Top Incomes in Indonesia, 1920-2004[1]

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In A.B. Atkinson and T. Piketty (eds) (2009) *Top Incomes Over the Twentieth Century: Volume II – A Global Perspective,* Oxford, Oxford University Press

Abstract

Using taxation and household survey data, this paper estimates top income shares for Indonesia during 1920-2004. Our results suggest that top income shares grew during the 1920s and 1930s, but fell in the post-war era. In more recent decades, we observe a sharp rise in top income shares during the late-1990s, coinciding with the 1997-98 economic crisis, and some evidence that top income shares fell in the early-2000s. For pre-war Indonesia, we decompose top income shares by income source, and find that for groups below the top 0.5%, a majority of income was derived from wages. Where comparable data are available, top income shares in Indonesia are generally higher than in other countries, a finding that is at odds with the view that Indonesia is a relatively egalitarian society.

JEL codes: H24, N35, O15
Keywords: inequality, top incomes, personal income taxation, Indonesia

[1] We are grateful to Anggito Abumanyu, (Economic, Financial and International Cooperation Analysing Board BAPPEKI, Ministry of Finance of Indonesia) and Robert Pakpahan (Directorate General of Taxation, Ministry of Finance of Indonesia) for help in obtaining taxation data for recent years, to Anne Booth and Terry Hull for advice on constructing our population and income control totals, to Sophie Holloway and Stephen Gray for help obtaining survey data, to Alicia Paul and Michael Leigh for assistance with survey data definitions, to Gweneth Leigh for assistance in tabulating taxation data for the pre-war era, and to Daniel Suryadarma and Thee Kian Wie for advice on constructing our top tax rate series. Susanne Schmidt, Elena Varganova and Yogi Vidyattama provided outstanding research assistance. Anthony Atkinson, Gavin Jones, Peter Lindert, Chikako Yamauchi, participants at the XIV International Economic History Congress, and a seminar at the Australian National University provided valuable comments on earlier drafts, as did Thomas Piketty and four anonymous referees. All errors are ours.

4.1 INTRODUCTION

According to the 2006 *Forbes* rich list, Indonesia's richest man, Sukanto Tanoto, and his family were worth US$2.8 billion (Doebele and Vorasarun 2006). Sukanto headed a group of Indonesia's 40 richest with a combined net worth of US$22.3 billion, or about 19 million times Indonesia's average income of US$1,150. The richest 40 Indonesians and their families hold about 6 percent of the nation's wealth, a considerably larger share than in the United States. In contrast, academic literature on income distribution in Indonesia often indicated that income inequality has been relatively low as a consequence of 'pro-poor growth' policies pursued by its government (e.g. Ragayah 2005; Timmer 2004, 2005; World Bank 2005). Such contrasting views are in part caused by significant difficulties in interpreting the available income and expenditure survey data for Indonesia (Cameron 2002).

Hence, whether income inequality in Indonesia has long been highly skewed, whether it is more skewed than elsewhere, and if so why, remain issues of debate. We aim to contribute to this debate on the basis of a methodology that establishes and analyses trends in the share of top income earners in a country's total income. Building on recent studies for other countries, employing under-explored historical data, and comparing our results with similar data for other countries, we establish and analyse such trends for the first time for one of Asia's most populous countries and biggest economies. We offer an assessment of changes in the share of top income earners in Indonesia on the basis of income tax data for 1920-39 and 1990-2003, augmented by household income data from the country's national socio-economic survey for 1982-2004.

To preview our results, we find a significant increase in the income share of the richest households during the early 1920s, and again during the early 1930s. From the late-1930s until the early-1980s, top income shares fell (particularly the top 1% share and above). Top income shares rose modestly in the 1980s, rose sharply in the late-1990s, and fell slightly in the early-2000s. Throughout the twentieth century, top income shares in Indonesia have been higher than in most other countries for which comparable data are available.

The remainder of this paper is organised as follows. Section 4.2 outlines how this study relates to other academic studies that fall in three categories: income inequality in Indonesia, the long-term relationship between income inequality and economic growth, and changes in top incomes in other countries. Section 4.3 discusses the data and the methodology we used in this paper, particularly the intricacies of the income tax data. Section 4.4 presents the results that the analysis of top incomes in Indonesia yields. Section 4.5 compares these results with top income shares in other countries, and presents some cross-national evidence on wealth concentration. The final section concludes.

4.2 CONTEXT OF THE PAPER

There are very few assessments of income distribution in colonial Indonesia. Booth (1988: 323-32) surveyed the available evidence and offered an assessment on the basis of the data on income tax that were published for 1920-39 in the annual statistical yearbooks for colonial Indonesia. These data differentiate between three

groups of tax payers – indigenous Indonesians, 'foreign Asians' (including ethnic Chinese, Indians and Arabs) and Europeans – and allow for the calculation of average income in each group. Booth (1988: 333) found that 'the distribution of income between Indonesians revealed less glaring disparities than between ethnic groups'. However, the author used the income tax data at face value, without taking account of the ways in which they were collected and therefore of their shortcomings, such as the allowances for spouse and children or consequences of the *f*120 threshold (see section 3.1 below).[2]

For the 1950s, 1960s and most of the 1970s, a lack of data impeded any analysis of changes in income distribution. The income tax system deteriorated and data on income tax revenues were only published in aggregated forms. The first information took the form of the national household survey (*Survei Sosial-Ekonomi Nasional*, Susenas), which since 1964-65 included information on household expenditure and since 1978 also on household income. The Susenas household data have been used over and again to analyse expenditure inequality and, to a lesser extent, income inequality.

Cameron (2002) discussed the available data and noted that they generally indicated low degrees of inequality in household expenditure, with Gini ratios between 0.32 and 0.38. She also discussed the possible shortcomings of the Susenas data. For example, the surveys are often believed to be biased towards the urban poor. They also underestimate household expenditure on food (Surbakti 1995: 61) and non-food items, particularly durables such as televisions and cars. Such factors create a progressively increasing degree of underestimation of expenditure and income among the high-income households in the surveys.[3]

Cameron (2002: 12) noted that the Susenas household income data have hardly been used in the analysis of income distribution in Indonesia.[4] Compared to measuring expenditure, the measurement of income through household surveys contains a multitude of difficulties, as Deaton (1997: 26-32) explained. Cameron (2002: 15) concluded that very few studies offer a longer-term perspective on changes in income distribution and offered her estimates of the Gini ratio of per capita household income of 0.42 in 1984 and 0.43 in 1990. On the basis of the same source, Alatas and Bourguignon (2000: 159) estimated the Gini ratio of per capita household income of 0.38 in 1980 and 0.40 in 1996. Using much smaller samples of Indonesia's Family

[2] The currency unit in colonial Indonesia was the guilder (*f*), which was renamed rupiah (Rp) after Indonesia's independence.

[3] The estimation of expenditure on consumer durables relies on the memory of a head of the household regarding spending during the year prior to the survey. For reasons that are unclear, low-income households tend to be less 'forgetful' than high-income households. On the whole, the degree of underestimation is illustrated by the fact that there has long been a substantial discrepancy between total household expenditure, estimated through Susenas, and total private consumption in the Indonesian national accounts, estimated as a residual after other main items of expenditure on GDP were accounted for (Hill 1996: 195). It is likely that the household income data from Susenas also suffer from underestimation. It is difficult to assess the possible degree of underestimation, as the Indonesian national accounts do not use the income-based approach, but Appendix 4E contains an approximation.

[4] An additional source of income data is contained in the National Labour Force Survey (*Survei Tenaga Kerja Nasional*, Sakernas), which collects information on wage incomes of employees since 1978. These have also hardly been used in assessments of wage income inequality in Indonesia, let alone changes in inequality over time.

Life Survey, Fields et al. (2003: 73) estimated Gini ratios of household income distribution to be 0.56 in both 1993 and 1997.

Available studies of income and expenditure distribution in Indonesia tend to cover short-term changes and use different data configurations, indicators of inequality and methods of decomposition that impede the comparability of the results. For those reasons, Cameron (2002) could not be conclusive about the degree of income inequality and changes in income distribution in the longer term. Hence, the low degree of inequality may be real, or due to shortcomings in the survey in capturing high-income households, or due to the fact that household expenditure tends to be more evenly distributed than income. Section 5 will directly compare the available inequality estimates with our estimates of top income shares.

Interest in long-term trends in income distribution increased since Kuznets (1955), who hypothesised that, from low levels of living, economic growth first increases inequality, before it generates a more even distribution of income. Extensive debate exists on the historical consequences of industrialisation during the 19th and 20th centuries for the equality of income and wealth in Western countries, particularly the UK and the US. This debate, and the evidence it yielded, indicate that inequality indeed increased since the early 19th century, but that in the 20th century pre-tax income inequality decreased until the 1970s. This was partly due to shifts in the progressivity of redistribution through government, and also to factor-market forces and economic growth (Lindert 2000).

Lindert and Williamson (2003) interpreted trends in income distribution between and within nations during 1500-2000 in the context of changes in relative factor prices, as the process of 'globalisation' mobilised production factors around the world. For Indonesia, they hypothesised an increase in inequality during 1900-30, as the country's abundant land resources were mobilised for export production, raising land rents relative to wages. Implicitly, the mobilisation of labour for export production since the 1970s should reverse the effect, as in other Asian countries where the mobilisation of labour through labour-absorbing industrialisation raised wages relative to the costs of capital and land. However, the authors noted instead – without referring to a specific source – that income in Indonesia became more concentrated in the top decile.

Such generalisations of long-term trends in income inequality enhance the pertinence of a closer study of the case of Indonesia. However, the available data for Indonesia – income tax data and national household surveys – contain limitations that impede an assessment of trends in inequality on the basis of conventional measures, such as Gini indices.

An alternative approach is the estimation of the share of top incomes in total income, which may suit the available data for Indonesia in principle. Increasing attention has been devoted to understanding long-term changes in top income shares. Beginning with the work of Piketty (2001) on France, there has been a renewed interest in using income taxation data to estimate the share of national income held by the rich. Long-run top incomes series have recently been estimated for more than a dozen developed countries, including Australia (Atkinson and Leigh 2007), Canada (Saez and Veall 2005), Finland (Riihelä et al. 2005), France (Piketty 2001, 2003, 2007; Landais 2007),

Germany (Dell 2005, 2007), Ireland (Nolan 2007), Japan (Moriguchi and Saez 2008), the Netherlands (Atkinson and Salverda 2005), New Zealand (Atkinson and Leigh 2008), Spain (Alvaredo and Saez 2006), Sweden (Roine and Waldenström 2008), Switzerland (Dell 2005; Dell, Piketty and Saez 2007), the United Kingdom (Atkinson 2005, 2007a) and the United States (Piketty and Saez 2003, 2006). Piketty and Saez (2006a) and Leigh (2007, 2009) surveyed these papers, confirming the trends noted by Lindert (2000) for a greater range of countries, namely that top income shares in developed countries decreased during the first half of the 20th century, and remained fairly flat during the 1950s and 1960s. Since the 1970s, top income shares in English-speaking countries have increased sharply, but there has been little change in top income shares in continental Europe.

Less work has so far been done on estimating top income shares in developing countries, with the exceptions of Argentina (Alvaredo 2007), urban China (Piketty and Qian 2006), and India (Banerjee and Piketty 2005). Since our focus is on Indonesia, we are most interested in understanding how top income shares in Indonesia compare with those in other Asian nations. Banerjee and Piketty (2005) used income taxation data to estimate top income shares for India during 1922-2000. They noted that the income share of top incomes decreased from the 1950s to the 1980s, before increasing again, and argued that this was consistent with economic policies in India. Using income tax data, Moriguchi and Saez (2008) found high top income shares in developing pre-war Japan, and significantly lower shares after World War II. Piketty and Qian (2006) used household survey data to estimate top income shares in urban China during 1986-2003, and noted increasing top income shares. They also assessed the revenue-raising potential of income taxation and its impact on mitigating after-tax income inequality.

The current paper not only adds to this body of studies, it also offers an assessment of long-term changes in income distribution for Indonesia on the basis of data for 1920-39 and 1982-2004, and a comparison of trends in Indonesia with trends in other countries. The questions it seeks to answer are: do trends in top incomes substantiate the widely perceived long-term increase in income inequality in Indonesia, and is Indonesia different from other countries in this respect?

Since the rate of income tax avoidance is generally thought to be higher in developing countries, we use both income taxation data and the Susenas household survey data to analyse top income shares over the last two decades. As well as providing a check on our results, this also provides insights into the extent to which income tax data in developing countries can be relied upon for estimating top income shares.

4.3 METHODOLOGY FOR ESTIMATING TOP INCOME SHARES

Our estimates of top income shares in Indonesia are based on three sources: income taxation data compiled at the Ministry of Finance of colonial Indonesia for 1920-1939, income taxation data from the Directorate General of Taxation of the Ministry of Finance of Indonesia for 1990-2003, and the Susenas household survey data for benchmark years between 1982 and 2004. This section deals with the issues surrounding the use of taxation data first, before turning to the Susenas data.

