International Inequalities Institute

Who are the Global Top 1%?

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Working paper 8

January 2017

THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

LSE International Inequalities Institute

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Abstract

This paper presents the first in-depth analysis of the changing composition of the global income rich and the rising representation of developing countries at the top of the global distribution. We construct global distributions of income between 1988 and 2012 based on both household surveys and the new top incomes data derived from tax records, which better capture the rich who are typically excluded from household surveys. We find that the representation of developing countries in the global top 1% declined until about 2002, but that since 2005 it has risen significantly. This coincides with a decline in global inequality since 2005, according to a range of measures. We compare our estimates of the country-composition and income levels of the global rich with a number of other sources – including Credit Suisse's estimates of global wealth, the Forbes World Billionaires List, attendees of the World Economic Forum, and estimates of top executives' salaries. To varying degrees, all show a rise in the representation of the developing world in the ranks of the global elite.

Keywords: top incomes, global top 1 percent, global inequality, extreme wealth

JEL Codes: D31, D63, O57

Editorial note and acknowledgements

An earlier version of this paper was presented at the World Bank Conference on Equity and Development: Ten Years On, 20 October 2016. For helpful comments or access to data, we are grateful to Facundo Alvaredo, François Bourguignon, Branko Milanovic, participants of the research seminar series at King's International Development Institute, Robyn Klingler Vidra, Stéphanie Verin, and the World Economic Forum.

1. Introduction

The growth of many low- and middle-income countries over the last three decades – among them the so-called 'emerging economies' – have transformed both the shape of the global economy and the structures of global power. Growth in the incomes of the poor has implied substantial reductions in poverty, and the composition of the global 'middle class' (defined in various ways) has shifted towards developing countries (Cruz et al. 2015; Kharas 2010; AfDB 2011; Dayton-Johnson 2015; Jayadev et al. 2015). Yet while we have information on global poverty and the broader global income distribution, the *top* of the global distribution of income has so far remained unexamined, not least because "it can be very challenging identifying all but the highest profile of the super-rich" (Hay and Muller 2012: 83). This paper aims to remedy that omission by using the new top incomes data along with global household surveys to analyse the composition and progress of the richest 1% globally, and compare them with the global top 10% and top 0.1%.

The wealth, as opposed to the income, of the very rich is tracked by several organizations including Forbes and Credit Suisse. Freund and Oliver (2016) find that Forbes's World Billionaire's list contained no Chinese billionaires in 1996, 2 in 2005 and 64 in 2010. The latest list for 2016 contains 251 Chinese, or 14% of the world's 1,810 billionaires – with 35% from outside the advanced economies more generally.[1] Research by the bank Credit Suisse covering the period 2000–2015 finds that the wealthiest 1% in the world owned 49% of global wealth in 2000, dropping to a trough of 44% in 2009, and then rising for the first time to 50% in 2015 (Davies et al. 2015: 99; Oxfam 2015: 2). The international NGO Oxfam (2016) refers to this as an "escalating inequality crisis", and also find that "Eight men now own the same amount of wealth as the poorest half of the world" (Oxfam 2017: 2).

Some of the global rich themselves have expressed concern about inequality. At the 2012 World Economic Forum meeting at Davos, "severe income disparity" was judged to be the single most likely global risk, and with one of the highest potential impacts.[2] Again at Davos in 2013, Christine Lagarde, Managing Director of the International Monetary Fund, stated that "[e]xcessive inequality is corrosive to growth; it is corrosive to society. I believe that the economics profession and the policy community have downplayed inequality for too long" (Lagarde 2013).

[1] http://www.forbes.com/billionaires/list/. 'Advanced economies' is the IMF classification that we use below. See Appendix 2.

[2] World Economic Forum (2012), reported by Tett (2012).

This neglect of inequality by most of the economics profession may be undergoing a correction with the rise in research on the incomes of the top 1% within countries (Atkinson and Piketty 2007, 2010; Piketty 2014). This literature focuses on estimating income shares of the top 1% within countries on the basis of tax records. Yet research on the *global* income-rich remains sparse. Milanovic (2011, 2016) gives brief sketches of the global top 1% based on household surveys from around the world. But the new research on the top 1% within countries indicates that household surveys are bad at capturing precisely the richest individuals, making such surveys a limited basis for analysis of the top of the income distribution.[3]

The World Top Incomes Database (WTID) contains data on top income shares for countries estimated from income tax records.[4] In our earlier paper (Anand and Segal 2015) we combined these newly-available income tax data with household survey data to provide estimates of global inequality up to 2005. As one would expect, global inequality so estimated is higher than when it is measured using household surveys alone. Here we follow a similar procedure as before to construct a global income distribution using both income tax and household survey data. Building on our earlier dataset, we improve our procedure for imputing top 1% shares, we add an additional benchmark year of 2012, use the 2011 PPPs, and for each country-year we smooth the top 10% using a Pareto distribution, where the Pareto coefficient is estimated using both tax and survey data. This allows a much finer-grained analysis of the top of the global distribution, at the same time as taking into account the data on the top 1% within countries. In addition to the global distribution at PPP exchange rates, for comparison we also consider the global distribution using market exchange rates.

