results. 370 expenditure and 380 income observations are shifted downward according to the winsor process.

4.4 SAMPLING WEIGHTS

The IFLS sample, which covers 13 provinces, is intended to be representative of these provinces which contain 83 percent of the Indonesian population in 1993. By design, the original survey over-sampled urban households and households in provinces other than Java. It is therefore necessary to weight the sample in order to obtain estimates that represent the underlying population. The cross-section analysis weights found in IFLS are intended to correct for sample attrition from 1993 to 2007, and to correct for the fact that the IFLS1 sample design included over-sampling in urban areas and the island of Java. The cross-section weights are matched to the 2007 Indonesian population, again in the 13 IFLS provinces, in order to make the attrition-adjusted IFLS sample representative of the 2007 Indonesian population in those provinces.[12]

[11] This was found necessary for 4 observations, all from ILFS1 (1993), which is more plagued by noisy data than the following waves.

[12] The IFLS4 cross-section analysis weights are intended to correct both for sample attrition from 1993 to 2007, and then to correct for the fact that the IFLS1 sample design included over-sampling in urban areas and off Java. The cross-section weights are matched to the 2007 Indonesian population, again in the 13 IFLS provinces, in

5 RESULTS

All the results are based on the two proxies for welfare, per capita incomes and expenditures. If the two were matched completely then using both measures would be not be necessary as they would convey the same data about changes in inequality. This is not the case. However, there should be a positive relationship between the two, since high expenditures normally necessitates high incomes, while high incomes make higher expenditures possible; and higher consumption levels agree with most people's preferences. It is therefore unsurprising that the two welfare proxies are positively correlated, with a correlation coefficient of 0.412 that is significant at all conventional levels.

5.1 GROWTH OF INCOMES AND EXPENDITURES

According to the national account numbers illustrated in figure 2, the period in question was one of consistent economic growth with the exception of 1997 and 1998. Looking at how total household expenditures developed in the same time-span lends support to this narrative.

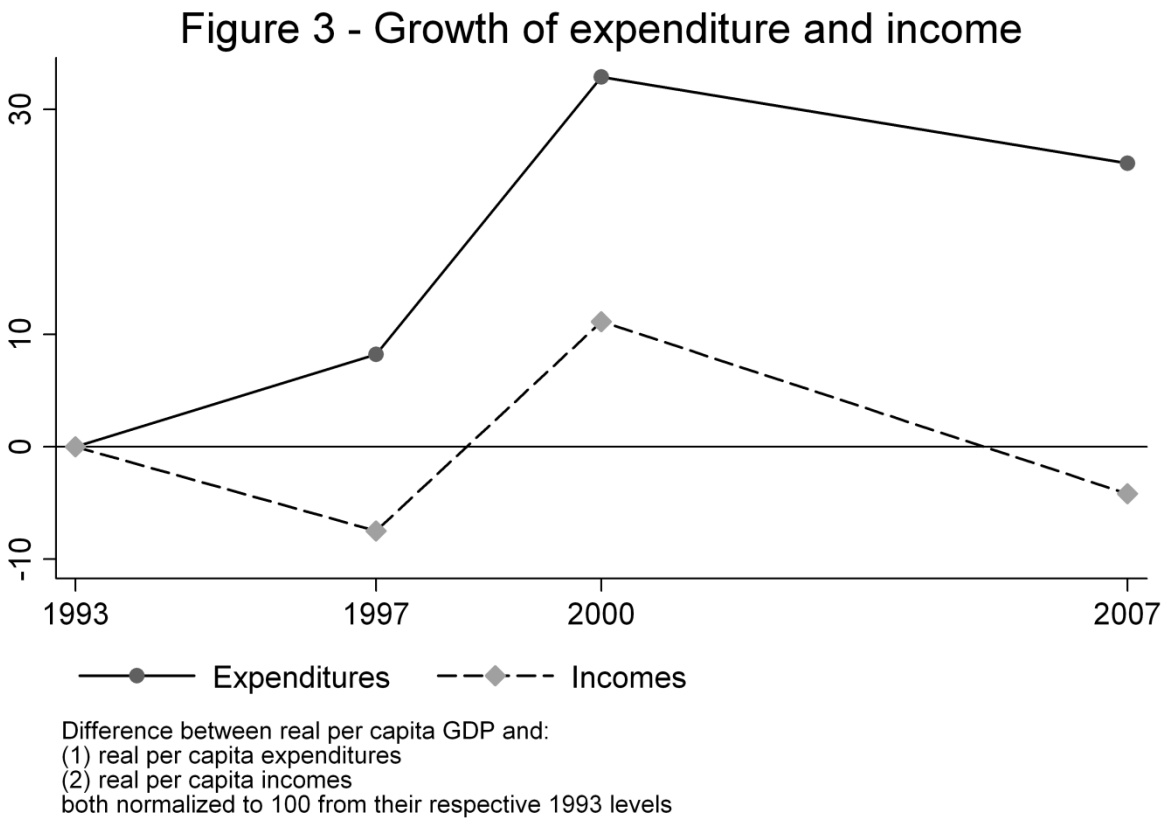


Figure 3 shows the growth difference between growth in gross domestic product, and household economy as measured by per capita expenditures and incomes. The rate of growth

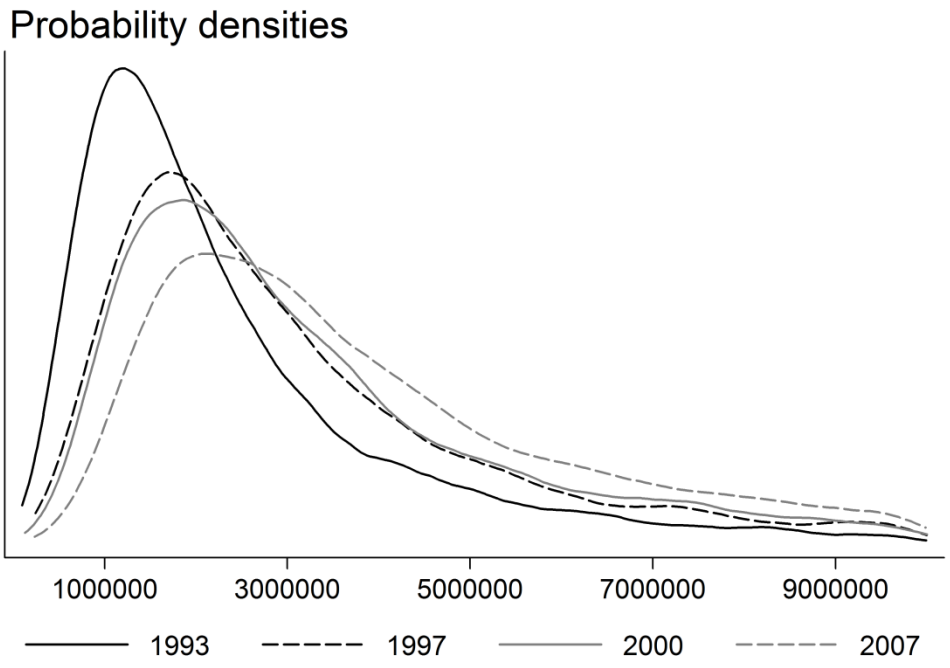
order to make the attrition-adjusted IFLS sample representative of the 2007 Indonesian population in those provinces. "

for the household economy differs substantially pre- and post-crisis; while the annual growth of median real household per capita expenditure was 7.9 percent from 1993 to 1997, it was only 2.9 percent from 2000 to 2007. The income numbers show a similar pattern at lower levels of growth, where pre-crisis growth of mean per capita income is 4.7 percent annually, post-crisis growth is less at 2.7 percent. The difference in growth rates between 1993 to 1997 and 2000 to 2007 is somewhat surprising, since real gross domestic product per capita grew at more similar rates during these two periods; on average 5.7 percent between 1993 and 1997, and 4.9 percent between 2000 and 2007. Per capita expenditures grew faster than GDP pre-crisis, and slower post-crisis, while per capita incomes grew slower than GDP both pre- and post-crisis. Finding discrepancies between survey and national account growth is common. Survey data often report lower growth than national accounts, causing an increasing gap between the two measurements of over time. According to Deaton (2005), this a most likely caused by biases in non-response to surveys, and issues with national account measurement, such as estimates of non-observed economy. Another point that emerges clearly from figure 3, is that regular household economies did not bear as heavy a burden from the Asian financial crisis as the GDP numbers might lead one to suspect. Both incomes and expenditures grew on average in the three years from 1997 to 2000, when the GDP numbers contracted heavily.