Using Taxation Data to Estimate Top Income Shares

The general methodological issues surrounding the use of taxation data to estimate top income shares have been well canvassed by Atkinson (2007). In essence, our approach involves using external control totals for both the adult population and total personal income, and interpolating top income shares using tabulated income taxation data. In Indonesia, as in other countries, those with incomes below a certain threshold were not liable for income tax. Our control totals are the total population that would have paid income tax if such thresholds did not apply, and the total personal income that would have been declared if such thresholds did not apply. We discuss tax evasion below.

Our first set of taxation data covers 1920-39. Until the enactment of the Income Tax Ordinance of 1920, the taxation system of colonial Indonesia was, as Mansury (1992: 13) described it, 'a mix of widely diverging statutes and provisions'. A tax on incomes in the trades and professions, or business tax (*bedrijfsbelasting*), was levied since 1839. The tax rate varied by income, but was paid by very few individual income earners and yielded only a very minor share of public revenue. In 1908, a general income tax was introduced, but only the net incomes of 'European' income earners were liable, while non-Europeans continued to be liable for the 1907 business tax on incomes in the trades and professions. The number of individuals assessed for income tax remained low – in 1919, still only 50,544 people were taxed.

The 1920 Income Tax Ordinance introduced a universal income tax for which in principle all individual income earners, regardless of ethnicity, as well as companies in colonial Indonesia were liable. This raised the number of individuals liable for income tax to 2.6 million in 1920 (22% of all households). Provisional assessments for income tax started in 1920, but final assessments could take up to two years to be settled. Net incomes of less than ƒ120 were exempted from income tax. A revision of the income tax in 1935 increased the tax threshold to ƒ900 and also saw the introduction of a withholding wage tax, which employers deducted from the wages and salaries of their employees at a uniform rate of 4%. Incomes higher than ƒ900 were also liable for income tax, but received an allowance for the withholding tax already paid.

The income taxation statistics were published annually in the statistical yearbooks of colonial Indonesia (see Appendix 4A). These tabulated net income into income bands, with the number of bands ranging between 23 and 91. Income tax was to be paid on all income and subject to a progressive scale, rising from 1% on the minimum taxable income of ƒ120 to 25% on incomes over ƒ180,000.

Although it is tempting to take these available data at face value, they harbour several problems. The following is a brief discussion of the main issues. First, persons living in the same household in Indonesia during this period were taxed jointly, as was the case under the tax system in The Netherlands at the time (see Atkinson and Salverda 2005). At the same time, heads of households could deduct set allowances for spouse and children from gross income. Hence, the income data represent net, pre-tax, taxable income.

Second, Huender and Meijer Ranneft (1926: 78-79) noted that non- and under-compliance was significant in the lower income bands. Reys (1925: 72-91) argued that taxable incomes in the lowest bands were significantly underestimated, simply because taxation authorities had no other data available to estimate income and base tax assessment on than the assessment of the previous year. Reys concluded that the cost of tax assessment and enforcing tax compliance was high in relation to the share of the income tax revenue from annual incomes between ƒ120 and ƒ1,800. Both studies proposed to raise the threshold to ƒ300, respectively ƒ600. Hence, there is a significant element of arbitrariness and underestimation in the numbers of income earners and their incomes in the lower income bands. In those bands, assessment of income tax liability was often a mere guess by village authorities, as non-European income earners with assessed incomes of less that ƒ1,200 were not required to file income tax returns.

Third, farmers in Java liable for land tax (*landrente*) were exempted from income tax. This was also the case in other parts of the country, where the land tax was introduced during the 1920s-30s, particularly Bali, Lombok, Sumbawa, Southeast Kalimantan and Southeast Sulawesi. Consequently, most ethnic Indonesians were exempted from income tax, because they had income from land, not necessarily because they earned less than the threshold of ƒ120 per year.

Fourth, the threshold was not adjusted for changes in the general level of prices until the revision in 1935. During the early 1920s, Indonesia experienced deflation after high price levels during World War I, while during the early 1930s prices fell due to the impact of the international economic slump. Given that the income threshold and the income bands were not adjusted for price changes, deflation caused a reverse 'fiscal drag'. A large portion of income earners, who would otherwise have been taxed, fell below the threshold and were no longer liable for income tax. This effect was masked during the 1920s, when the number of income tax payers increased from 2.6 million in 1920 (22% of households) to 4.1 million in 1930 (30% of households). The effect was obvious during the 1930s, when the number of income tax payers decreased to a low of 2.3 million in 1938 (15% of households).

Lastly, as noted in section 4.2, the data appear to distinguish between groups of income tax payers according to ethnicity. However, Fasseur (1994) explained that the distinction only served the purpose of determining which sets of private and family laws applied to individual cases involving people of different ethnic backgrounds. He also noted that from 1899, the distinction 'lost its purely racial connotation' (p. 40), as people would not necessarily be classified according to ethnic background. For example, all ethnic Japanese were classified as 'Europeans', Indo-Europeans could be classified as 'indigenous' or 'European', and ethnic Chinese could be classified as 'foreign Asians' or 'European'. Hence, by the 1920s, if not before, the distinction had no socio-economic basis. Under the 1920 Income Tax Ordinance, all income earners were subject to the same legislation for the purpose of income tax liabilities. The differences in average income between ethnic groups and the changes in income distribution may have been due to general factors which determine the distribution of income in all economies; particularly the distribution of human capital and advances

in educational attainment.[5] In addition, the 1930 population census indicated that 66% of the 'foreign Asians' and 71% of the 'Europeans' had actually been born in Indonesia. It would therefore be more appropriate to regard all non-ethnic Indonesians as residents of colonial Indonesia, rather than 'foreigners'. Many became Indonesian nationals in the 1950s, after Indonesia became independent. For the purpose of comparing pre- and post-Independence data, we refrain from using the distinction of income tax payers according to 'ethnicity'.

More details on the taxation data for 1920-39 are provided in Appendix 4A. It should be noted that by developing country standards, the coverage of the income tax system in colonial Indonesia during this period, with a maximum of 4.1 million taxed income earners in 1930, was extraordinarily high. For example, Banerjee and Piketty (2004: Table A0) note that the number of income tax returns in India – a much more populous nation – only passed 1 million in 1960-61. This may indicate that the income tax threshold in Indonesia was relatively low.

After Indonesia's independence, the land tax was abolished and all income earners became in principle liable for withholding wage tax and/or personal income tax. The total number of income tax assessments was still considerable, but decreasing – from 3.0 million in 1952 to 2.3 million in 1955 (Dris 1958: 433). This was most likely below the taxable capacity, as growing staff shortages, shortages of trained and experienced staff at the Ministry of Finance, and greater complexity of the accumulating new income tax regulations caused increasing delays in income tax assessments and payments, and new opportunities to evade tax obligations.

The number of self-employed people registered for personal income tax liability remained around 0.2 to 0.3 million during 1955-71, although by 1971 the number of effective tax payers had approximately halved (Dris 1958: 433; Lent and Missorten 1967: 43; Oberndörfer et al. 1976: 149). The total number of income tax payers, including withholding tax, decreased to just 0.6 million in 1971 or about 2.5% of households (Lerche 1978: 300). By 1980, still only 1.2 million income earners paid income tax – or 4% of households – of which only 0.2 million were self-employed (Asher 1997: 134). Hence, by the early 1980s, it was obvious that Indonesia's income tax system was 'plagued by uneven enforcement and compliance' (Asher 1997: 127) and underperforming in terms of maximising tax revenues.

As part of a comprehensive package of tax reforms, a new Income Tax Law was introduced in 1984. It integrated the personal and corporate income tax into a single income tax law and simplified the income tax regulations considerably (Mansury 1992: 22-27; Asher 1997: 140-44; Uppal 2003: 1-29). The 1984 law introduced a new withholding tax, payable monthly by employers on wages and salaries of their employees, and also on gross dividends, interest payments, royalties etc., and on estimated net incomes of a wide range of purchased services, including rentals and insurance premiums. Individual income earners engaged in business or self-employed, or with incomes higher than a specified non-taxable allowance (Rp 0.96 million from

[5] Scholte (1929: 4-5) noted that the average incomes of 'Europeans' were higher than in The Netherlands, due to the lower share of low-income groups.

1984, increasing gradually over time, plus allowances for dependants) were required to register for income tax and file tax returns.

The Income Tax Law was updated and revised in 1994 and 2000 (Siswanto 2003: 22-26). For example, in 1994, the principle of self-assessment of personal income tax liability was abandoned in favour of assessment by the tax authorities only. In 2000, five income bands were introduced, self-assessment was re-introduced, and the non-taxable allowance was drastically increased to Rp 12 million from 2001, plus allowances for dependants. Withholding tax rates also changed marginally, but most principles remained the same.

The number of registrations for personal income tax increased from 0.3 million in 1984 to almost 0.7 million in 1988, where it stayed until 1991, when only half the registrants actually paid personal income tax (Asher 1997: 152-53; Mansury 1992: 209). Hence, non- and incomplete compliance were still significant. Including individuals assessed for withholding tax, the total number of actual income tax payers rose to 0.7 million in 1985, but was still only 1.4 million in 1989.

During the 1990s, the taxation authorities improved their tax registration capabilities and increased their efforts to enforce compliance. At the same time, the number of companies required to pay withholding tax on behalf of their employees increased. A sluggish adjustment of the non-taxable allowance caused 'fiscal drag' and also increased the number of income earners liable for income tax. The data we obtained from the Directorate General for Taxation indicate that the total number of individual income tax payers increased to 8.8 million in 1991 (22% of households) and 20.7 million in 1997 (43% of households), after which it stagnated until the increase to 23.7 million in 2002 (still 43% of households), of which 23.0 million paid withholding tax and 0.7 million were personal income tax payers.

Although the withholding taxes were actually paid by a smaller number of companies, their number increased from about 51,900 in 1989 to 350,000 in 2003, requiring a greatly enhanced capacity and also greater capabilities of the taxation authorities. Employment at the Directorate General of Taxation and at the regional tax offices has indeed increased significantly during the 1990s. Despite this, non- and incomplete compliance remained a concern. Uppal (2003: 53-54) noted that in 1997, 56% of individual tax payers did not file income tax return forms. Although this percentage may have decreased as the tax office sought to increase compliance, a significant degree of non-compliance is likely to have remained.

Our second set of personal income taxation data for the period 1990-2003 was especially extracted for us at the Directorate General of Taxation of the Ministry of Finance in Jakarta in 2005. So far as we are aware, we are the first to use these particular data. Although 1989 was the first year for which the data were available in electronic format, the data for that year were not tabulated in a usable manner, so our analysis starts with the 1990 data. 2003 was the last year for which complete income tax data were available. The withholding tax data were not available in disaggregated form by individual wage earners, but only by companies paying the withholding tax obligations.

During 1990-2003, personal income taxation applied to wage, salary and capital income, with earnings over the taxable threshold being subject to progressive tax rates in initially three bands, taxed at 10%, 15% and 30%, and five bands rising from 5% up to 35% since 2001. An advantage of 1990-2003 taxation data is that they are highly disaggregated. The number of bands into which earnings are divided, ranges between 182 and 662. However, a disadvantage of these data is that we are only able to identify the very top taxpayers. In addition, since taxpayers with only salary income are not required to file a return, our results assume that all those with incomes in the top 0.5% of the distribution file a return; either because they wish to seek deductions, or because they have other sources of income.

Details of the 1990-2003 taxation data are provided in Appendix 4B.

Figure 1: Share of Households Assessed for Income Tax as % of all Households in Indonesia, 1920-2003

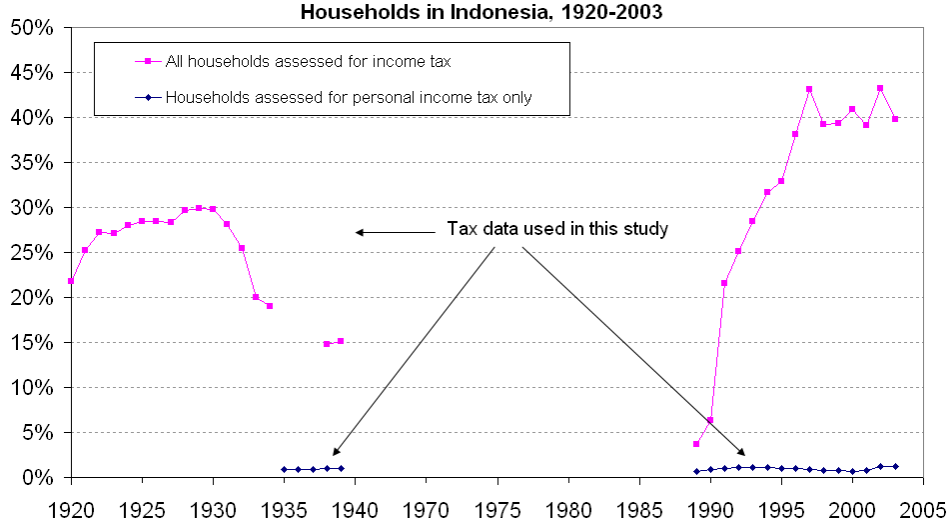


Figure 4.1 shows the coverage of our two taxation series. For the pre-war years, the data cover the incomes of 15 to 30% of the households, except for 1935-37 for which only the personal income tax data are available for about 2.5% of households, not the withholding tax data. This share is lower than for the later period, but it should be reiterated that a large number of farming households was not liable for income tax, as noted above. The decrease after 1930 was caused by the fact that deflation, following the 1929 crisis, caused nominal incomes to fall below the *f*120 threshold.