We use this global income distribution to estimate the progress of the global top 10%, top 1% and top 0.1%. We focus in detail on the global top 1% to determine its country composition, and its change over time. One reason to study the global top income groups is simply to discover the extent to which citizens of developing countries have succeeded in entering the ranks of the global rich. But the global rich are also worth studying as an international group, because the global top 1%, and even more so the global top 0.1%, share more than simply an income bracket.

The global rich, unlike the global 'middle class' or the global poor, have some claim to constituting a 'class' in a substantive sense. They meet and interact with each other across national boundaries. As a prerequisite of modern globalization, officials and

[3] Milanovic (2016: 121) acknowledges an "inability to estimate accurately the highest incomes" on the basis of household survey data.

[4] In January 2017 the WTID was superseded by the World Wealth and Income Database (http://wid.world/).

business people travel and meet regularly to make deals, to trade, and to work. For instance, Beaverstock (2002: 525) argues that "expatriates are major agents in the accumulation and transfer of financial knowledge in the IFC [international financial centres], and that such processes are undertaken through expatriate global–local knowledge networks and other social practices". The international business meeting *par excellence* is the above-mentioned World Economic Forum at Davos, and we show that the composition of nationalities of those attending this meeting indicates an increase in the internationalization of the global elite, with a rising share coming from outside the advanced economies.

Moreover, increasingly the elites from non-rich countries buy property abroad – Chinese buyers alone spent more than US$52bn on foreign property in 2015[5] – and study in rich countries, acquiring qualifications, a shared language (typically English) and, it seems likely, some degree of a shared culture and attitudes. The British Council (2012: 15-17) reports that 3.5 million students studied abroad in 2009, up from 800,000 in the mid-1970s, and that the countries with the highest net outflows of students were China, India, South Korea, Kazakhstan, Turkey, Morocco and Vietnam. China and India alone contributed 21 percent to the total number of outbound students. To the extent that doing business together, sharing networks, and a foreign education foster common understanding and values, the global rich may more closely resemble a 'class' than do either a 'global middle class' or the global poor.[6]

Below we show that the threshold for an individual to enter the global top 1% in 2012 is an annual income of about PPP$50,600 per capita household income, or PPP$202,000 for a family of four. We find that for many developed countries it includes the top 4% to 8% of their national income distribution. These income groups are likely to include senior professionals and some middle managers as well as business owners and 'supermanagers' (Piketty 2014: 291-303). Among developing countries, Brazil has the largest share of its own population in the global top 1%, where 1.5% of its national distribution is in that group. For most developing countries the share is much smaller than 1%. We show that in emerging economies this group includes senior executives in large firms. Thus the global top 1% may be thought of as approximating the professional and technocratic elite – a global professional class – rather than just the super-rich.[7]

[5] http://www.bbc.co.uk/news/world-asia-china-35957232

[6] Robinson and Harris (2000: 18, cited in Hoffmann-Lange, 2012) went so far as to argue that the group of capitalists among the global elite (the "Transnational Capitalist Class") "is class conscious, has become conscious of its transnationality and has been pursuing a class project of capitalist globalization, as reflected in its global decision-making and the rise of a transnational state apparatus under the auspices of this fraction."

[7] See Hoffmann-Lange (2012) for a discussion of alternative approaches to defining global elites.

An individual in the global top 0.1%, on the other hand, has a minimum of PPP$181,000 per capita household income, or about PPP$725,000 for a family of four. This comprises the top 1% in the US, and the top 0.3% – 0.5% in Japan, Germany, France and the UK, the developed countries with the largest memberships of the club comprising the global top 0.1%. Even if less wealthy than the billionaires in the Forbes list, they are likely to wield significant power and influence.

The threshold for an individual to enter the global top 10% in 2012 was about PPP$15,300 per capita household income, or PPP$61,000 for a family of four. This income level would not count as 'rich' within a developed country: for most developed countries this group includes more than *half* their populations. For the US the top 60.4% of its population is in the global top 10%, and for Switzerland the corresponding figure is 71.2%. Of course, the global top 10% cannot include more than 10% of the population of every country, and for most developing countries the number will be much smaller than 10%.