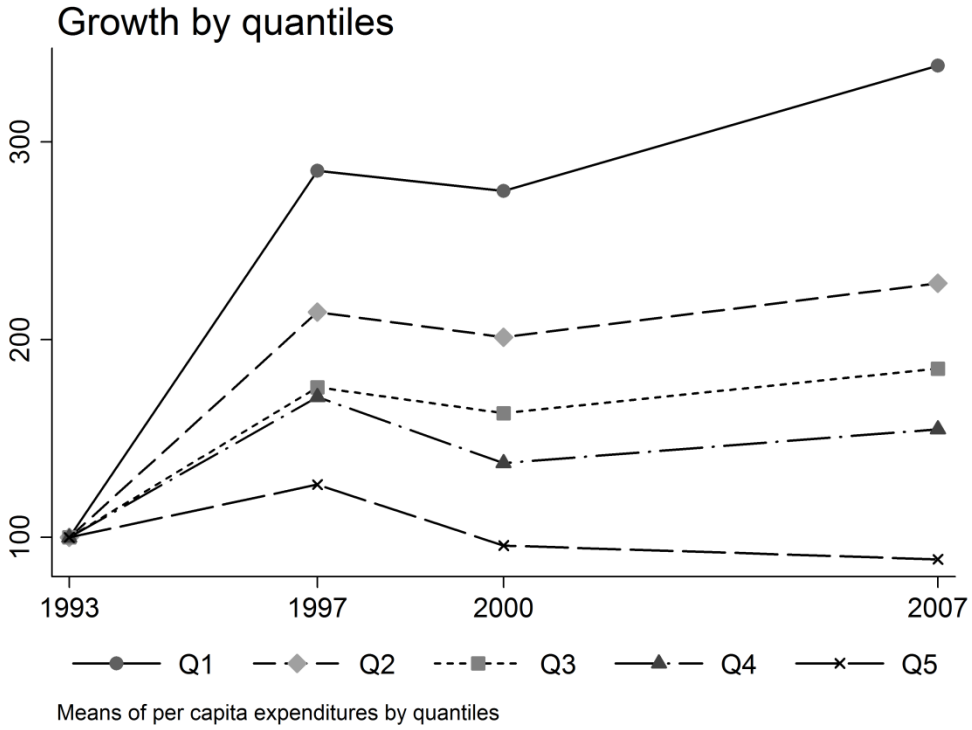
5.2 INEQUALITY

Now we turn away from levels of income and expenditures, and focus instead on the shape of their distributions. Refer to figure 4 to strengthen the understanding of the spread inequality measures should capture. It provides the transition from thinking about growth to thinking about inequality. When plotting the expenditure growth for all five quintiles, it is natural to ask whether the differences between these groups are increasing or decreasing. The top graph is a probability plot of per capita expenditure levels for all four waves of ILFS. The changes are large enough to be appreciated by simply viewing the distributions which shift leftward and become shorter, indicating higher probabilities of being a higher expenditure household in the latter distributions. The rather simplistic picture of household economy illustrated in figure 3 is decomposed to show some variety in the bottom graph of figure 4, illustrating that the simple average of expenditure growth masks variation between different parts of the distribution. When separate growth paths are generated for each expenditure quintile, it becomes apparent that the lower quintiles systematically outgrew the top ones. While the mean of the top quintile actually experiences contraction in their real expenditures per capita, the bottom quintile mean grows by over 300 percent.

Figure 4 - Expenditure distribution



Probability plots by univariate kernel densities estimations
Observations above 10000000 Rupiah excluded



Means of per capita expenditures by quantiles

These results suggest reductions in inequality as measured by per capita expenditures. We turn to more formal tests of these distributional developments, as well as decomposition of inequality by sources and population subgroups in the following sections.

5.2.1 INDONESIAN INEQUALITY

Using real annual per capita expenditure and income, table 1 shows the distributional development in Indonesia using several common measurements of inequality,[13] further, inequality is illustrated in figure 5 which plots the Lorenz curves for real annual per capita expenditures and real annual per capita incomes in all four waves.

TABLE I:
COMMON MEASURES OF INEQUALITY

	PER CAPITA EXPENDITURE			
	1993	1997	2000	2007
Gini	0.40 (0.005)	0.39 (0.004)	0.39 (0.003)	0.38 (0.002)
Theil	0.28 (0.008)	0.25 (0.005)	0.26 (0.005)	0.24 (0.003)
Varlog	0.52 (0.012)	0.49 (0.009)	0.48 (0.008)	0.45 (0.006)
90/10	6.90	6.33	6.37	6.04
N	7136	7536	10229	12658

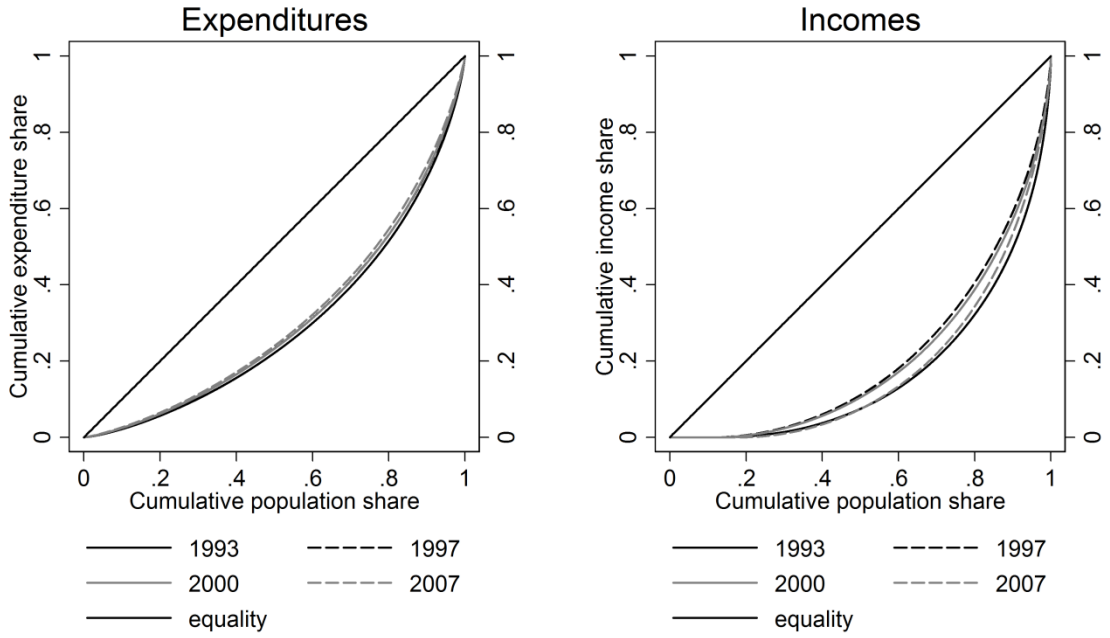
	PER CAPITA INCOME			
	1993	1997	2000	2007
Gini	0.62 (0.009)	0.53 (0.005)	0.54 (0.006)	0.57 (0.005)
Theil	0.78 (0.050)	0.50 (0.012)	0.55 (0.019)	0.61 (0.017)
Varlog	2.23 (0.089)	1.46 (0.038)	1.57 (0.041)	1.63 (0.033)
N	7214	7620	10434	13534

90/10 not calculated for incomes due to zero-income observations

Annual Jakarta 2000 per capita household expenditures and incomes.
Bootstrapped standard errors in parentheses. Cross-section analysis weights applied.
Inequality measurements: Gini coefficient, Theil entropy measure, variation of log and 90/10 percentile ratio

[13] Inequality measurements are produced by the STATA subprogram 'inequal' [sg30: STB-23] by Edward Whitehouse at OECD, and manual calculations (eg. r(90)/r(10)) within STATA, available upon request.

Figure 5 - Lorenz curves



Note from the table that the number of observations is increasing in time, the original sample and their split-offs are included in the consequent waves of IFLS. The increase is accounted for by the growing number of household split-offs.

The level of observed expenditure inequality as measured by the Gini coefficient is unremarkable. With observations ranging from 0.38 to 0.40, neither the change nor the level is extraordinary for country level measurements. The Gini coefficient for incomes however, is measured between 0.53 and 0.60, which is quite high. If representative of Indonesian inequality, it makes Indonesia one of the most inequal countries in the world. The expenditure-income inequality gap is almost identical to the one found by Földvári and van Leeuwen (2009) for Indonesia 1932 to 1999. Further, seeing income inequality which is higher than expenditure inequality is not very surprising, as temporarily high or low incomes may exaggerate the true position of the household when borrowing or saving is employed to smooth the path of consumption as pointed out by Blundell and Preston (1998). As illustrated in figure 5, the changes are more dramatic for income than expenditure inequalities. The Lorenz curves of incomes are further from the line of equality, and the four different observations lie further apart from each other. In other words: income inequality is at a higher level than expenditure inequality and change more between measurements. Both absolute and

relative amplitude of changes in the income inequality are larger than the same for expenditure inequality. Finding a consumption path (measured by expenditures in this study) which is smoother than the income path is a common result. Campbell and Deaton (1988) point to a possible explanation. They find that consumption is quite insensitive to unanticipated changes in income, and theorize that consumption adjusts slowly based on averages of past changes in incomes. The magnitude of inequality change is not unheard of, especially in quickly growing economies, as witnessed by Chinas rising income inequality.