For the period 1990-2003, Figure 4.1 shows the significant increase in the share of households paying income tax, mostly withholding tax. For this period, only data on households paying personal income tax data can be used, representing on average 0.9% of households (see Appendix 4B).

For control purposes, we need to establish the total number of potential tax units. In both periods, married couples and their income-earning dependents were taxed jointly, which effectively defines the tax unit as a household.

As noted above, farmers in parts of colonial Indonesia were excluded from income taxation. As there are hardly any data that allow us to identify income distribution among the farm households liable for land tax in order to add the top income-earning farmers to the income tax data, we opted to assume that the incomes of all farm households would have fallen below the cut-off incomes used to identify the top income earners. This is plausible, as by the 1920s, the size distribution of farm land was not heavily skewed in favour of large landholders (Van der Eng 1996: 142-52). For example, the only available quantitative information indicates that in 1925 the number of large holders of farmland in Java owning 18 hectares or more, was 3,387, or just 0.06% of the total number of landholders (Huender and Meijer Ranneft 1926: 203). Assuming that the net income of their land was the same as the Java average, 18 hectares would have generated an income of around ƒ3,000.[6] Hence, they would have been in the top 0.5% of income earners, but they would have added less than 5% to the total number of top 0.5% income earners.

For the post-war years, we estimated the total number of households in Indonesia. For both periods we assumed that all households were earning an income. Details on the derivation of our population control totals are provided in Appendix 4C.

In using taxation data to estimate top income shares, our personal income control total aims to answer the question: if there had been no minimum threshold in the income taxation system and full tax compliance, how much income would have been declared?

Estimates of total pre-tax household income do not exist for Indonesia for both 1920-39 and 1990-2003. For that reason we had to construct the best possible estimates of household earnings from wages, salaries and capital on the basis of available national accounts data. Details on the derivation of our income control totals are provided in Appendix 4D.

In short, for 1920-39, the estimates were based on estimates of total personal income in current prices from Polak (1943/1979). It is very likely that Polak's estimates of total output were too low (Van der Eng 1992). The main reason for underestimation was that Polak had few data to make proper estimates of output or income in particularly small-scale industry and a range of services. The degree of underestimation of total output could be around 30%, when compared with 'reflated' estimated Gross Domestic Product (GDP) in constant prices (Van der Eng 2002: 171-72). For that reason, the pre-war estimates of household income we used in this paper have to be regarded as minimum estimates. This suggests that the income shares of top income earners may be somewhat lower than presented. At the same time, our implicit assumption that all land-tax-liable farm households had incomes below the

[6] Total value added in agriculture in Java was ƒ1,232 million (Polak 1943/1979: 32-39), divided by 7.5 million hectares of farmland in Java (Van der Eng 1996: 285), times 18 hectares.

cut-off incomes of the top income groups implies that the shares may be somewhat higher than presented. Both effects may cancel each other out.

The main problem for 1990-2003 was that Indonesia's national accounts data do not employ the income approach to estimating GDP, only the output and expenditure approaches. Another problem is that the national accounts data before the latest revision in 2000 are underestimated (Van der Eng 2005), which makes it difficult to use private consumption expenditure as a proxy of household income. For the purpose of this paper, we estimated total pre-tax personal income on the basis of the data on disposable household income for benchmark years from Indonesia's Socio-Economic Accounts (BPS various years). These data are extensions of the improved official national accounts data. They were interpolated on the basis of the official national accounts data.

Using Household Survey Data to Estimate Top Earnings Shares

Given the noted limitations of the income tax data for 1990-2003, we also opted to use Susenas household survey data in our estimation of top shares, as far as they were available to us. We were able to obtain a relatively consistent income definition for 12 years between 1982 and 2004. The sample size was around 30,000 households for 1982-96, and around 80,000 households thereafter (sample sizes are listed in Appendix 4E). We are mindful of the possible shortcomings of the Susenas data, as noted in section 4.2.

When using survey data, we simply calculated the total employee earnings of all households, and then estimated the fractions of this income that are held by the richest 10%, 5%, 1%, 0.5%, 0.1% or 0.01% of households. We assumed that the household samples were representative of the population, so that it was not necessary to use external control totals. For comparability with top incomes studies in other countries, we did not adjust household incomes for household size. Appendix 4E provides further details on our Susenas estimates.

4.4 TOP INCOME SHARES IN INDONESIA

Our estimated top income shares are presented in Table 4.1. We use taxation data to estimate the top 0.5% share (and higher groups) from 1920-39. However, we are only able to reliably estimate the top 1% share for 1921-39 and the top 5% share for the years 1931-34. We also present survey-derived estimates for the top 10% share (and higher groups) for 1982-2004, and taxation-derived estimates of the very highest groups from 1990-2003.

Table 4.1: Top Income Shares in Indonesia, 1920-39 and 1982-2004

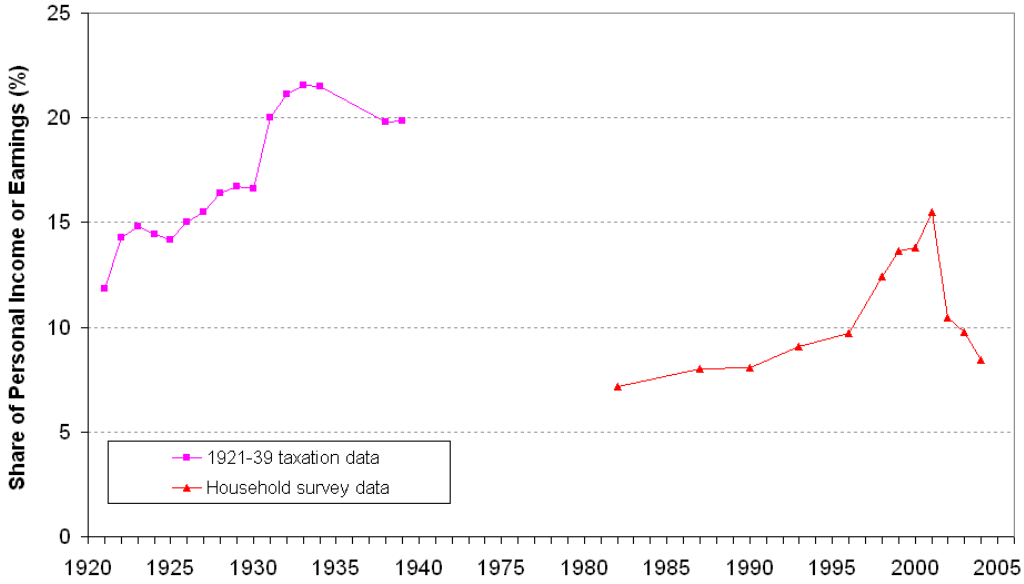
Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
Using Income Taxation Data							
1920				6.92	3.70	2.73	1.39
1921			11.82	10.08	5.54	4.15	2.21
1922			14.28	11.53	5.35	3.72	1.69
1923			14.81	11.99	5.69	4.04	1.93
1924			14.42	11.62	5.67	4.06	1.97
1925			14.19	11.42	5.65	4.01	1.91
1926			15.00	12.08	5.97	4.30	2.04
1927			15.52	12.41	5.98	4.24	1.94
1928			16.38	13.04	6.14	4.30	1.93
1929			16.71	13.31	6.32	4.45	1.92
1930			16.64	13.08	5.87	4.02	1.67
1931		30.57	20.03	15.65	6.77	4.53	1.78
1932		32.62	21.13	16.57	7.02	4.62	1.74
1933		32.83	21.55	17.01	7.18	4.68	1.72
1934		31.82	21.51	17.02	7.22	4.69	1.68
1935				15.82	6.81	4.45	1.60
1936				15.99	6.93	4.52	1.63
1937				14.64	6.56	4.38	1.69
1938			19.80	15.84	7.24	4.90	2.00
1939			19.87	15.83	7.03	4.68	1.83
Using Household Survey Data							
1982	32.64	20.85	7.17	4.60	1.80	1.21	0.58
1987	36.48	24.12	7.99	4.68	1.23	0.61	0.28
1990	36.11	23.16	8.05	5.28	1.61	0.95	0.35
1993	39.94	26.07	9.10	5.85	2.04	1.33	0.38
1996	39.37	25.30	9.69	6.59	2.06	1.38	0.37
1998	36.22	24.92	12.42	9.87	5.93	4.93	2.17
1999	37.47	26.39	13.65	10.86	6.20	4.68	1.87
2000	38.45	27.25	13.82	11.11	6.94	5.29	2.25
2001	39.53	28.42	15.52	12.63	5.26	3.20	1.35
2002	36.38	23.40	10.47	7.93	4.05	3.21	1.58
2003	34.58	24.36	9.76	7.26	3.59	2.54	0.91
2004	34.76	22.03	8.46	5.89	2.12	1.29	0.47
Using Income Taxation Data							
1990						1.01	0.69
1991						0.90	0.58
1992						1.04	0.69
1993						1.02	0.66
1994						1.02	0.67
1995						0.89	0.55
1996						0.91	0.56
1997						0.94	0.59
1998						0.80	0.54
1999						0.84	0.58
2000						1.05	0.78
2001						1.20	0.81
2002					1.47	1.26	0.75
2003					1.34	1.10	0.61

Note: Survey data are not available annually before 1998.

Figure 4.2 shows our estimate of the income share of the richest 1% of households, combining taxation estimates for 1921-39 with survey estimates for 1982-2004. In 1921, the richest percentile group held 12% of total income. We observe sharp increases in the share of the richest 1% during 1921-23 and 1930-32. In both cases the increases may have been caused by significant reductions in the incomes of farm

households relative to those of non-farm households, caused by drastic falls in the price of farm-produced export commodities, such as copra and rubber, in both the early 1920s and early 1930s. Most export commodities were produced by farmers outside Java who were not exempted from income tax. In the early 1920s, the price fall was in part a correction from a situation of very high commodity prices during and immediately after World War I. The price fall in the early 1930s was a consequence of oversupply in and reduced access to commodity export markets, combined with increased competition from imported commodities, particularly rice. While high income salary earners were to a degree shielded from the effects of these commodity price falls, small farmers had few choices to evade them, apart from returning to subsistence production. In 1933-34, the richest 1% held 22% of total income. By 1938-39, their share had fallen slightly to 20% of total income.

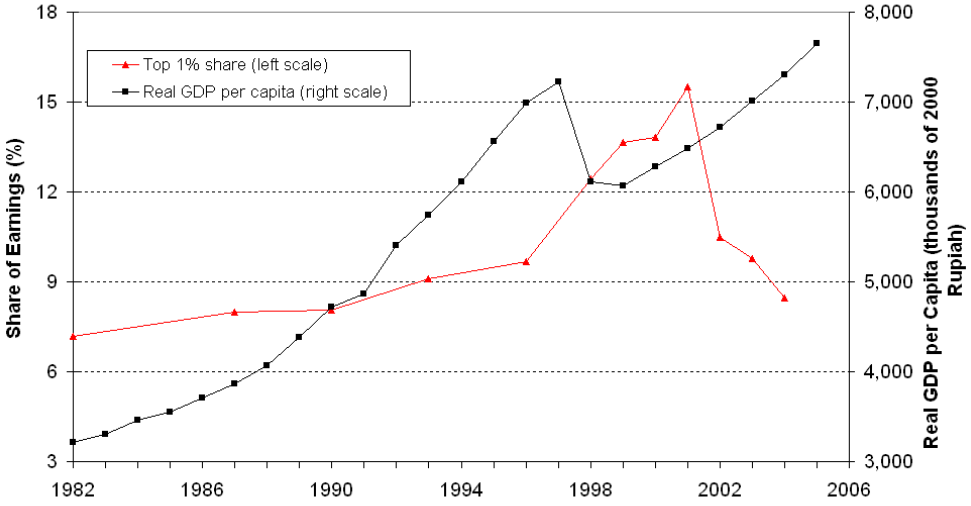
Figure 2: Income Share of the Top 1% in Indonesia



We then have a four-decade break in our series. When we resume with the 1982 survey data, we find the income share of the richest 1% to be lower – around 7% (note that our income measure also differs, now being employee earnings). Over the next two decades, the top 1% share fluctuated between 7% and 16%. From 1996 to 1998, the top percentile group's share rose from 10% to 12%, suggesting that the 1997-98 economic downturn increased the concentration of income at the top of the distribution.

Figure 4.3 focuses on the period from 1982-2004, charting the top 1% share against real GDP per capita. The rise in the top 1% share in the late-1990s coincided with a fall in average per-capita GDP, suggesting that part of the explanation may have been that the top 1% were better able to withstand the 1997-98 economic downturn and its aftermath than the bottom 99%. During 1996-2001, rapid inflation and currency depreciation eroded wage incomes in different sectors. Wages in private enterprises that were not heavily affected by the crisis (e.g. the export sector that used domestic inputs, such as agricultural exports) may have experienced a faster upward adjustment than wages in the public sector and in private enterprises that were affected by the crisis (particularly the manufacturing export sector that depended on imported inputs), until the consequences of the crisis subsided after 2001.

Figure 3: Top 1% Share and Average Incomes



Sources: Top 1% share, see main text; GDP per capita from Van der Eng (2007).

Figures 4.4 and 4.5 show the income share of the richest 0.1% and 0.05% of the population, respectively. In these charts, we use both taxation and survey data for the post-war period. The income concept is not precisely the same in the two sources, being employee earnings in the survey data and taxable income in the tax data. Taxation data contain a much larger sample of the rich. However, in principle, both datasets may underestimate top incomes. In the case of survey data, this is typically thought to arise because high-earners are underrepresented in surveys (see e.g. Groves and Couper 1998; Moore et al. 2000). In the case of taxation data, top incomes are generally thought to be downward-biased because of underreporting of income to the tax authorities. In practice, it is not clear which of these biases will be larger. For Argentina in 1997, Alvaredo (2007, Appendix B4) finds 698 taxpayers with incomes over US$1 million, but no survey respondents with incomes in this range. At the very top of the Indonesian distribution, the same is true; the 2003 survey does not contain respondents with incomes over US$1 million, but the 2003 tax data contains 70 taxpayers with incomes over US$1 million.[7] However, when moving only slightly further down the distribution, we find the opposite: the cut-off for the top 0.01% is higher in the survey data (874 million Rupiah) than in the taxation data (816 million Rupiah). We therefore opt not to follow Alvaredo's approach of combining tax and survey data.[8]

[7] Our calculations are based on the average exchange rate for 2003, being US$ 1 = Rp 8,592.

[8] Alvaredo (2007) also adjusts the Argentinean surveys so that the implied totals for aggregated wages, pensions, self-employment income, dividends and rents match those in the national accounts. In the case of Indonesia, the national accounts do not use the income approach, only the production and expenditure approaches. In Appendix 4D, we outline our approximation of total household income on the basis of the Social Accounting Matrices. However, the income estimate cannot be disaggregated for the purpose of following Alvaredo's approach.

Figure 4: Income Share of the Top 0.1% in Indonesia

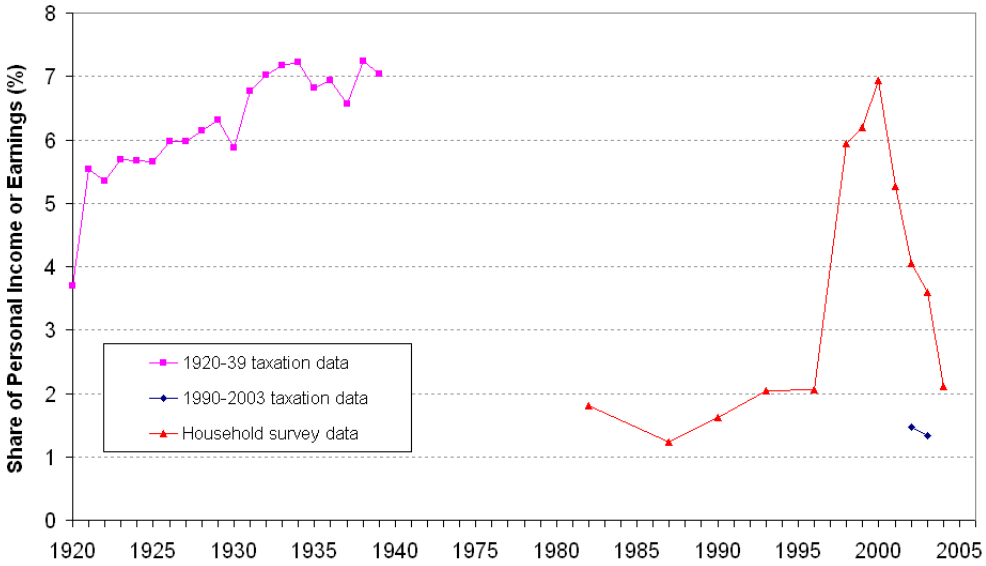
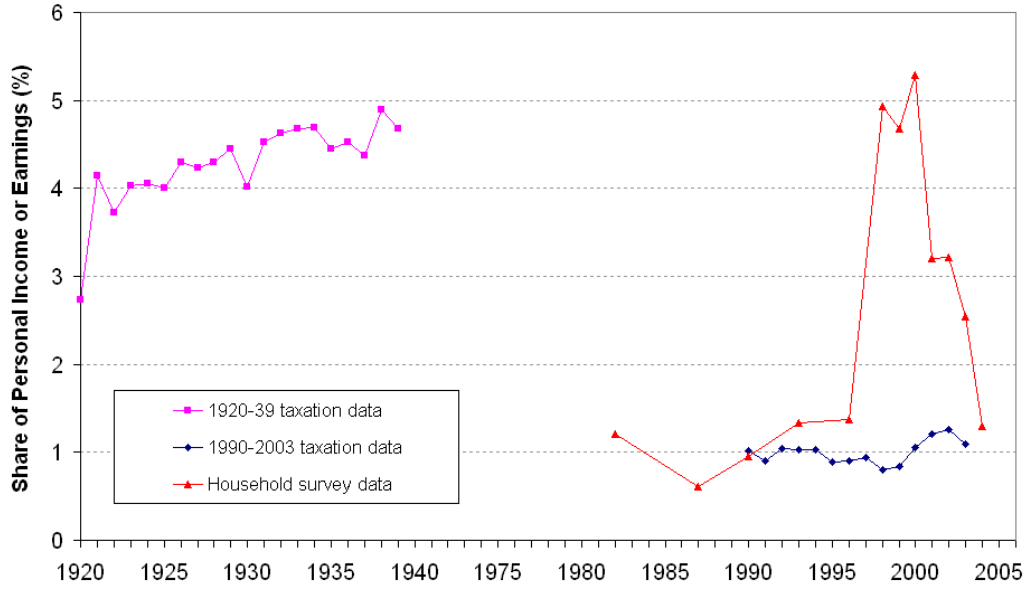


Figure 5: Income Share of the Top 0.05% in Indonesia



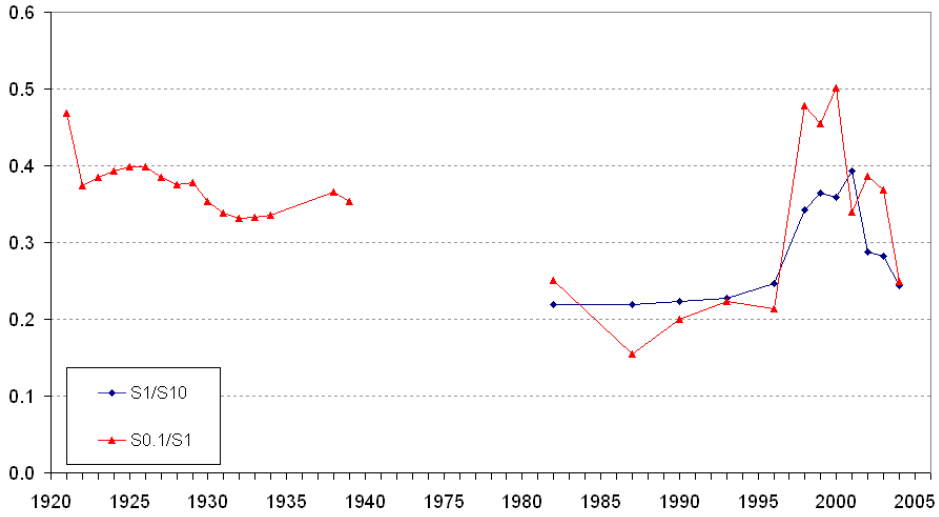
For the period 1920-39, we find that the income shares of the top 0.1% increased during the 1920s and 1930s, but less sharply than the top 1%. A similar pattern holds for the super-rich 0.05%.

A levelling at the very top appears to have occurred between 1939 and 1982; both the survey-derived and taxation-derived estimates indicate that the shares of the top 0.1% and 0.05% were lower in the early-1990s than the late-1930s. During the 1990s, the taxation and survey data both indicate a rise, but the magnitude of the increase is considerably larger in the survey data than in the taxation data.[9] Figures 4.4 and 4.5 also show an increase in top income shares from 1996 to 2000, followed by a fall in

[9] Not only are top income shares higher in the survey estimates, it is also the case that income thresholds (in Rupiah) are generally higher in the survey-derived estimates (Table 4E.4) than in the tax-derived estimates (Table 4B.2). Given that the income definition is narrower in the surveys, this is consistent with a substantial degree of tax underreporting at the top of the distribution.

the early-2000s. The significant fluctuations in the survey data may be caused by the very low number of observations in the groups of top income earners in the Susenas sample (ranging from 13 to 87 in the top 0.1% and half as many in the top 0.05%). However, it is worth noting that when we separately analyse the survey-derived estimates of the top 0.05% share and the next 0.05% share (i.e. P99.95-P100 and P99.90-P99.95), both series follow a similar trend, spiking upwards in the late-1990s. It should be noted as well that the income tax data, although they cover a much larger number of observations, only apply to those assessed for personal income tax, not all income tax paying households. This issue is discussed in detail in Appendix 4B.

Figure 6: Shares Within Shares

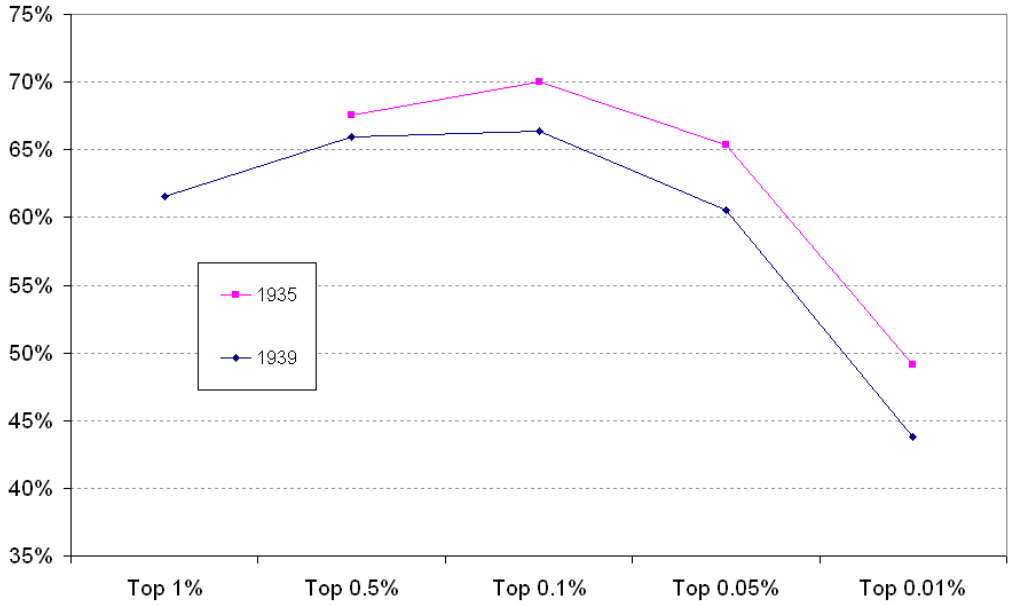


Notes: Taxation data for 1920-39; survey data for 1982-2005.

Another approach is to estimate shares within shares, comparing the super-rich with the very rich. This has the benefit that it is not affected by our control totals. Figure 4.6 shows the share of the richest 1% within the top 10%, and the share of the richest 0.1% within the top 1%. We observe a slight decline in concentration within the top 1% during the 1920s and 1930s, which is consistent with the earlier observation that the top 1% share rose faster than that of the top 0.1%. The S0.1/S1 concentration index shows a fall between 1939 and 1982. In 1939 the richest 1/1000th of households had about 35% of the income held by the top 1/100th, compared with 25% in 1982. During the late-1990s, both shares-within-shares measures rose sharply, before declining slightly in the early-2000s.

An advantage of the pre-war taxation data is that we are able to separate salary and non-salary income for the years 1935-39. Figure 4.7 shows the share of income from wages in 1935 and 1939. In general, the wage shares are high, though it should be recalled that most farmers are excluded from these statistics. For the richest 1 percentile group, about 70% of income comes from wages, compared with about 40% for the richest 0.01%. The share of top incomes derived from wage-earnings fell slightly from 1935 to 1939. But even in 1939, all but the richest 0.05% derived a majority of their income from wages.