By both welfare indicators and all inequality measures, economic inequality has fallen over the period seen as a whole.[14] Expenditure and income inequality develop in parallel in the first period, but then income inequality rises slightly while expenditure inequality stagnates, and in the final period the two indicators diverge entirely, with income inequality increasing while expenditure inequality decreases. Expenditure inequality decreased from 1993 to 2000 and from 2000 to 2007. The period from 1997 to 2000 is less clear, while mean and median incomes increased, inequality increased, decreased or remained unchanged depending on which measure is used, drawing conclusions about the direction of change during these 3 years is therefore difficult; the per capita expenditure of the poorest decile increased less than the richest one did, evident by the 90/10 ratio, though this change is to slight to heavily influence opinion about the periods change in inequality.[15] In fact the Gini, Theil and variation of logs are all insignificantly changed from 1997 to 2000, based on their bootstrapped standard errors.

The data for incomes agree with the narrative from expenditures for the first period, but then diverges in the last two. Income inequality, like expenditure inequality, falls from 1993 to 1997 by all measures. For the period thereafter, from 1997 to 2000, income inequality increases slightly, as indeed does one measure of expenditure inequality, but while the increase in expenditure inequality is slight, or most likely unchanged, income inequality unequivocally increased. As previously mentioned though, the two measures also diverge, now more dramatically, from 2000 to 2007. While expenditure inequality continued its slow decline in the final period, income inequality increased almost back to its original 1993 level as measured by the Gini coefficient. This means that either the upper parts of the distribution increased their expenditure less than their incomes increased, lower parts of the distribution

[14] This is checked against other inequality measures which include; standard deviation of logs, relative mean deviation, Mehran, Piesch, Kakwani and the Theil mean log deviation measure.

[15] While the real per capita expenditures of the 90th percentile increased by 6.8%, the corresponding growth for the 10th percentile was 6.1%

increased their expenditures more than their incomes increased, or some combination of the above.

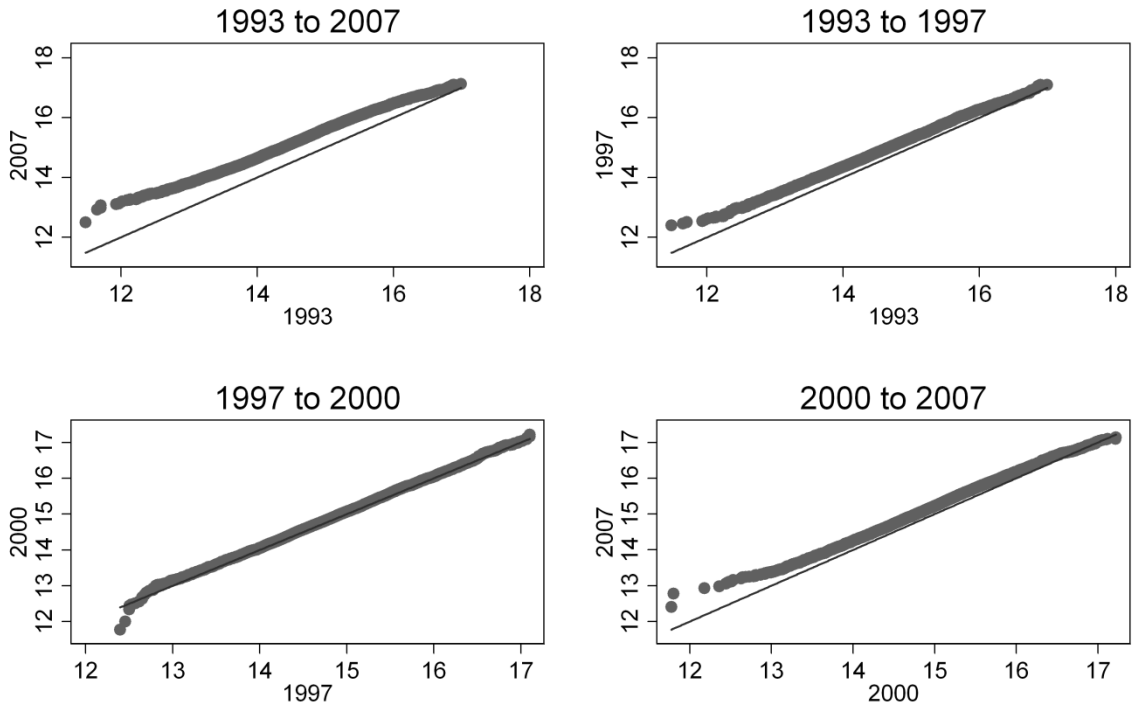
5.2.2 Distributional Variation

It is interesting to see the relative growth in different parts of the distributions when inequality changes. It sheds some light on whether the relatively affluent or impoverished are the primary drivers of the observed changes in inequality. Since the developments in expenditure and income inequality differ qualitatively, they are discussed separately.

We know from table I that expenditure inequality fell, stagnated, and then fell again in respectively the pre-crisis, crisis and post-crisis periods. A closer look at this development is illustrated in figure 6, where quantiles of temporally separated distributions are plotted against each other. Total inequality fell in the 14 year period, as confirmed by the top left panel. It illustrates that the latter distribution has a lower inequality than the first because the plot shows a flatter curve than the $y = x$ line. The latter distribution, plotted on the vertical axis, must therefore be less dispersed than the former. Inequality of expenditures changed significantly both pre- and post-crisis. The broad picture shows that almost the entire distribution has been catching up with the more affluent part. Further, roughly equal portions of poor and middle income households catch up by equal strides in the two periods pre- and post-crisis. It appears that the pre-crisis period includes more movement in the upper parts of the distribution. Distributional changes point toward more inclusive growth pre-crisis than post-crisis. It is the top of part of the distribution that is not included in post-crisis expenditure growth, this in turn implies that inequality reduction post-crisis may have been more targeted at raising expenditures for the poorest households.

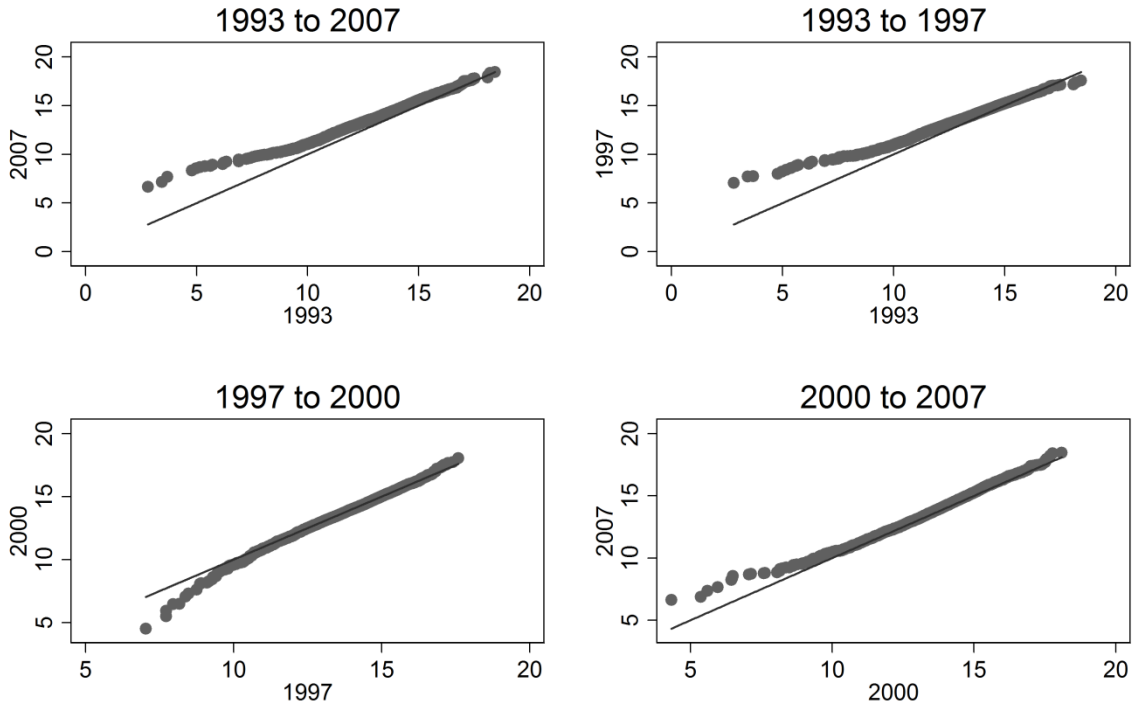
The distributions of per capita incomes are plotted against each other in figure 7. For the period as a whole inequality has decreased, but while there was significant decrease in the pre-crisis period, there was an almost equivalent and significant post-crisis increase. It is quite clear that the distribution changed, and became less dispersed pre-crisis. Not only did almost the entire poorer half raise its relative position enough to be plainly visible, but there is a slight income decrease among the more affluent as well. In the crisis the poorer part of the distribution falls behind, increasing inequality, but this does not reach as far in to the distribution as the change pre-crisis. The post-crisis period sees another and larger increase in inequality, but the poorer part of the distribution is still increasing its relative position, but by a smaller magnitude than they did pre-crisis. This is more than offset by the richer part of the distribution increasing their incomes.