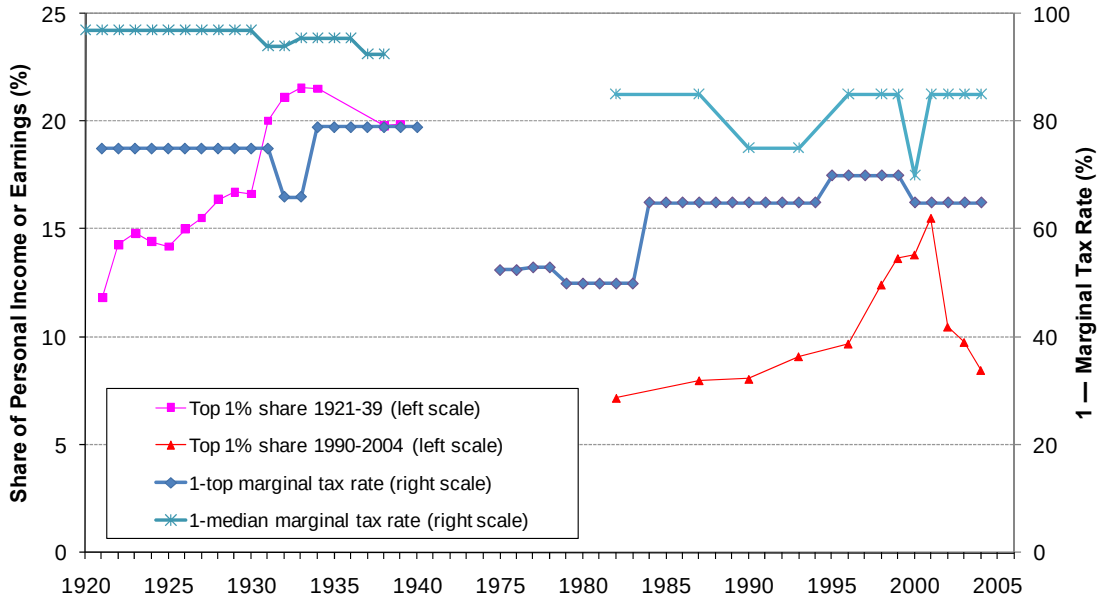
Figure 7: Share of Income from Wages in Indonesia, 1935 and 1939



One factor that has been highlighted in studies of top incomes in developed nations is the negative relationship between top incomes and marginal tax rates (see e.g. Saez 2004; Saez and Veall 2005; Atkinson and Leigh 2007a; Roine and Waldenström 2008). However, we are unaware of any attempt thus far to look at the effect of tax rates on top income shares in developing countries. Since the underreporting of income to tax authorities is generally thought to be more of a problem in developing nations, one might expect that the elasticity of top income shares with respect to tax rates would be lower in the developing world. Figure 4.8 charts our estimates of the top 1% share against the top marginal tax rate and the median marginal tax rate paid by the top 1% (so far as we are aware, we are the first to construct such tax series for Indonesia).[10] Note that we are plotting the after-tax share – so if cutting top tax rates increased the share of the rich, we would expect these lines to move together. Yet in contrast to studies that have focused on developed countries, there appears to be little evidence that an increase in the after-tax share (i.e. a reduction in the top tax rate) had the effect of boosting top income shares in Indonesia.

[10] The median marginal tax rates are calculated by taking the threshold incomes at the 99.5th and 99.95th percentiles (Appendix Tables 4A.2 and 4E.4), and checking the tax schedules for each year to determine the marginal rate at these incomes.

Figure 8: Top 1% Share and the After-Tax Share



To test this more formally, we calculate the median marginal tax rates paid by the top 1% group and the top 0.1% group. We then regress top income shares on the after-tax share (based on the median marginal tax rate payable by that group). These results are shown in Table 4.2. Using either the top 1% share or the top 0.1% share as the dependent variable, we find no consistent evidence of a positive relationship between top incomes and the after-tax share. Using top income shares that are derived from taxation data (Panel A) we find a (counter-intuitive) negative relationship in three out of four specifications. Using top income shares that are derived from survey data (Panel B), the relationship is insignificant for the top 1% share, negative for the top 0.1% in the absence of a time trend and positive for the top 0.1% with a linear time trend. Although Panels A and B use a different income concept, we show in Appendix 4E that this has little impact on the estimated top income shares (at least for a year in which we have data on both). We therefore pool the data for 1920-2004 in Panel C, and find that the relationship between top income shares and the after-tax share is mostly positive (consistent with the findings for developed countries). However, the magnitude of the coefficient varies substantially across specifications.

Table 4.2: Tax Rates and Top Incomes in Indonesia (Endogenous Rate)

	[1]	[2]	[3]	[4]
	Dependent variable is top 1% share		Dependent variable is top 0.1% share	
Panel A: 1920-1939 (tax-based top income shares)				
1-Marginal Tax Rate	-1.289***	0.117	-0.455***	-0.172***
	[0.322]	[0.414]	[0.130]	[0.058]
Linear time trend	No	Yes	No	Yes
Observations	16	16	20	20
Panel B: 1982-2004 (survey-based top income shares)				
1-Marginal Tax Rate	-0.034	-0.061	-0.152**	0.381*
	[0.106]	[0.084]	[0.057]	[0.182]
Linear time trend	No	Yes	No	Yes
Observations	12	12	12	12
Panel C: 1920-2004 (pooling data used in panels A and B)				
1-Marginal Tax Rate	0.333***	0.033	0.091**	-0.163
	[0.111]	[0.126]	[0.038]	[0.106]
Linear time trend	No	Yes	No	Yes
Observations	28	28	32	32

Notes: Standard errors, corrected for autocorrelation using the Newey-West procedure with 8 lags, in square brackets. Marginal tax rate is the marginal rate payable by a taxpayer at the 99.5^{th} percentile (in the case of the top 1% share), and the marginal rate payable by a taxpayer at the 99.95^{th} percentile (in the case of the top 0.1% share).

While the results in Table 4.2 have the advantage that they use the median marginal rate paid by the income group, it is possible that this rate might be endogenous. To see this, suppose that some external factor caused the top 1% share to fall, such that income at the 99.5^{th} percentile slipped into a lower tax bracket. In this case, we might erroneously conclude that there was a negative causal relationship between the after-tax share and the top income share. In order to correct for this, we instrument for the (endogenous) marginal tax rate paid using the (exogenous) top marginal tax rate. This addresses the endogeneity problem, but suffers from the fact that there is only a weak relationship between the top rate and the rate paid – particularly in the pre-Independence era. This can be seen from the F-statistics in Table 4.3, which are often not statistically significant. However, even when the top rate is a good instrument (as in Panel C), the effects of tax rates on top income shares are mostly statistically insignificant. Overall, we interpret the results in Tables 4.2 and 4.3 as meaning that there is no systematic relationship between top marginal tax rates and top income shares in Indonesia.

Table 4.3: Tax Rates and Top Incomes in Indonesia (IV Specification)

	[1]	[2]	[3]	[4]
	Dependent variable is top 1% share		Dependent variable is top 0.1% share	
Panel A: 1920-1939 (tax-based top income shares)				
1-Marginal Tax Rate	-6.314	-3.686	-0.78	-0.797
	[33.275]	[3.613]	[0.540]	[0.667]
Linear time trend	No	Yes	No	Yes
F-test on excluded instrument	0.02	1.45	2.87	3.39*
Observations	16	16	20	20
Panel B: 1982-2004 (survey-based top income shares)				
1-Marginal Tax Rate	0.128***	-1.053	-0.196	-0.145
	[0.013]	[3.905]	[0.112]	[0.852]
Linear time trend	No	Yes	No	Yes
F-test on excluded instrument	0.00	0.10	11.95***	1.13
Observations	12	12	12	12
Panel C: 1920-2004 (pooling data used in panels A and B)				
1-Marginal Tax Rate	0.510**	1.526	0.148	-0.367
	[0.200]	[1.953]	[0.089]	[0.347]
Linear time trend	No	Yes	No	Yes
F-test on excluded instrument	7.92***	1.41	5.65**	0.83
Observations	28	28	32	32

Notes: Standard errors, corrected for autocorrelation using the Newey-West procedure with 8 lags, in square brackets. Marginal tax rate is the marginal rate payable by a taxpayer at the 99.5^{th} percentile (in the case of the top 1% share), and the marginal rate payable by a taxpayer at the 99.95^{th} percentile (in the case of the top 0.1% share). This marginal tax rate is then instrumented using the top marginal tax rate. Our analysis is implemented using the *ivreg2* module in Stata (Baum et al. 2007).

4.5 COMPARISON WITH OTHER ESTIMATES

In this section, we look at how our estimates compare with those for other countries. We approach the question in two ways. Our first approach simply uses available data to look for consistent patterns. Specifically, we take top income share estimates for all available countries and look at the relationship between those estimates and ours for Indonesia. Our second approach focuses on Argentina, India, Japan and the United States, which allows us to chart and discuss the trends in more detail.

Table 4.4 shows the results from comparing Indonesian top income shares with those in 17 other countries. For the purposes of this exercise, we focus on the top 1% share. For Indonesia, we combine the tax-based estimate for 1921-39 with the survey-based measure for 1982-2004. Although the income concept in the two periods differs, we believe that they are sufficiently comparable so that pooling provides a more useful impression than separate analysis of both periods.

We estimate two summary statistics: the mean difference and the pair-wise correlation. Across the common years (which differ from country to country), the average top 1% share in Indonesia is 2.3 points higher than the share in other countries for which top

incomes have been estimated. In only three of the 17 countries (Argentina, the United Kingdom and the United States) is the mean top 1% share higher than in Indonesia.

As has been documented in other studies (e.g. Piketty and Saez 2006a), top income shares in many countries follow a common path across the twentieth century – falling during the first half of the century, and rising (particularly in English-speaking countries) during the last quarter of the century. The estimated correlations in Table 4.4 reinforce this point, the mean correlation with the Indonesian top 1% share being 0.650. The highest correlations are 0.967 with India (21 common observations) and 0.970 with Ireland (9 common observations). Given that the correlation with India is based upon more than twice as many data points as the correlation with Ireland, we conclude from this that trends in Indonesian top incomes most closely follow those in India. The lowest estimated correlations are with two other developing nations: Argentina and China. This suggests that trends in top income shares may have been more divergent among developing countries than in developed nations (although it is also possible that the apparent diversity merely reflects greater measurement error in developing country estimates). The results from Table 4.4 also suggest that it may be worth further exploring the relationship between top incomes in Indonesia and India.

Table 4.4: Relationship Between the Income Share of Top 1% Income Earners in Indonesia and the Income Share of Top 1% Income Earners in Other Countries

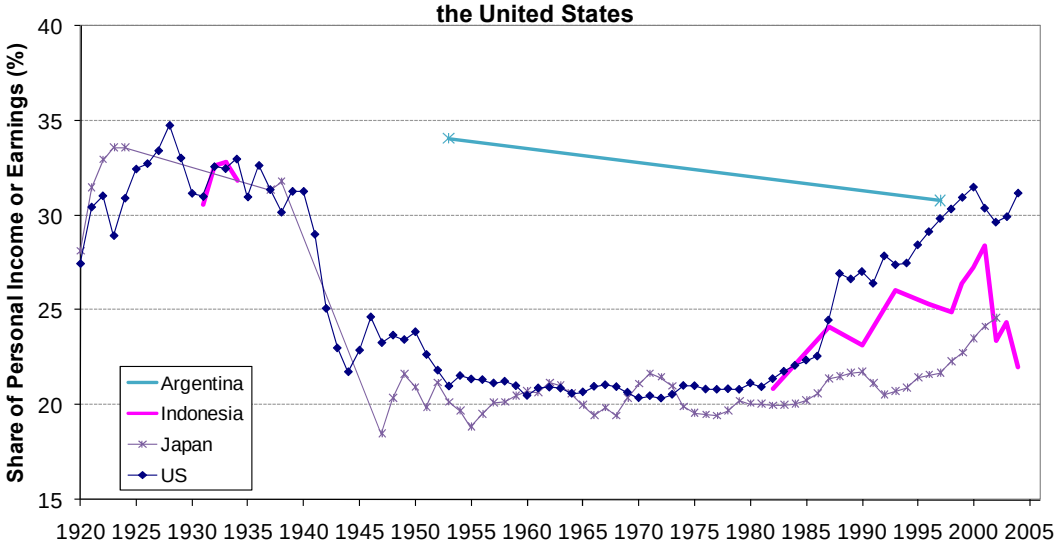
Country	Difference (Other country top 1% minus Indonesian top 1%)	Correlation	Number of common years	Common years
Argentina	5.456	-0.212	12	1932-2004
	[1.601]			
Australia	-5.242	0.666	26	1922-2003
	[0.668]			
Canada	-0.637	0.904	24	1921-2000
	[0.424]			
China (urban only)	-6.607	0.453	10	1987-2003
	[0.746]			
Finland	-5.952	0.859	8	1990-2002
	[0.567]			
France	-0.946	0.59	22	1921-1998
	[0.852]			
Germany	-3.654	0.504	17	1925-1998
	[1.092]			
India	-2.698	0.967	21	1923-1999
	[0.317]			
Ireland	-2.325	0.970	9	1939-2000
	[0.434]			
Japan	-0.302	0.717	26	1921-2002
	[0.739]			
Netherlands	-1.6	0.633	23	1921-1999
	[0.900]			
New Zealand	-2.737	0.714	25	1922-2002
	[0.611]			
Spain	-2.416	0.689	10	1982-2002
	[0.831]			
Sweden	-5.863	0.905	17	1930-2004
	[0.587]			
Switzerland	-4.395	0.763	9	1933-1996
	[1.876]			
United Kingdom	0.467	0.923	8	1982-2000
	[0.419]			
United States	1.143	0.520	28	1921-2004
	[0.710]			
Mean	**-2.253**	**0.680**		

Sources: Top incomes series for Australia, Canada, France, Germany, Ireland, Japan, the Netherlands, New Zealand, Spain, Sweden, Switzerland, the UK, and the US are drawn from Leigh (2007), who makes minor adjustments to put the data on a consistent calendar year basis and account for series breaks. The original sources for Leigh's series are cited in section 4.2. In addition, we use data from Argentina (Alvaredo 2007, Table 6, series adjusted for underreporting where applicable), urban China (Piketty and Qian 2006, Table A5, household distribution), Finland (Riihelä et al. 2005, Table 2, Gross income), and India (Banerjee and Piketty 2005, adjusted from tax year to calendar year basis). All series exclude capital gains, to the extent possible.

We now turn to a more detailed comparison of Indonesian top income shares, focusing on four particular countries. For this purpose, we chose India and Japan, the two other Asian countries for which top income shares are available over a long time span, Argentina (the only Latin American country for which we were able to obtain long-run top income estimates), and the United States, since it provides a familiar benchmark for many readers. In the case of Argentina and the United States, the estimates are based on households, while the estimates for India and Japan are based on individuals. The estimates for India, Japan and the United States are derived from taxation data, while those for Argentina are based upon both taxation and survey data.

Figure 4.9 compares the top 5% share in Indonesia with that in Argentina, Japan and the United States (the top 5% share is unavailable for India). During the early-1930s, the top 5% share was very similar in all three countries. In the 1980s and 1990s, the top vingtile share in Indonesia rose more rapidly than in Japan, though less rapidly than in the United States. In the early-2000s, the Indonesian top 5% share fell; leaving it closer to the Japanese estimate than the United States estimate at the very end of the period. There are only two observations of the top 5% share for Argentina, both significantly higher than for other countries in the same years.

Figure 9: Income Share of the Top 5% in Argentina, Indonesia, Japan, and the United States



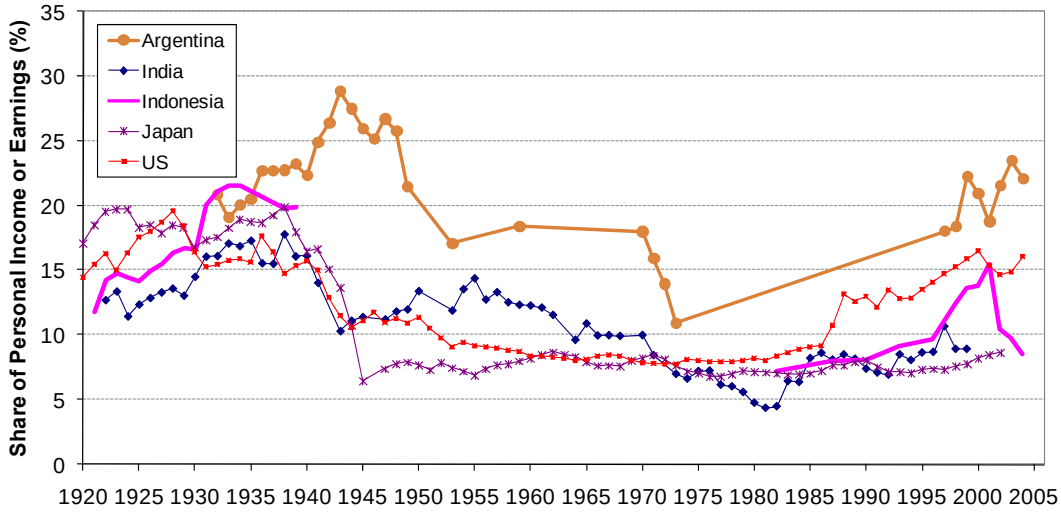
Sources: Argentina, Alvaredo (2007); Indonesia, authors' calculations; Japan, Moriguchi and Saez (2008); United States, Piketty and Saez (2003, 2006).

Figure 4.10 charts the top 1% share. In Indonesia, India and the United States, the series follows a similar trajectory, peaking in the 1920s or 1930s, falling in the middle decades of the twentieth century, and rising in the 1980s and 1990s (though not to the heights of the early decades). A similar pattern holds for Argentina, though the peak is in the 1940s. In the 1980s and 1990s, the share of the top percentile group was slightly higher in Indonesia than in India and Japan. The share of the richest 1% in Indonesia was lower than that of Argentina and the United States during most of the twentieth century, although the level of top income inequality in Indonesia exceeded the level in both Argentina and the United States in the 1930s.

The high level of inequality in Indonesia in the 1930s is possibly caused by the fact that agricultural producers suffered from the downturn in the terms of trade of agricultural commodities *vis-à-vis* non-agricultural producers, as noted in section 4.4.

In the United States, economic regulation and protection may to a degree have prevented a similarly sharp drop in agricultural incomes relative to non-agricultural incomes.

Figure 10: Income Share of the Top 1% in Argentina, India, Indonesia, Japan and the United States



Sources: Argentina, Alvaredo (2007); India, Banerjee and Piketty (2005); Indonesia, authors' calculations; Japan, Moriguchi and Saez (2008); United States, Piketty and Saez (2003, 2006).

Our finding that top income shares in Indonesia are high – relative to other countries – may surprise some readers, as it contradicts the common 'growth with equity' understanding of Indonesia's growth experience since the 1960s. For example, a discussion of inequality in Indonesia's development experience in the *World Development Report 2006* used the phrase 'pro-poor' 12 times in two pages (World Bank 2005a: 126-127). Although our most recent estimates for Indonesia are based on surveys and taxation statistics, both data sources have some limitations for analysing top incomes. To buttress the foregoing conclusions, we therefore look briefly at wealth inequality, to see how the concentration of top wealth shares in Indonesia compares with other nations.

Population surveys on household wealth are a plausible source of information. In a comprehensive report on global wealth distribution, Davies et al. (2006) show data for 20 nations with comparable information on the distribution of wealth. Among these 20 countries, the top 10% share is 3rd highest in Indonesia (65%), after only the United States (70%) and Switzerland (71%). A similar pattern emerges for the top 1% of Indonesian wealth-holders, who have 29% of the nation's wealth, again surpassed only by the United States (32%) and Switzerland (35%).

A second way of analysing wealth inequality at the top end of the distribution is to use data from the *Forbes* rich lists. In 2006, for the first time, *Forbes* compiled a list of the richest Indonesians, covering the richest 40 individuals and in some cases their families (Doebele and Vorasarun 2006). Table 4.5 compares these data to the 40 richest Americans in the same year (from the *Forbes 400* rich list). In Indonesia, the richest 40 held 6% of the nation's wealth, while the richest 40 Americans held 1% of the nation's wealth. The same pattern holds *within* the top 40, a comparison that is unaffected by estimates of total national wealth. Of the total wealth held by the top 40,

the richest four Indonesians held 39%, while the richest four Americans held 26% of the total wealth of the top 40. Similarly, the richest 20 held 85% of top 40 wealth in Indonesia, compared with 69% in the United States.

Table 4.5: Wealth Inequality at the Top of the Distribution, 2006

	Indonesia	U.S.
Wealth of richest 40 as a share of total national wealth	5.9%	1.1%
Distribution within richest 40:		
Top 4 / Top 40	39.1%	26.0%
Top 8 / Top 40	59.3%	37.8%
Top 20 / Top 40	85.5%	68.6%
Wealth per capita, US$2006 (exchange rate basis)	$1,686	$168,266

Sources: 2006 Forbes lists of the 40 richest individuals and families in Indonesia (Doebele and Vorasarun 2006) and the 40 richest individuals in the US (http://www.forbes.com/lists/). Wealth per capita is based upon figures for the year 2000 from Davies et al. (2006, Appendix V Table 1), scaled up by 1.17 to account for increases in the US CPI from 2000-2006.

4.6 CONCLUSION

Notwithstanding some major data problems, and continued shortcomings of the available data, we are able to offer several new insights into the long-term trends in income distribution in Indonesia during the twentieth century that allow us to address the questions that this paper set out to answer.

The available evidence on trends in top incomes does not suggest that there has been a sustained long-term increase in income inequality in Indonesia. There was an increase in the top 1% income share during the early 1920s and early 1930s, possibly caused by adverse changes in markets for agricultural commodities affecting farm incomes. But even during the rest of the 1920s, there was an increase, possibly associated with the fact that the 1920s was a period of significant economic expansion, largely based on the growth of commodity export production (Van der Eng 2002). This increase may substantiate the inferences of Lindert and Williamson (2003). On the other hand, the share of the top 1% decreased during the late-1930s, even though at that time the economic growth resumed vigorously, this time on the basis of the growth of import-substituting production.

For the period 1982-2004, which also was a period of high economic growth, we found that the income share of the top 5% was lower than in the early-1930s. While the top 10% in total income increased only slightly over the period 1982-2004, a more marked increase can be observed in the top 1% share. Notably, the sharp economic contraction during 1997-98 was associated with a rise in the share of the very richest groups (top 1% and above), but little change in the top 10% share. Generally speaking, these findings accord with the interpretations of income inequality in Indonesia offered by e.g. Cameron (2002) and Timmer (2005). However, we should note that our findings and those of other studies are based on the same source; the household survey data.

Comparing top income shares in Indonesia with the available data for other countries, we find that Indonesian top income shares track Indian top income shares particularly closely. In terms of the level of top income shares, the top 1% share in Indonesia has

been higher than in most countries and years for which comparable data are available. The same is true of wealth concentration at the top of the distribution, which has been relatively unequal in Indonesia during recent years.

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Appendix 4A: Income Taxation Data, 1920-39

Our data are based on personal income taxation records for 1920-39 published by income bands in the annual reports and statistical yearbooks of colonial Indonesia: *Koloniaal Verslag*, 1922/23-1923/24, *Statistisch Jaaroverzicht voor Nederlandsch-Indië*, 1922-30, *Indisch Verslag*, 1931-40. The taxation data were revised in subsequent years, pending final assessments of tax obligations. Income earners with incomes over *f* 1,200 were compelled to submit a tax return form that required time to be assessed (Reys 1925: 68). For that reason we use the latest data available. The sources only give net taxable income, after the deduction of set allowances for spouse and children from gross taxable income. Table 4A.1 shows the numbers of households assessed for income tax.

Table 4A.1: Total income earners assessed for income tax, 1920-39

	Withholding taxpayers	Personal income taxpayers	Total income taxpayers
1920			2,648,640
1921			3,098,431
1922			3,377,760
1923			3,398,159
1924			3,544,376
1925			3,653,080
1926			3,683,578
1927			3,716,561
1928			3,934,933
1929			4,026,979
1930			4,057,698
1931			3,887,520
1932			3,574,353
1933			2,848,903
1934			2,748,721
1935		132,626	
1936		131,960	
1937		141,256	
1938	2,118,679	154,205	2,272,884
1939	2,198,770	157,415	2,356,185

The published tables ordered taxpayers into various income bands, according to their taxable income. In 1920-29, the published tables show only the number of taxpayers within each income band. In these cases, we assume that the average earnings within each band are at the midpoint of the band, extrapolating for those in the top band. E.g. in 1920, the top two bands are *f* 150,000 and *f* 200,000, so we assume that the average income of those in the second-top band is *f* 175,000, and the average income of those in the top band is *f* 225,000 (our results are not particular sensitive to how we treat the top band). In 1930-39, such a correction is not necessary, since the tables show both the number of taxpayers within each band, and the total income earned within each band (a table for 1925 also shows total income, but it turns out to be based on the midpoint assumption). In 1935 and 1938-39, the tables separately identify wage and non-wage income.

As discussed in section 4.3, incomes of married couples and their income-earning dependents were taxed jointly. The exceptions to this rule were widows, divorced women and women who held assets that were managed independently from those of their husbands. According to Reys (1925: 84) the share of women in the total of income tax payers was negligible. In instances where couples were separated, we assumed that they would have been living apart, and therefore will appear in separate households in the control totals.

As noted in section 4.3, there was significant degree of non- and under-compliance in the lower income bands. Table 4A.2 shows the income cut-offs used in this study. Underestimation of incomes in the income bands up to ƒ1,200 (below which income earners were not obliged to submit tax returns) may affect our estimates of top income shares. For this reason, we do not show estimates for income groups where the income cut-off for that group was below 150% of mean personal income in the general population (estimated by dividing our control total for personal income by our control total for the number of households in the population).