Figure 6 - Distribution change for Expenditures



Logarithm of per capita expenditures, measured in real Jakarta 2000 Rupiah

Figure 7 - Distribution change for Incomes



Logarithm of per capita incomes, measured in real Jakarta 2000 Rupiah

5.2.2 DECOMPOSING BY FACTOR COMPONENTS

This section further explores per capita expenditures and incomes, using a decomposition of the Gini coefficient by factor components. In other words analyzing how the different constituents of income and expenditure contribute to inequality, and how this has changed over time.[16] How much a part of income or expenditure contributes to total inequality depends on its budget share, source Gini,[17] and how the income or expenditure source and the distribution of total income or expenditure are correlated. Because the factor components of expenditures and incomes are necessarily different, they are presented separately.

5.2.2.1 EXPENDITURE CATEGORIES

As previously mentioned, total expenditure is the sum of five subcategories: They are described in order of average initial (1993) budget share. (1) Food expenditure, (2) non-food expenditures; frequently purchased goods/services, (3) non-food expenditures; less frequently purchased goods/services (including durables) (4) education expenditures and (5) housing expenditures.[18]

A little more than half of household budget is allotted to food expenses on average, though this masks considerable variation, in 1993 food expenditure has a 53 percent budget share, and a standard deviation of 17 percent. With such a large portion of household budgets, it is unsurprising that food expenditure is the largest contributor to expenditure inequality. Food also has the lowest source Gini of all expenditure categories. Its contribution is roughly equal in 1993 and 2007, but somewhat less in 1997 and more in 2000. Budget share did not change pre-crisis, the decreased inequality contribution is attributable to lower Gini correlation and a more equal distribution of food expenditures: the source Gini of food was reduced from 0.394 to 0.374. When the inequality contribution increased in 2000 the opposite is true, source Gini was unchanged at 0.374 while the budget share of food increased by 5.5 percent.

[16] This decomposition of the Gini coefficient is done by the STATA subprogram 'descogini' (SJ6-1: st0100) by Alejandro Lopez-Feldman, Department of Agricultural and Resource Economics, University of California, Davis.

[17] For a graphical illustration of the source Gini of expenditures, refer to Pen's parade of expenditures, over the different expenditure sources, in appendix B

[18] A table showing all the results discussed in this section is available in appendix D

TABLE II:
EXPENDITURE INEQUALITY DECOMPOSED

	FOOD			
	1993	1997	2000	2007
Budget Share	0.53	0.53	0.56	0.53
Gini	0.39	0.37	0.37	0.37
Gini correlation	0.91	0.88	0.90	0.90

	NON-FOOD; FREQUENTLY PURCHASED			
	1993	1997	2000	2007
Budget Share	0.151	0.134	0.139	0.181
Gini	0.623	0.613	0.591	0.522
Gini correlation	0.851	0.829	0.84	0.845

	NON-FOOD; LESS FREQUENTLY PURCHASED			
	1993	1997	2000	2007
Budget Share	0.127	0.129	0.131	0.119
Gini	0.636	0.643	0.644	0.63
Gini correlation	0.819	0.794	0.802	0.769

	EDUCATION			
	1993	1997	2000	2007
Budget Share	0.097	0.05	0.046	0.048
Gini	0.814	0.75	0.772	0.777
Gini correlation	0.694	0.529	0.525	0.471

	HOUSING			
	1993	1997	2000	2007
Budget Share	0.091	0.156	0.124	0.121
Gini	0.525	0.614	0.604	0.591
Gini correlation	0.572	0.737	0.731	0.741

Gini coefficient; 0.42 in 1993, 0.40 in 1997, 0.40 in 2000 and 0.38 in 2007
Expenditures per capita, measured in Jakarta 2000 Rupiah

Indonesia is a net importer of food, including several major staple foods like rice, maize, cassave, soybeans and sugar, so the increased budget share after the financial crisis is most likely caused by the diminished value of the Rupiah. Nonfood expenditure is further subdivided into two categories, depending on the frequency of purchase and the durability of

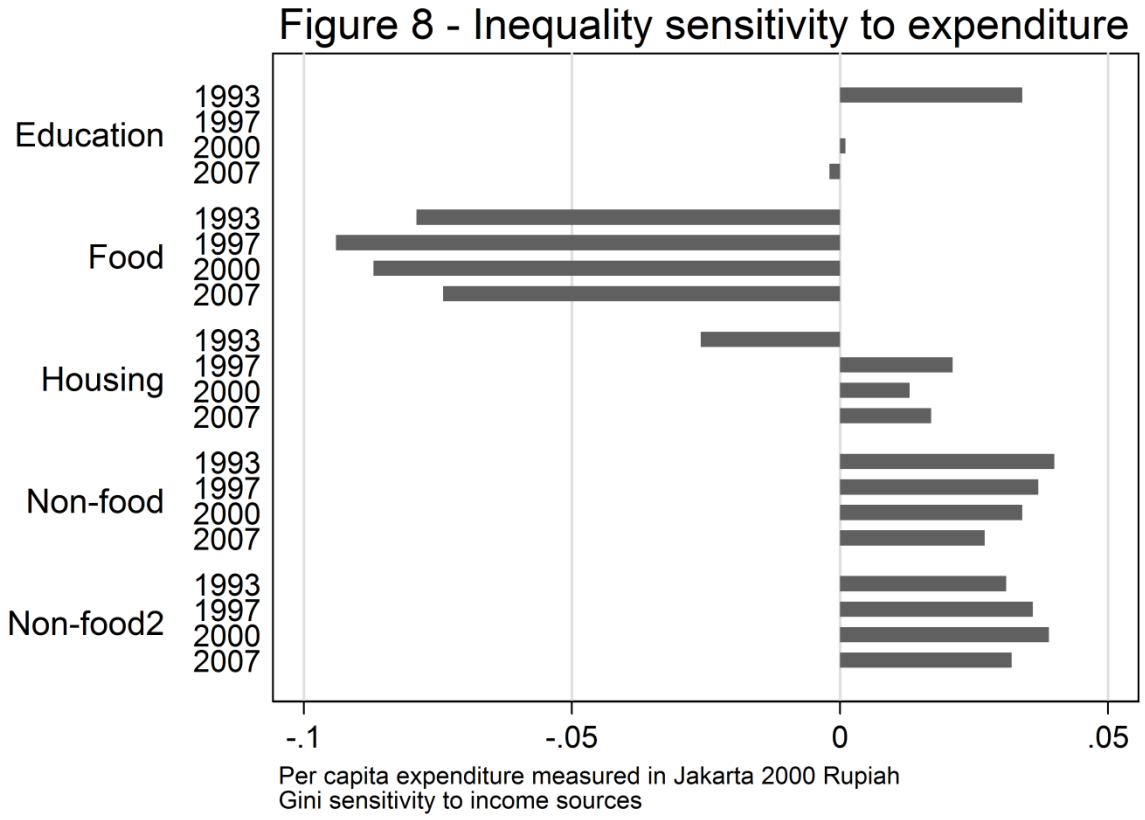
the good. Less durable/more frequent purchase category has remained the second largest contributor to total expenditure inequality throughout the period, while the more durable goods are the third. Both of their contributions to inequality have also remained roughly unchanged throughout the period. The two nonfood categories have similar budget shares in the first three waves, but then diverge post-crisis as more durable goods increase from 13.1 to 18.1 percent, while less durable goods/services decreased from 13.9 to 11.9 percent. The two categories also show consistent divergence in source Gini.

In 1993 the inequalities are roughly equal at 0.62 for more durable and 0.64 for less durable goods. However, the more durable goods stay almost unchanged at 0.63 while the source Gini of less durable goods gradually decreases to 0.52. Summarizing nonfood expenditures, both categories have close to the same contribution to total inequality in 2007 as they did in 1993. For the more durable goods this is simply the result of unchanged budget share and source Gini, but for the less durable goods it masks a decreased budget share combined with higher source inequality.