Table 4A.2: Income cut-offs for given percentiles, 1920-39 (guilders)

	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%	Mean income (based on control totals)
1920			1,958	7,862	11,529	27,091	483
1921		926	2,035	8,724	12,818	29,397	373
1922		1,220	2,915	9,519	13,012	26,969	337
1923		1,170	2,713	8,950	12,271	25,878	313
1924		1,281	2,822	9,252	13,103	28,482	336
1925		1,311	2,858	9,893	14,116	31,052	347
1926		1,480	3,166	10,364	14,589	35,425	364
1927		1,486	3,239	10,372	14,543	33,008	349
1928		1,523	3,397	10,664	14,686	32,765	337
1929		1,574	3,547	10,965	15,185	34,063	343
1930		1,594	3,556	10,528	14,583	30,761	330
1931	430	1,468	3,207	9,522	13,100	25,457	246
1932	372	1,201	2,636	7,978	10,728	20,160	191
1933	286	957	2,150	6,724	9,072	16,385	155
1934	245	867	1,976	6,355	8,521	15,321	143
1935			1,833	6,007	8,087	14,714	145
1936			1,777	5,900	7,937	14,520	140
1937			1,910	6,246	8,480	16,608	165
1938		904	2,109	7,021	9,653	19,697	174
1939		910	2,140	7,036	9,507	18,387	172

Appendix 4B: Income Taxation Data, 1990-2003

With the exception of 1966 and 1971 (Lent and Missorten 1967: 43; Lerche 1978: 298), we have been unable to locate any published tabulations of income taxpayers by income bands for Indonesia since the 1950s. (Both the 1966 and 1971 tabulations turned out to be unusable for our purposes.) However, we were fortunate in 2005 to be supplied with a unique tabulation of income taxpayers by grade of taxable income. These data were extracted for us from the electronic tax data base of the Directorate General of Taxation, and are the only data available at the Directorate General.

The files supplied to us provided the number of taxpayers in each band, and the total taxable income of taxpayers in that band. The data are the result of online data submissions by the regional tax offices. Apart from non- or under-compliance, the low numbers of returns may indicate that data for 1990 were underestimated, because not all offices were online then. We were unable to check this. The 1989 data could not be used, since more than 99.9% of the taxpayers were classified in the same income band (nonetheless, we show below the summary statistics for 1989). The data only referred to net taxable income, after the deduction of set allowances for spouse and children from gross taxable income. Table 4B.1 shows the numbers of households assessed for income tax.

Table 4B.1: Total income earners assessed for income tax, 1989-2003

	Withholding taxpayers	Personal income taxpayers	Total income taxpayers
1989	1,156,891	244,091	1,400,982
1990	2,161,586	339,316	2,500,902
1991	8,360,557	424,572	8,785,129
1992	10,087,064	450,147	10,537,211
1993	*11,800,000*	460,223	12,260,223
1994	13,578,446	471,855	14,050,301
1995	14,565,973	467,303	15,033,276
1996	*17,400,000*	456,279	17,856,279
1997	20,262,393	434,849	20,697,242
1998	18,927,125	404,673	19,331,798
1999	19,541,043	380,796	19,921,839
2000	20,890,946	371,698	21,262,644
2001	20,488,669	391,210	20,879,879
2002	23,077,662	655,448	23,733,110
2003	21,771,865	709,787	22,481,652

Note: numbers in italics are approximations.

Our top income shares are estimated using midpoint interpolation, rather than Pareto extrapolation. We experimented with Pareto extrapolation, but found that the irregular size of the income ranges used in the taxation data meant that the Pareto index was imprecisely estimated. We therefore concluded that extrapolating outside the range of the available data was unlikely to provide accurate estimates of top income shares.

We were also supplied with data on withholding tax. However, this is not tabulated according to the wages of individuals, but according to the total income of the employees for which firms paid the withholding taxes. Since these data do not allow us to determine the distribution of earnings within the firm, we opted not to use them.

For the most part, Indonesian taxation laws require couples to file tax returns jointly (article 8 of the tax law). The two main exceptions are where the spouse's employer has already paid withholding tax, and where wife and husband are separated. Since we do not have any data on frequency with which the spouse's employer pays withholding tax, we do not make any adjustment for it. In instances where couples are separated, we assume that they will be living apart, and therefore will appear in separate households in the control totals.

Table 4B.2 shows the income cut-offs used in this study.

Table 4B.2: Income cut-offs for given percentiles, 1990-2003 (million rupiah)

	Top 0.1%	Top 0.05%	Top 0.01%
1990		18.3	66.9
1991		19.9	79.6
1992		22.1	97.3
1993		25.7	117.3
1994		31.2	140.8
1995		39.1	159.2
1996		43.5	173.6
1997		46.1	190.9
1998		44.1	214.0
1999		47.4	254.2
2000		55.7	391.8
2001		89.0	748.8
2002	86.6	161.2	816.4
2003	105.9	188.8	774.2

Appendix 4C: Population Control Totals, 1920-2005

1920-39

The population control totals had to be estimated, due to severe limitations in the available demographic data for colonial Indonesia, for which only the 1930 population census offers reliable data. The 1920 and 1930 population censuses do not offer estimates of households, so that their total number had to be estimated.

Firstly, population numbers were estimated for Java and separately for the other islands for 1920-30. The 1930-39 population data are interpolations of 1930 and 1940 from Van der Eng (2002).

For 1920-30 Java, non-Indonesian population is taken from the 1920 population census, the administrative counts for 1925-27 and the 1930 population census, and interpolated with exponential growth rates. For Java, the Indonesian population 1920-30 is estimated, using 1920-27 growth rates for 19 residencies (assuming that the 1920 data were the 'anchor' for the collection of the 1927 data). 1920-30 growth rates were used for 4 other residencies (Semarang, Kudus, Wonosobo and Kedu, where the 1920-27 growth rate was negative and the 1927-30 growth rate was abnormally high).

For 1920-30, Outer Islands non-Indonesian population is taken from the 1920 population census, the administrative counts for 1925 and 1927, and the 1930 population census, and interpolated with exponential growth rates. The Indonesian population is estimated, using 1920-27 growth rates for 18 regions on the basis of the same reasoning as for Java above. For West Papua, 600,000 people were assumed in 1930, which was extrapolated assuming 1% annual growth.

To estimate the number of households, we needed an indication of average household size. The 1920 and 1930 population censuses only identify the numbers of dwellings, which yields estimates of 4.6 people per dwelling in Java and 6.6 in the Outer Islands in 1920, and 4.6 people per dwelling in Java in 1930. These data may be used as proxies for average household size. The Java estimates appear acceptable, but the 1920 estimates for the Outer Islands seem too high. The only other sources are local surveys for consumption and expenditure surveys, summarised in Table 4C.1. Taken together, these surveys suggest a weighted average of 4.41 per household in both rural and urban Java. The 1961 population census also suggested an Indonesia-wide total of 4.41 people per household: 4.24 in Java and 4.82 in the Outer Islands (BPS 1963: 13-14).

We assumed all households in pre-war Indonesia to have comprised an average of 4.5 people. The estimated population totals were divided by 4.5 to yield the total number of income-earning households shown in Table 4C.2.

Table 4C.1: Overview of household average household size in food consumption and expenditure surveys in Java, 1924-1961

Source	Sample size	Region	Year(s)	Av. hh.size
Boeke (1927)	29 rural hh	Java (various parts)	1924-25	4.3
CKS (1928)	314 urban hh	Indonesia	1925	4.3
Ochse and Terra (1934: 59, 77)	30 farm hh	Kutawinangun (Kebumen, C. Java)	1932-3	6.7
CKS (1939)	95 labourers' hh	Jakarta	1937	4.6
Volksvoeding (1940: 42)	12 rural hh	Pacet (Cianjur, W.Java)	1938	4.0
Volksvoeding (1941)	100 rural hh	Gunungkidul (Yogyakarta, C.Java)	1938-9	5.5**
Postmus and Van Veen (1949: 264)	400 hh	Rengasdengklok (W.Java)	1939	4.2
Huizenga (1958: 112-148)	1,945 rural hh	Java	1939-40	4.7
Sato (1994: 90)	443 rural hh	Tasikmadu (Malang, E.Java)	1942	4.0
Sato (1994: 97)	345 rural hh	Tumut (Bantul, C.Java)	1942	5.0
Sato (1994: 103)	938 rural hh	Cimahi (Sukabumi, W.Java)	1942	5.0
Ibrahim and Weinreb (1957: 766-8)	50 urban hh	Jakarta	1953-4	5.9*
Bachtiar Rifai (1958: 39, 90)	806 rural hh	Pati (C.Java)	1956-7	4.2
ILO (1967: 27) = Ministry of Labour	2,639 urban hh	Jakarta	1957	4.3
ILO (1967: 27) = Ministry of Labour	2,180 urban hh	Surabaya	1958	4.3
ILO (1967: 27) = Ministry of Labour	123 rural hh	Wuryantoro (Solo, C.Java)	1958-9	4.9
Adyanthaya (1963: 11-12)	10,700 hh	Java (rural, throughout)	1958	4.3
Adyanthaya (1963: 11-12)	1,300 hh	Java (urban, throughout)	1958	4.8
Sukamto (1962), Wirjosudarmo (1964)	503 hh	Yogyakarta	1958	4.4
Lauw et al. (1962: 119)	46 rural hh	Pacet/Rengasdengklok (W.Java)	1961	4.4

* Children and other dependants included.

** Unusually high, according to the report.

Sources: Adyanthaya, N.K. (1963) 'Report on the Labour Force Sample Survey in Java and Madura', *Ekonomi dan Keuangan Indonesia*, 14: 1-96; Bachtiar Rifai, T. (1958) *Bentuk Milik Tanah dan Tingkat Kemakmuran: Penjelidikan Pedesaan Didaerah Pati, Djawa-Tengah.* PhD Thesis, Fakultas Pertanian, Universitas Indonesia; Boeke, J.H. (1926) 'Inlandsche Budgetten', *Koloniale Studiën*, 10, pp.229-334; CKS (1928) 'Onderzoek naar Gezinsuitgaven in Nederlandsch-Indië Gedurende Augustus 1925 en het Jaar 1926.' *Mededeelingen van het Centraal Kantoor voor de Statistiek No.60.* Weltevreden: Albrecht; CKS (1939) 'Een Onderzoek naar de Levenswijze der Gemeentekoelies te Batavia in 1937.' *Mededeelingen van het Centraal Kantoor voor de Statistiek No.177.* Batavia: Cyclostyle Centrale; Huizinga, L.H. (1958) *Het Koeliebudgetonderzoek op Java in 1939-40.* Wageningen: Vada; Ibrahim, A.M. and W.F. Weinreb (1957) 'Penjelidikan Biaja Hidup di Djakarta', *Ekonomi dan Keunangan Indonesia*, 10, pp.738-795; ILO (1967) *Household Income and Expenditure Statistics No. 1, 1950-1964.* Geneva: International Labour Office; Lauw Tjin Giok et al (1962) 'A Study of the Nutritional Status of Two Economic Levels in Tjiwalen and Amansari Villages of West Java' in *Laporan Kongres Ilmu Pengetahuan Nasional Kedua, Djilid Kedua Seksi A-1.* (Djakarta: MIPI) pp.113-144; Postmus, S. and A.G. van Veen (1949) 'Dietary Surveys in Java and East-Indonesia', *Chronica Naturae*, 105:229-236, 261-268, 316-323; Ochse, J.J. and G.J.A. Terra (1934) *Geld- en Producten-Huishouding, Volksvoeding en -Gezondheid in Koetowingagoen.* Buitenzorg: Archipel; Sato, S. (1994) *War, Nationalism and Peasants: Java under the Japanese Occupation.* Sydney: Allen and Unwin; Sukamto (1962) 'Laporan Penjelidikan Biaja Hidup untuk Daerah Istimewa Jogjakarta 1954-1960' in *Laporan Kongres Ilmu Pengetahuan Nasional Kedua, Djilid Kesembilan Seksi E-3.* (Djakarta: MIPI) pp.331-378; Volksvoeding (1940) 'Patjet-Rapport: Onderzoek naar de Voeding en Voedingstoestand van de Bevolking te Patjet (Regentschap Tjiandjoer) in 1937-1939.' *Mededeeling van het Instituut voor Volksvoeding No.2.* Batavia: Instituut voor Volksvoeding; Volksvoeding (1941) 'Goenoeng Kidoel-Rapport: Onderzoek naar de Voeding en Voedingstoestand der Bevolking in het Regentschap Goenoeng Kidoel (Djokdjakarta) in 1938-1941.' *Mededeeling van het Instituut voor Volksvoeding No.5.* Batavia: Instituut voor Volksvoeding; Wirjosudarmo, S. (1964) *Beberapa Penemuan pokok Penjelidikan Anggaran Belandja Keluarga di Daerah Istimewa Jogjakarta, Agustus 1958-Agustus 1959.* Yogyakarta: Gadjah Mada University.

Table 4C.2: Total number of households, 1920-39

1920	12,132,164	1930	13,629,447
1921	12,265,765	1931	13,834,123
1922	12,401,499	1932	14,041,886
1923	12,539,414	1933	14,252,784
1924	12,679,562	1934	14,466,863
1925	12,821,994	1935	14,684,172
1926	12,969,625	1936	14,904,761
1927	13,122,109	1937	15,128,678
1928	13,287,109	1938	15,355,974
1929	13,456,353	1939	15,586,701

1990-2005

The estimates of the total number of households were based on the population census data for 1961, 1971, 1980, 1990 and 2000, and the inter-census survey of 1995. We used the 1961 and 1971 data for consistency checks.