Education expenditure is clearly the most unequally distributed expense with source Gini ranging from 0.814 to 0.772. However, it's relatively low budget share makes it the smallest contributor to total inequality on average, and one which decreased with every measurement. The largest change in inequality contribution happened between 1993 and 1997 because of a halving of educations budget share, while source Gini also reduced from 0.81 to 0.75. In the two following periods, the source Gini actually climbed slightly, but this was more than offset by shrinking budget shares. Education expenses also saw variation in the correlation between its own distribution, and that of total expenditures. It fell gradually throughout the period.

Housing expenditure has an average measured budget share of 12.3 percent and source Gini of 0.58. Its contribution to total inequality ranges from 6.5 percent in 1993 to 17.7 percent in 1997, while in the final two measurements it is unchanged at 13.8 percent. The large jump from 1993 to 1997 is attributable to the sharp increase in budget share from 9.1 percent to 15.6 percent, while the source Gini also increased, from 0.52 to 0.61.

As previously mentioned, using this method of Gini decomposition allows estimation of the effect of small changes in a specific source on inequality (Lerman and Yitzhaki, 1985), holding all other sources constant. Figure 8 illustrates the impact that a 1% change in the respective expenditure sources will have on inequality, all other expenditures being equal. The bars in figure 8 can thus easily be imagined as the price elasticity of inequality to prices of whole categories of expenditures.



Broadly speaking, this is an illustration of how much lower the source Gini of food is than all other expenses. But note also the steady decline of non-food frequently purchased, the near disappearance of the influence of education as its contribution share to the Gini becomes more equal to its budget share, and the sign change in influence of housing expenditure. Non-food expenditures, which have a relatively high source Gini, would increase inequality, while a broad increase in food expenses, with its relatively low source Gini, would lower total inequality. These results are fairly intuitive.

In the pre-crisis period, education expense shrank to half its original proportion of household budgets, and it became a neutral contributor to inequality. This may be related to the major education reforms undertaken in 1994 to expand mandatory schooling to nine years while decentralizing parts of the curriculum and increasing the provision of teaching materials (Acedo et al, 2002).

The overall expenditure inequality was decreasing for the whole period from 0.40 to 0.38, with a halt at 0.39 from 1997 to 2000. During this period, housing expenditures and frequently purchased non-food expenditure changed in the direction of higher inequality while also increasing their influence on the Gini. Meanwhile, educational expenses became more

equal, but its influence of the Gini also fell. The bulk of falling total inequality can therefore be traced to the decrease in the inequality of food and frequent non-food expenses.

5.2.2.1 INCOME SOURCES

Total household income is the sum of four income sources: (1) labor income, (2) farm-business income, (3) non-farm business income and (4) asset income.[19] Most households report some income from self-employment or wage labor apart from self owned farming or non-farming business.[20]

Labor income accounts for a large share of total income in all years, ranging from 61.5 percent to 66.8 percent. Its share in inequality is almost unchanged between 1993 and 2007, but labor influences inequality relatively less in 1997 and more in 2000.

The drop in 1997 is driven neither by the slight decrease in budget share or correlation to the income distribution, but by the reduction in food expenditures' source Gini from 0.56 to 0.47. The relative equality is short lived however, and the source Gini increases to 0.52 in 2000, which in combination with increasing budget share creates the peak in inequality influence. Non-farm business accounts for between 20 percent and 27 percent of total household income per capita. Its share in Gini inequality shows a jagged rise from 16 percent in 1993 to 24 percent in 2007. This increase from 1993 to 1997 is attributable to a slight increase in source Gini and a higher Gini correlation of non-farm income with the total income distribution, which means that the flow of nonfarm incomes became more disproportionally distributed toward the top of the distribution. This is reversed in 2000 however, as both Gini correlation and source Gini revert to their 1993 levels, but the budget share remains higher and then grows even further in following years up to 2007. Interestingly, though the share in inequality is at its highest level in 2007, the source inequality is at its lowest with a Gini of 0.48, this again is caused by a combination of budget share and sharply increasing Gini correlation.

Farming business is responsible for a steadily decreasing share of total incomes, starting out at 14 percent and decreasing to 7 percent. Its source Gini is almost entirely unchanged throughout the period. Almost all the variation in inequality contribution is attributable to a large change in Gini correlation between 1997 and 2000. From an unchanged level of 0.73 in 1993 and 1997, it drops to 0.18 in 2000 and 0.26 in 2007.

[19] A table showing all results discussed in this section is available in appendix E

[20] The shares of households that report zero or missing labour incomes for all members of the household is 31% (1993), 21% (1997), 20% (2000) and 23% (2007). The share of households with wage income for whom this constitutes all of their income is 26% (1993), 31% (1997), 37% (2000) and 40% (2007)

TABLE III:
INCOME INEQUALITY DECOMPOSED

	LABOR			
	1993	1997	2000	2007
Income Share	0.63	0.61	0.67	0.64
Source Gini	0.56	0.48	0.52	0.51
Gini correlation	0.98	0.93	0.92	0.97

	NON-FARM BUSINESS			
	1993	1997	2000	2007
Income Share	0.20	0.23	0.22	0.27
Source Gini	0.57	0.58	0.57	0.48
Gini correlation	0.68	0.74	0.65	0.82

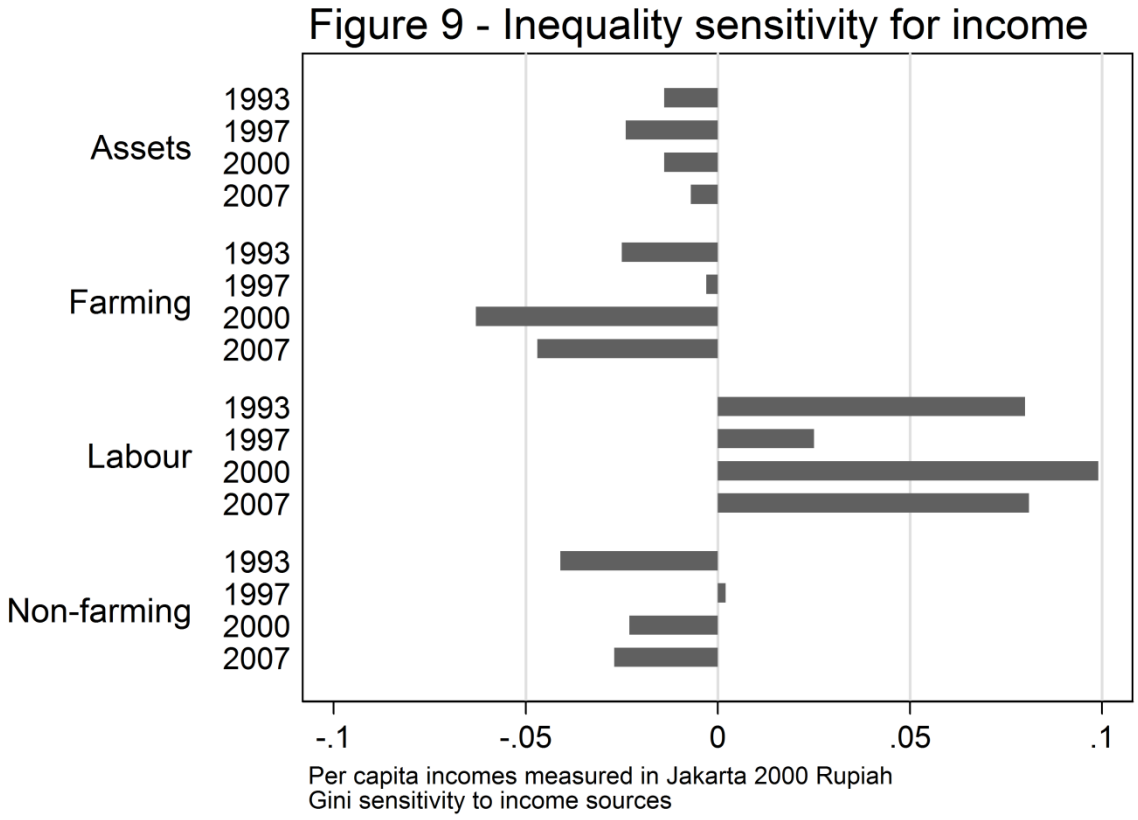
	FARMING BUSINESS			
	1993	1997	2000	2007
Income Share	0.14	0.13	0.08	0.07
Source Gini	0.54	0.57	0.56	0.56
Gini correlation	0.73	0.73	0.18	0.26

	ASSETS			
	1993	1997	2000	2007
Income Share	0.03	0.03	0.04	0.03
Source Gini	0.70	0.54	0.60	0.64
Gini correlation	0.39	0.40	0.41	0.51

Gini coefficient: 0.48 in 1993, 0.43 in 1997, 0.42 in 2000 and 0.44 in 2007
Incomes per capita, measured in Jakarta 2000 Rupiah

Asset incomes constitute the smallest share of household incomes, and the smallest contribution to inequality at 2 percent for all measurements, except 1997 when it was 0.1 percent. This lower value is caused by a lower Gini correlation for this observation. A low and declining share of households report receiving incomes from their assets; starting at 9.2 percent and declining to 4.2 percent in 2007.