We interpolated the population totals from the census data and added population data for 2001-2005. We then took the numbers of households for each census year, calculated the average number of people per household, interpolated these average numbers of people per household and divided the total numbers of people for 1961-2005 with the average number of people per households to obtain annual estimates of the total number of households.

Table 4C.3: Total number of households, 1971-2005

1971	24,322,589	1990	39,695,375
72	24,917,894	91	40,809,866
73	25,528,406	92	41,961,383
74	26,154,531	93	43,151,390
1975	26,796,684	94	44,381,421
76	27,455,293	1995	45,653,084
77	28,130,798	96	46,838,934
78	28,823,652	97	48,065,457
79	29,534,317	98	49,334,520
1980	30,263,273	99	50,648,103
81	31,140,668	2000	52,008,308
82	32,045,818	01	53,416,089
83	32,979,691	02	54,976,293
84	33,943,294	03	56,590,330
1985	34,937,672	04	58,259,807
86	35,835,940	2005	59,982,945
87	36,759,990		
88	37,710,661		
89	38,688,822		

Appendix 4D: Income Control Totals, 1920-2003

1920-39

As noted in section 4.3, the 1920-39 income control totals were based on estimates of personal income provided by Polak (1943/1979: 70) for 'Indonesians', 'Europeans' and 'other Asians'. Polak's personal income data for the group of 'Indonesians' are based on a variety of estimates of incomes in different economic sectors, but are likely to have been underestimated, particularly for small-scale industry and a range of services. In essence, Polak used the income tax data to estimate these incomes for the groups of 'Europeans' and 'other Asians', albeit with various corrections, e.g. for non-compliance, to include some income not subject to income tax, and to exclude pensions. Polak added value added in farm agriculture and several other sources of income to approximate total income of the 'Indonesians'.

Table 4D.1 shows the estimates of total household income. 1920 is a rough estimate obtained by linking Polak's estimates of total income in 1921 to an estimate of 'reflated' Gross Domestic Product (GDP) in constant prices (Van der Eng 2002: 171). The estimates in Table 4D.1 are imperfect. In part, because Polak's estimates are likely to be too low, in part because they only approximate disposable household income, and in part because Polak based them on population estimates that are not in line with our estimates used in Appendix 4C.

Table 4D.1: Total household income, 1920-39 (million guilders)

1920	*5,870*	1930	4,503
1921	4,587	1931	3,417
1922	4,187	1932	2,686
1923	3,927	1933	2,217
1924	4,272	1934	2,077
1925	4,452	1935	2,130
1926	4,721	1936	2,090
1927	4,585	1937	2,503
1928	4,490	1938	2,674
1929	4,623	1939	2,685

Note that the figures in Table 4D.1 indicate that total nominal household income shrank by 54% from 1920 to 1939. This is largely due to deflation: real GDP grew by 63% over the same period, while real GDP per capita grew by 22% (Van der Eng 2007).

1980-2004

As noted in section 4.3, Indonesia's national accounts do not disaggregate national income by sources of income, only by expenditure and output. Moreover, the national accounts data are underestimated, as the successive rounds of revisions, the latest being in 2000, have shown (Van der Eng 2005). These revisions were based on the Input-Output (I-O) Tables, which were given much greater attention and where published with a significant delay, compared to the national accounts data. For that reason the I-O Tables have been used as 'anchors' for national accounts revisions.

The I-O Tables were also used as 'anchors' for Indonesia's System of Economic and Social Accounting Matrices and Extension (SESAME) for Indonesia (Keuning and Saleh 2000), which have been published as Social Accounting Matrices since the early 1980s. These accounts offer a fine disaggregation of total income by a variety of key socio-economic income groups, but not a disaggregation of income by size. The published accounts offer data on pre-tax disposable household income for 1980, 1985, 1990, 1993, 1995, 1998, 2000 and 2003 (BPS, various years) These were interpolated with the help of national accounts data in current prices, as follows.

Firstly, the Social Accounting Matrices also offer revised estimates of total GDP, which are higher than in the national accounts. The degree of underestimation of GDP was interpolated for each benchmark year, and the 1980-2003 series of the degree of underestimation was used to multiply the existing GDP series from the national accounts with, to yield a new series of GDP in current prices.

Secondly, the shares of total pre-tax disposable household income in GDP were calculated for each benchmark year and these shares were interpolated. The 1980-2003 series representing the share of disposable household income in GDP was multiplied with the new GDP series in current prices, to yield the annual series of total disposable household income for 1985-2003. The 2003 share was used to estimate total disposable household income for 2004. The estimates in Table 4D.2 are firmly anchored to the official data of disposable household income for benchmark years.

Table 4D.2: Total pretax disposable household income, 1980-2004 (billion rupiah)

1980	31,172	1993	244,548
1981	37,710	1994	310,805
1982	42,314	1995	402,104
1983	55,982	1996	438,717
1984	65,740	1997	479,912
1985	71,932	1998	671,984
1986	76,365	1999	787,491
1987	93,085	2000	988,484
1988	111,928	2001	1,248,222
1989	134,662	2002	1,461,546
1990	158,545	2003	1,638,095
1991	187,085	2004	1,881,756
1992	210,384		

Appendix 4E: Using Household Survey Data, 1982-2004

So far as we are aware, no other researchers have used the income variables from all available Susenas surveys. Most have argued that this is because the quality of data on income is inferior to the quality of data on expenditure. Whether or not this is true, it is almost certainly the case that for the very rich, ignoring savings will lead to large measurement errors when estimating inequality.

Generally speaking, there are two ways of measuring income in the Susenas.

(a) Approximately every three years, the Susenas contains an income module, which contains data on earnings from employment over the past month, from agricultural businesses over the past year, from non-agricultural businesses over the past quarter, and from other sources over the past month. In these years, the Susenas data files contain a variable with the English term *income*. However, because this variable follows a national accounting concept of income (e.g. it includes imputed rent for owner-occupiers), and not a Haig-Simons definition of income (i.e. the money value of the net increase over a period of time in a person's potential to consume), it is not suitable for our purposes. In some years (e.g. 1993, 1996), it is possible to create an income variable that includes earnings from employment, agriculture businesses, non-agricultural businesses, and other sources, but not imputed rent. However, this is not feasible for all years in which the Susenas includes an income module. Using this broader definition of income would substantially reduce the number of years for which we were able to estimate top income shares.

(b) In virtually all years, the Susenas contains questions on earnings. The question asks about cash earnings (*upah/gaji berupa uang*) and in-kind earnings (*upah/gaji berupa barang*). For comparability, we opt to use this simpler definition of income in our analysis, creating a measure of earnings that sums both cash and in-kind earnings. Note that in most cases, respondents were asked for their earnings over the past month, which implies that seasonal variations in income and the moment during the year when the survey is conducted may distort the estimated distributions, compared to a situation where households are asked about their annual income.

For 1999 and 2002, we used the core to calculate top shares, on the basis that this was more comparable with earlier and later years than using the income module. In calculating top shares, we sum earnings to the household level. Households with zero or negative earnings are ignored in the calculations.

Table 4E.1: Susenas Summary Statistics, 1982-2004 (households)

Year	Sample Size	Core or Income Module	Average Earned Household Income (Susenas)	Average Total Household Income (from appendices 3 and 4)
1982	44,960	Core	754,979	1,320,423
1987	13,315	Module	1,203,789	2,532,249
1990	23,310	Module	1,430,713	3,994,037
1993	32,013	Module	2,211,095	5,667,217
1996	32,691	Module	2,886,196	9,366,504
1998	83,292	Core	4,581,106	13,620,969
1999	81,531	Core	5,881,665	15,548,283
2000	75,931	Core	6,880,478	19,006,261
2001	76,852	Core	9,563,413	23,367,910
2002	79,927	Core	11,255,366	26,585,031
2003	76,486	Core	12,364,493	28,946,561
2004	86,821	Core	13,422,218	32,299,389

Note: Sample sizes refer to the number of households with positive employee earnings.

Our data suggest that, for most years, average earned household income constituted between one-half and one-third of average household income from the national accounts. By way of contrast, note that the ratio of the US wage bill to household income over the period 1917-2004 ranged between 0.62 and 0.95, with a mean of 0.79 (Piketty and Saez 2006, Tables A0 and B1). The lower share of wage income in Indonesia reflects the greater importance of self-employment earnings in developing nations than is the case in developed economies.

Although it is theoretically possible that self-employment income is distributed across households in a very different way than earned income, this appears not to be the case in practice. In Table 4E.2, we show estimates of top wage shares and top income shares, based on the 1996 Susenas, for which we are able to estimate both measures. The estimates are quite close, with the ratio of the two ranging between 0.87 and 1.00. In most cases, our estimated top shares are higher when based on earned income than on total income.

Table 4E.2: Comparing top share estimates based on total income and earned income (1996 only)

	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%
Based on total income	35.34	23.85	9.37	5.75	2.06
Based on earned income	39.37	25.30	9.69	6.59	2.06
Ratio	0.90	0.94	0.97	0.87	1.00

Source: Authors' estimates, based on 1996 Susenas.

For comparison purposes, we also calculated three inequality measures, being the Gini coefficient, the mean log deviation, and the Theil index. We computed each of these measures for both earned income and expenditure (*rata-rata pengeluran rumah*

tangga). As noted above, our top income share estimates follow the previous literature in not adjusting for household size, and treating each household as a single observation. Similarly, we do not make any adjustment for household size in these estimates (consequently, our expenditure Ginis do not perfectly match those in Cameron 2002).

These results are shown in Table 4E.3. In general, we do not observe strong trends in these measures, either upwards or downwards. For example, the Gini for earned household income ranges from 0.43 to 0.52, while the Gini for household expenditure is typically about 10 points lower, ranging from 0.32 to 0.40.

Table 4E.3: Susenas Inequality Estimates, 1982-2004

Year	Earned household income			Household expenditure		
	Gini	Mean Log Deviation	Theil	Gini	Mean Log Deviation	Theil
1982	0.45	0.38	0.37			
1987	0.43	0.35	0.32	0.34	0.19	0.21
1990	0.51	0.48	0.51	0.38	0.24	0.27
1993	0.50	0.48	0.47	0.39	0.25	0.29
1996	0.52	0.59	0.50	0.40	0.27	0.32
1998	0.46	0.40	0.49	0.34	0.19	0.22
1999	0.47	0.41	0.55	0.36	0.22	0.30
2000	0.47	0.41	0.54	0.32	0.18	0.20
2001	0.47	0.41	0.51	0.33	0.18	0.20
2002	0.46	0.39	0.44	0.36	0.22	0.27
2003	0.45	0.37	0.43	0.34	0.19	0.22
2004	0.44	0.34	0.38	0.35	0.21	0.25

Note: Expenditure data is not available in the version of the 1982 Susenas available to us.

Full Stata do-files are available from the authors upon request.

Microdata from Susenas were obtained from the Australian Social Science Data Archive at the Australian National University (http://www.assda.anu.edu.au), and the Demography program at ANU. Two Susenas surveys were omitted from our analysis:

- Earned income data from the 1980 Susenas are so highly skewed (an apparent Gini of 0.85) that we formed the view that some incomes are probably monthly, and others are annual. We therefore decided not to use the survey.
- Earned income in the 2005 Susenas (core) appears to have been top-coded. The highest wage levels in the 2005 survey are about 100 times smaller than in the 2003 and 2004 surveys. We therefore opted not to use this survey.

We contacted Statistics Indonesia, and were told that it was not possible to obtain the microdata for any Susenas surveys conducted prior to 1980. To the best of our knowledge, this paper therefore incorporates all available Susenas income surveys.

Most Susenas codebooks (with English translations) are available at http://www.rand.org/labor/bps.data/webdocs/susenas/susenas_main.htm

Table 4E.4 shows the income cut-offs used in this study.

Table 4E.4: Income cut-offs for given percentiles, 1982-2004 (million rupiah)

Year	Top 10%	Top 5%	Top 1%	Top 0.5%	Top 0.1%	Top 0.05%	Top 0.01%
1982	1.5	2.1	3.6	4.4	7.2	9.4	19.6
1987	2.4	3.1	5.1	6.4	10.8	12.5	20.4
1990	2.9	4.0	8.4	10.6	36.0	42.6	57.0
1993	4.6	6.4	13.0	18.0	32.3	39.0	71.7
1996	6.0	8.3	16.2	24.0	50.4	60.0	85.8
1998	8.5	11.4	24.0	33.0	76.5	135.2	600.0
1999	10.4	14.3	30.9	48.0	147.2	258.7	727.2
2000	12.4	16.8	37.2	52.8	196.1	260.8	743.3
2001	18.0	23.0	49.5	79.8	274.5	286.7	541.7
2002	21.6	29.4	57.6	84.0	180.0	240.0	759.6
2003	23.6	30.0	60.6	90.0	216.0	324.0	874.3
2004	25.2	34.8	69.6	97.0	194.4	258.0	492.0