Figure 9 shows the Gini sensitivity to a change in the income sources. Although there is some variation in sensitivity over time, it broadly illustrates that an increase in labor incomes at any time would increase inequality, while increases in any of the other income sources at any time (except non-farming business in 1997) would decrease inequality.



The results for total income inequality from table 1 show a reduction from 1993 to 1997, followed by increases in the next two periods. The Gini coefficient in 2007 of 0.57 ends up almost back at its 1993 level of 0.62. The fall in income inequality in the first period coincides with increasing source Gini for both farming and non-farming business, accompanied with a 14 percent increase in income share for non-farming business. Thus in this period both non-farming and farming business increase their influence in the overall Gini while becoming more unequal. However, as figure 9 illustrates, an increase in either of these sources works toward lowering inequality. Labour income meanwhile, became more equal, its source Gini dropped 14 percent, and also reduced its share in total incomes which reduces the total Gini further. The relative reduction in asset income pulls the Gini upward, its source Gini decreases and the already small influence on the income Gini is reduced by half, making the change of little significance.

The rise in income inequality from 2000 to 2007 is traced to an increasing share of incomes from non-farming business and reduced share from labor, with coinciding increase and decrease in share of inequality influence. This happens at the same time as the source Gini of non-farming business decreases by 16 percent and source Gini of labor is almost constant.

As said, the 2007 Gini catches up significantly to the 1993 Gini. What primarily changes in the fourteen years that lie between is that labour constitutes a slightly larger share of total income, and non-farming business has a sharp increase, while farming and assets reduce their shares. All source Gini except farming decrease. The reduction of farming and assets, and the increase of labour incomes all work toward higher inequality, while the increase in non-farming business of 35 percent outweighs these in pulling in the opposite direction.

5.2.3 PROVINCE VARIATION

The vastness and diversity of Indonesia must be taken in to account, especially because it could be increasing under the less strict national regulations of an electoral democracy. Since the initialization of 'Big Bang decentralization', the Indonesian provinces have enjoyed a much larger degree of self government. Each province has its own local government and legislative body, and the governor and local representatives are elected by popular vote for five year terms. In addition, the fiscal power of local governments is much larger.

The following section explores the variation in inequality across the provinces of Indonesia, first by comparing the static measure of inequality within each province, then the changes that each province has experienced from 1993 to 2007. Finally total inequality is decomposed to within-province and between-province inequality. First, to get an idea of the variation in within-province inequality, the static picture of inequality measured by the Theil index is given in table IV, where the 13 original provinces from IFLS1 are included.[21] [22]

The provinces are ordered by inequality in all waves. Sumatera Selatan (South Sumatra) starts out being the most unequal at 0.364 with a standard error of 0.037, meanwhile DKI Jakarta is most equal at 0.202. This means that the highest observation would need to decrease its inequality by four and a half of its original standard errors to equal the lowest one. This range suggests rather large differences across provinces. It is somewhat surprising to find the capital as the most equal province in Indonesia, but the result is supported by both expenditure and income inequality. Possible explanations include limited access to the top of the distribution and homogenous surroundings, while most provinces include both urban and rural areas, DKI Jakarta is almost entirely urban. In addition, household composition or size may differ between urban and rural settings, skewing the per capita measurements.

[21] The Theil index with bootstrapped standard errors is calculated by the STATA subprogram 'ineqerr' (STB-51: sg115) by Dean Jolliffe and Bohdan Krushelnytskyy at the Center for Economic Research and Graduate Education, Czech Republic.

[22] An equivalent table, for per capita incomes rather than per capita expenditures, is available in appendix F

TABLE IV:
INEQUALITY WITHIN AND BETWEEN PROVINCES

	Indonesia			
	1993	1997	2000	2007
Theil index	0.308 (0.006)	0.272 (0.004)	0.272 (0.004)	0.245 (0.003)
R_b	7.8	5.9	4.3	6.3

	Per province Theil index				
	1993	1997	2000	2007	All years
Sumatera Selatan	0.364† (0.037)	0.344† (0.029)	0.261* (0.019)	0.255† (0.013)	0.314 (0.012)
Sulawesi Selatan	0.284* (0.021)	0.279 (0.032)	0.247* (0.021)	0.229* (0.012)	0.284 (0.010)
Jawa Tengah	0.287* (0.015)	0.279 (0.012)	0.255* (0.012)	0.245 (0.008)	0.281 (0.006)
Jawa Timur	0.283* (0.019)	0.243* (0.012)	0.272 (0.016)	0.234* (0.009)	0.278 (0.006)
Sumatera Utara	0.292 (0.029)	0.233* (0.015)	0.268 (0.012)	0.239 (0.013)	0.274 (0.007)
Jawa Barat	0.287* (0.017)	0.242* (0.011)	0.263 (0.012)	0.254† (0.008)	0.273 (0.005)
Nusa Tenggara Barat	0.261* (0.027)	0.221* (0.019)	0.246* (0.016)	0.275† (0.016)	0.272 (0.010)
Bali	0.213* (0.020)	0.235* (0.020)	0.230* (0.015)	0.244 (0.013)	0.272 (0.011)
Di Yogyakarta	0.292 (0.024)	0.238* (0.016)	0.233* (0.018)	0.211* (0.009)	0.259 (0.007)
Sumatera Barat	0.231* (0.022)	0.205* (0.017)	0.227* (0.013)	0.211* (0.010)	0.255 (0.009)
Kalimantan Selatan	0.226* (0.026)	0.237* (0.024)	0.216* (0.018)	0.210* (0.014)	0.250 (0.010)
Lampung	0.205* (0.026)	0.205* (0.020)	0.227* (0.020)	0.195* (0.012)	0.249 (0.009)
DKI Jakarta	0.202* (0.015)	0.211* (0.011)	0.249* (0.014)	0.199* (0.008)	0.225 (0.005)

Theil index for annual per capita expenditures, bootstrapped standard errors in parentheses. R_b is between-province inequality share (per cent) of total inequality. Within-province inequality share 1 - R_b
Provinces sorted by inequality level for all waves.
†above Indonesian total, *below Indonesian total.

Each province is labeled as above or below Indonesian total if its inequality differs significantly from the country as a whole in the current year. [23] As table IV repeats, inequality for Indonesia as a whole has experienced a steady decline, only halting from 1997 to 2000. Between 1993 and 1997, between-province inequality and inequality for Indonesia as a whole dropped; however, inequality actually increased within 5 of 13 provinces. In Bali it increased by 1.1 standard errors.[24]

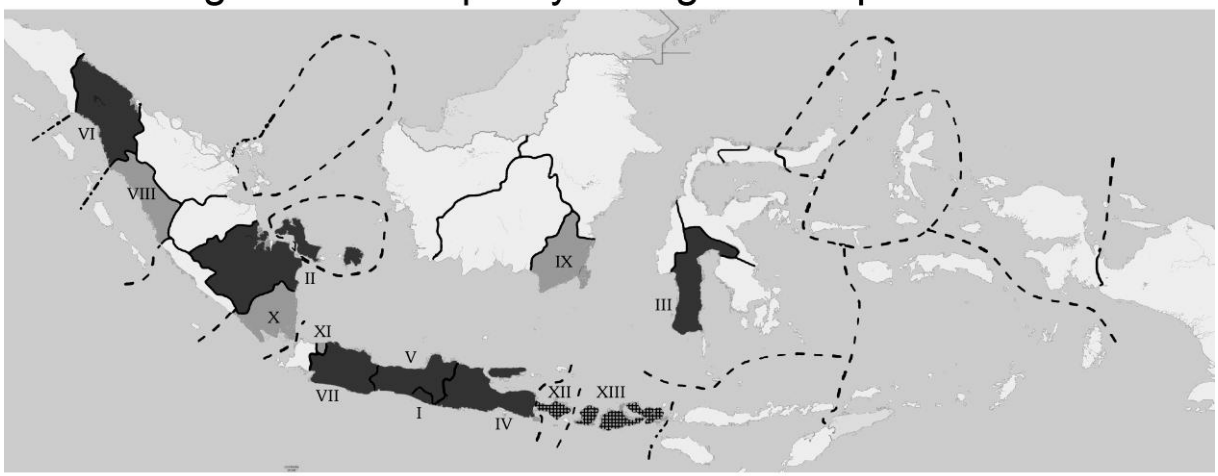
The remaining eight provinces experienced decreasing inequality, four decreased significantly. Further, even though inequality for Indonesia as a whole was almost unchanged from 1997 to 2000, and even though the time span is limited to three years, only four provinces did not see their inequality change by more than one standard error. Two out of thirteen provinces reduced their inequality by more than one standard error. In Sumatera Selatan it decreased significantly. Meanwhile, seven provinces increased inequality by more than one standard error, four significantly. Thus, in this period where total inequality was almost unchanged, five provinces significantly changed their within-province inequality, the largest change occurred in DKI Jakarta, where inequality was reduced by 3.38 standard errors. In other words, the performance in inequality reduction is quite different across the various provinces. Only considering the very small average reduction in the Theil index for the whole of Indonesia, effectively masks this variation.

In the final period between 2000 and 2007, total inequality decreases again, and this period sees only Nusa Tenggara Barat increase its inequality by more than its standard error, however between-province inequality also increased. Six provinces experienced decreased inequality of more than one standard error, three of them significantly. Finally, considering the whole period from 1993 to 2007, the only two provinces whose inequality actually increased are the two neighboring provinces of Nusa Tenggara Barat and Bali, and only Bali's change was higher than one of its standard errors. More surprising perhaps, given that the Theil index fell from 0.308 to 0.245 in this period, is the fact that a further five provinces saw their inequality decrease by less than one standard error.

[23] Calculated based on bootstrapped standard errors, observations marked as significantly deviating if the provinces observed inequality falls outside both normal and bias-corrected confidence intervals for Indonesia as a whole for that year at all conventional significance levels.

[24] When discussing whether the changes in within-province inequality are significant, the bootstrapped standard errors for each province at the beginning of the period discussed is used, changes are referred to as significant if they cross the 5 percent significance level.

Figure 10 - Inequality change within provinces



I	Di Yogyakarta	-3.33	V	Jawa Tengah	-2.25	IX	Kalimantan Selatan	-0.61
II	Sumatera Selatan	-2.98	VI	Sumatera Tengah	-1.85	X	Lampung	-0.39
III	Sulawesi Selatan	-2.68	VII	Jawa Barat	-1.39	XI	Dki Jakarta	-0.26
IV	Jawa Timur	-2.65	VIII	Sumatera Barat	-0.90	XII	Nusa Tenggara Barat	0.52
						XIII	Bali	1.39

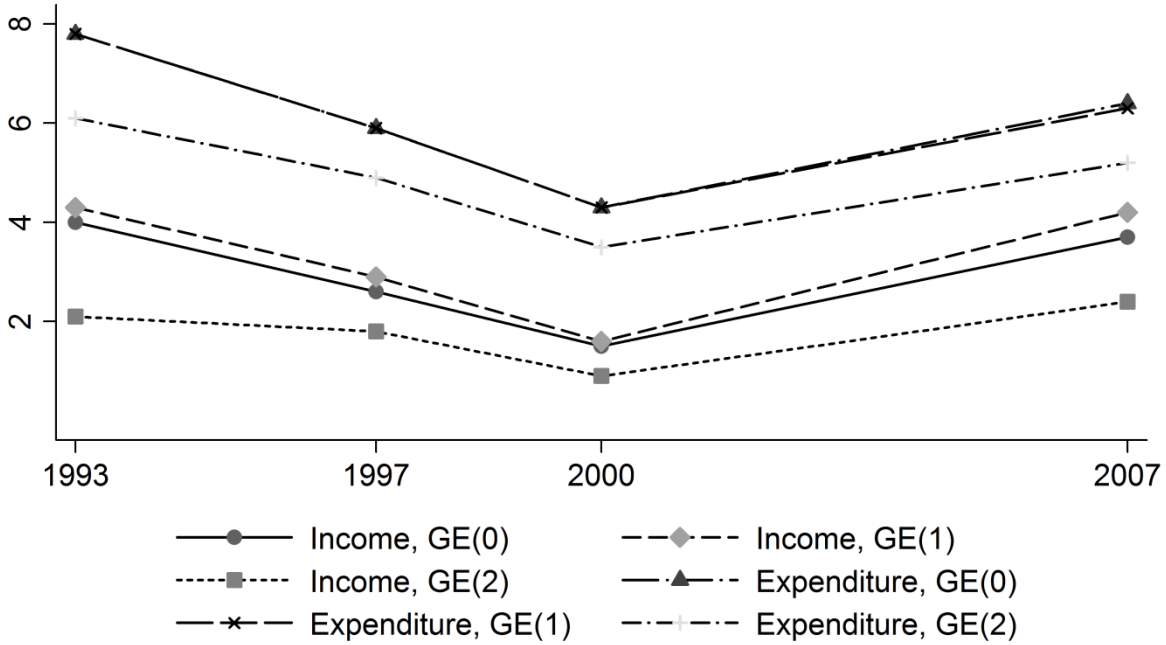
That leaves only eight out of thirteen provinces which experienced reduction in inequality of more than one of their initial standard errors, and five of these changed significantly. These eight represent a little more than half of the Indonesian population. Their expenditure conversion, in combination with a small decrease in between-province inequality, drove the reduction in inequality. The total changes in inequality are illustrated in figure 10, where provinces are ordered by the change they experienced in the whole period from 1993 to 2007.

5.2.4 WITHIN AND BETWEEN-PROVINCE INEQUALITY

Total inequality is dominated by the variation within provinces, leaving a maximum of 7.8 percent to between-province inequality. From its highest level in 1993, the between-share drops in both 1997 and 2000, but the trend reverses from 2000 to 2007. This means that while both pre-crisis and post-crisis periods of marked reduction of inequality, they display opposite changes in the composition of between and within-province inequality.

From 1993 to 1997 inequality was reduced while between province inequalities also decreased. Not only did Indonesia as a whole become more equal, but the households' location was less likely to determine their place in the distribution. In the period from 2000 to 2007 however, while expenditure inequality for Indonesia as a whole decreased, the differences between provinces increased.

Figure 11 - Inequality change between provinces



Per capita annual real Jakarta 2000 Rupiah expenditures and incomes
GE(0) is mean log deviation
GE(1) is the Theil Index
GE(2) is half the squared coefficient of variation

This picture is further supported by the income data, whose ratio of between and within inequality follows much the same development as the expenditure numbers, but at a lower level. Calculation of between-province inequality by per capita income required elimination of 4868 zero-income observations, the four waves include, respectively; 661, 665, 999 and 2453 such observations. This point is illustrated in figure 10. Where the three generalized entropy measures with $\alpha = 0, 1, 2$ are plotted for both per capita incomes and per capita expenditures.

Throughout the economic expansion of the early 1990s, total inequality was reduced, as was between-province inequality. The provinces expenditure distributions increasingly overlap one another. Said differently, Indonesia became more equal as a whole and province inequalities converged. The convergence continued for both incomes and expenditures from 1997 to 2000 even though inequality as a whole stagnated for expenditures and increased for incomes. In the economic expansion period from 2000 to 2007 however, inequality of expenditures decreased while inequality of incomes increased, and both expenditures and incomes became more unequal across provinces as illustrated above.

6 CONCLUDING REMARKS

Before concluding, this section provides a summary of the results, and answers to the five questions posed in the introduction, for both the pre-crisis and post-crisis periods.

In pre-crisis Indonesia there was strong economic growth. (1) Expenditure and income inequalities were both in decline. (2) The changes were driven by the poorer and middle-income households increasing their expenditure and incomes relative to the richer ones, though the expenditure changes were more inclusive than incomes changes, reaching higher parts of the distribution. (3) It saw education expenditure turn from a positive to a neutral contributor to expenditure inequality and housing from negative to neutral. Income inequality became less sensitive to farming income and labor, more sensitive to non-farming business income. (4) The inequality changes were not as inclusive geographically as the distribution plots might lead one to believe. The expenditure distributions of 5 out of 13 provinces became more unequal, though not significantly; only four provinces significantly reduced their within-province expenditure inequality. (5) Between-province inequality fell, making province of residence less important for position in the Indonesian distribution.

In post-crisis Indonesia the strong growth continued, as did the (1) declining expenditure inequality, but income inequality increased. (2) Both ends of the distribution drove the changes in inequality, with the middle part largely unchanged, though this is more the case for income than expenditure where there is a little lift also for middle-class households. (3) Food expenditure became a less important contributor to expenditure inequality and labor less important for income inequality. (4) One province experienced increasing within-province expenditure inequality, while three decreased significantly, and (5) between-province inequality increased. Summarized in short form, in the pre-crisis period, inequality was decreasing by all measures and the provinces were converging. In the post-crisis period the measures conflict about the direction of change, but provinces were diverging.

The two most striking differences between pre- and post-crisis development in Indonesian inequality are (1) that income inequality increased post-crisis while it decreased pre-crisis, and (2) that between-province inequality increased post-crises while it decreased pre-crisis. (1) The increase of income inequality post-crisis can be explained by income and expenditure inequality capturing different things. The two measures may diverge due to some non-linear relationship between increases in income and expenditure. The difference is driven by the more affluent part of the distribution. Post-crisis, their expenditures increase less than their incomes, relative to the distribution. While both governments lift the incomes and expenditures of the poor, the growth in income of the rich was lesser before pre-crisis. An

alternative explanation of diverging inequality measurements is that they represent a common phenomenon, while income inequality has higher variation than expenditure inequality. The higher variations both downward and upward suggest that income inequality may be decreasing along with expenditure inequality, only in a noisier way because expenditures generally have a smoother path than income. (2) Between-province inequality decreases pre-crisis, but increases post-crisis. One can plausibly argue that this has is related to governmental form. The largest political difference between the two periods is the decentralization of legislative and fiscal power throughout Indonesia, which followed in the wake of democratization. The budget shares of local government were doubled from pre-crisis levels, the added discretion exasperated the differences between them. It is only educated speculation, but it may have been easier to spread growth evenly throughout Indonesia when under centralized power. The ruling elite in Jakarta emphasized national unity, national identity and national growth. *Pancasila,* or the five principles, underscore this. One is Indonesian unity, and another is social justice for all Indonesians. All political parties were required to subscribe to *Pancasila*. This may have led to fairly equal treatment of the various provinces. The province divergence result may be another manifestation of increased differences in governmental quality due to decentralization, which according to Firman (2010) has fragmented development. An example of the possible divergence in quality of government is that the decentralization of fiscal power is threatens to coincide with a decentralization of corruption. According to the World Bank (2003) it is widely believed that the decentralization can be exploited by local elites in order to 'drink at the deep well of the public exchequer'.

However, it is important not to infer too much about government from the results in this study. The two periods do not represent a perfect natural experiment, other factors influencing inequality were not identical. The change from dictatorship to democracy is not the only difference between pre- and post-crisis periods. Even though governments in both periods had stated goals of inequality reduction, both the will and the potential for reducing inequality can have been quite different. Especially considering that under the ongoing process of globalization, any governments control over their economy may lessen because of increasing interconnectedness to world markets. What matters in evaluating the performance of the respective governments is how much of the potential for influencing inequality they were able to realize. While no clear conclusion can be drawn about the influence of government on inequality, it is clear that neither dictatorial nor democratic Indonesia failed entirely to keep inequality in check. However, the democratic period saw it increase along some dimensions.

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Appendix

A:

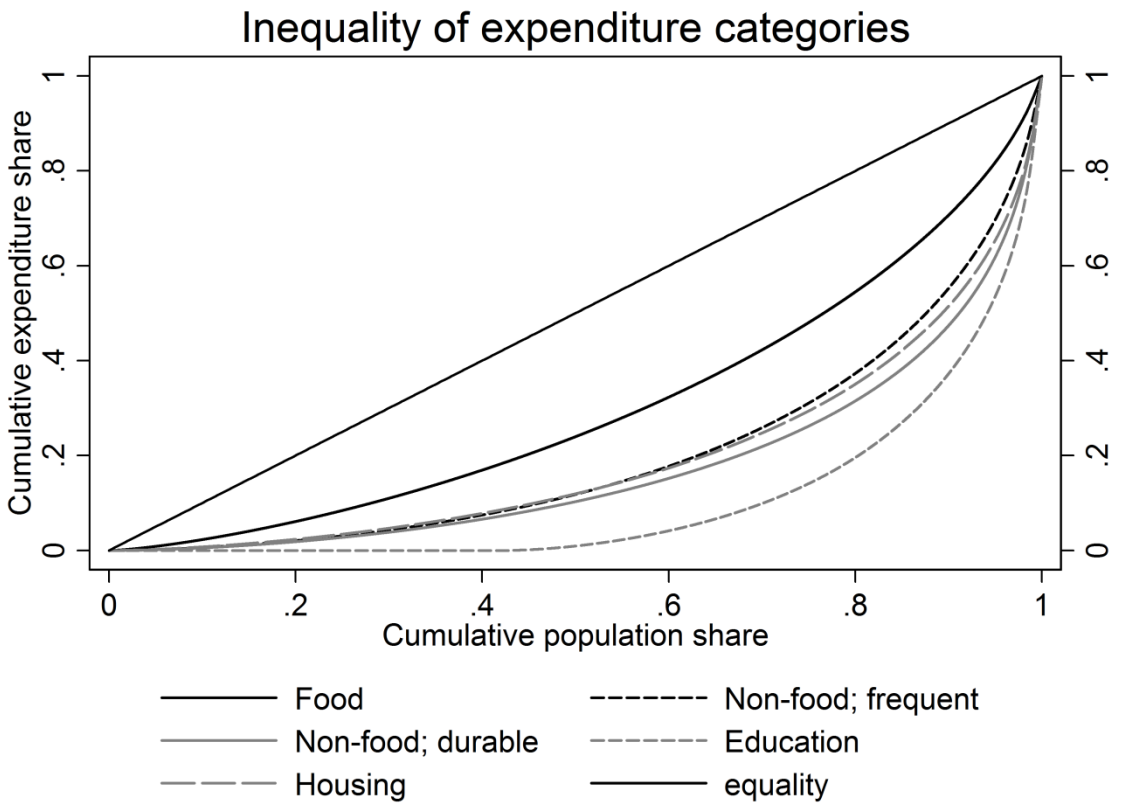
IMPACT OF WINSORIZE OUTLIER TREATMENT;
COUNT OF CHANGED OBSERVATIONS PER WAVE, PER CATEGORY

	EXPENDITURES				
	All	IFLS1 1993	ILFS2 1997	IFLS3 2000	IFLS4 2007
Food	370	45	91	113	121
Non-food (frequent purchases)	370	43	82	88	157
Non-food (infrequent purchases)	370	44	82	133	111
Education	370	199	46	51	74
Housing	370	4	158	110	98
Total	1850	335	459	495	561

	INCOMES				
	All	IFLS1 1993	ILFS2 1997	IFLS3 2000	IFLS4 2007
Labour	380	76	48	108	148
Farm business	380	56	104	183	37
Non-farm business	380	44	66	54	216
Assets	380	72	108	102	98
Total	1900	248	326	447	499

Treated variables are, total household expenditure and per capita expenditure, total household income and per capita income; all in annual real Jakarta 2000 Rupiah

B:


Inequality of expenditure categories
Cumulative expenditure share
0
.2
.4
.6
.8
1
Cumulative population share
0
.2
.4
.6
.8
1
Food
Non-food; durable
Housing
Non-food; frequent
Education
equality

C:

INEQUALITY WITHIN AND BETWEEN PROVINCES
PER CAPITA INCOME

	Indonesia			
	1993	1997	2000	2007
Theil index	0.757 (0.032)	0.501 (0.010)	0.553 (0.014)	0.593 (0.012)
R_b	4.3	2.9	1.6	4.2

	Provinces				
	1993	1997	2000	2007	All
Sulawesi Selatan	0.838† (0.094)	0.510 (0.038)	0.561 (0.043)	0.813† (0.076)	0.719 (0.041)
Sumatera Selatan	0.877† (0.081)	0.649† (0.063)	0.599† (0.079)	0.664† (0.103)	0.717 (0.067)
Lampung	0.698 (0.096)	0.735† (0.090)	0.478* (0.056)	0.545* (0.031)	0.629 (0.031)
Jawa Tengah	0.814 (0.048)	0.483 (0.026)	0.515* (0.028)	0.651† (0.047)	0.625 (0.031)
Nusa Tenggara Barat	0.717 (0.120)	0.558† (0.077)	0.643† (0.067)	0.584 (0.047)	0.625 (0.037)
Sumatera Utara	0.668* (0.071)	0.534† (0.040)	0.541 (0.043)	0.625 (0.087)	0.617 (0.041)
Jawa Barat	0.762 (0.151)	0.480 (0.035)	0.598† (0.047)	0.596 (0.036)	0.614 (0.027)
Jawa Timur	0.882† (0.119)	0.484 (0.028)	0.528 (0.035)	0.559 (0.029)	0.596 (0.024)
Sumatera Barat	0.605* (0.077)	0.371* (0.034)	0.495* (0.044)	0.509* (0.040)	0.546 (0.031)
Di Yogyakarta	0.680 (0.051)	0.406* (0.031)	0.479* (0.032)	0.532* (0.036)	0.540 (0.022)
Kalimantan Selatan	0.634* (0.056)	0.537† (0.058)	0.520 (0.067)	0.450* (0.027)	0.521 (0.021)
Bali	0.378* (0.033)	0.419* (0.047)	0.486* (0.058)	0.573 (0.037)	0.509 (0.027)
Dki Jakarta	0.454* (0.030)	0.369* (0.028)	0.419* (0.030)	0.479* (0.029)	0.461 (0.017)

Theil index for annual per capita incomes, bootstrapped standard errors in parentheses.
R_b is between-province inequality share (per cent) of total inequality. Within-province inequality share 1 - R_b
Provinces sorted by inequality level for all waves
†above Indonesian total, *below Indonesian total