We find that the advanced economies' share of the global rich has declined in the last decade, with a corresponding rise in that of the emerging economies. We also find a concurrent decline in global inequality. However, it is important to realize that these two outcomes need not go together. For instance, if an emerging economy that has some representation in the global top 1% were suddenly to become wholly egalitarian, that would reduce its share of the global rich and also unambiguously reduce global inequality. Relatedly, a country's membership of the global rich may expand if incomes grow throughout the national distribution while inequality remains constant, or if inequality increases with a rich minority (including those just below the threshold for the global top 1%) gaining more than the non-rich majority. Moreover, there is little reason to believe that previously under-represented groups will benefit from some of their number reaching the elite. Zweigenhaft (2001: 279) notes that despite observing a dramatic increase in the diversity of the US elite in terms of the participation of women and minorities since the 1950s, there is "no evidence of a kinder, gentler power elite in how it functions ... and in terms of wealth and income they are now further removed from the bulk of Americans 'below them'." The interests of a female executive, for instance, are more closely aligned with those of her firm's shareholders than with those of any female workers she may employ. Similarly, citizens of developing countries who reach the global elite may simply find themselves further removed from their own compatriots.

2. Data and methodology

As in Anand and Segal (2015), this paper combines two sets of data: national household surveys covering most of the global population and economy, and data on the income share of the top 1% in 28 countries from the World Top Incomes Database. Here we update in five respects the global income distribution estimated in Anand and Segal (2015). First, in Anand and Segal (2015) we estimated the global distribution only up to 2005, whereas here we extend it to 2012. Second, we improve our imputation of top 1% shares, as described below. Third, we use the PPP conversion rates from the 2011 International Comparison Program (ICP), which represents an update and improvement over the 2005 ICP used in Anand and Segal (2015).[8] Fourth, while our previous estimates used only PPP exchange rates to compare incomes across countries, here we also use market exchange rates – as discussed below. Fifth, we smooth the top decile of each country's income distribution by estimating a Pareto density function for this group.

Our household survey data up to 2005 are from Milanovic (2012), 'benchmarked' to the years 1988, 1993, 1998, 2002 and 2005. Milanovic's data are provided in quantiles – in most cases 20 income groups each comprising 5% of the population, i.e. vigintiles. For our 2012 'benchmark year' we use the most recent household survey data available post-2005 from the World Bank Povcalnet website. Of 129 surveyed countries, 109 of the surveys (or 84.5%) are from 2009 or later, i.e. within 3 years of the 2012 benchmark. The relative distributions within countries are assumed to remain constant between the survey year and 2012, while real incomes for non-2012 survey years are assumed to grow at the rate of real per capita household final consumption expenditure (HFCE) in the country.

As shown in Table 1, we have a total of 668 country-years in our dataset. Of these, 128 country-years also have income tax data on the share of the top 1% of the population. These countries include the three most populous developing countries, all in Asia – China, India and Indonesia; three Latin American countries – Argentina, Colombia and Uruguay; one African country – South Africa; and all the G7 countries. See Appendix table A1 which shows these 128 country-years with income tax data on the top 1%.

[8] Deaton and Aten (2014) argue that the methodology of the 2011 ICP was an improvement over that of the 2005 ICP and that the differences between the two are primarily due to problems with the earlier round. They find that the 2005 consumption PPPs for countries in Asia (excluding Japan), Western Asia, and Africa were overstated relative to the US by between 18 and 26 percent.

Our method for combining the top income data with household survey data follows our earlier procedure in Anand and Segal (2015), where it is discussed in detail. The rationale for using income tax data for top 1% shares is that household surveys typically fail to capture the richest members of society (Atkinson et al. 2011). For instance, the income share of the top 1% in China in recent years was about 7% in surveys and about 12% in tax data.[9] On this basis, we assume that household surveys are representative of only the bottom 99% of the population in each country, and that the true top 1% share is that given by the tax data. Hence we multiply the population in each income group in the household surveys by 0.99, and append the top 1% with its income share independently estimated from the tax data. Our assumption that the top 1% is excluded from the survey sample implies that mean incomes in the surveys are underestimated, and our procedure thus results in a corresponding increase in mean (and total) income for each country.[10]

Table 1: Coverage of countries and populations, 1988-2012

Year	Number of countries	Population in billions (% of world population)
1988	92	4.42 (87%)
1993	104	5.05 (93%)
1998	109	5.29 (89%)
2002	115	5.74 (92%)
2005	119	5.91 (91%)
2012	129	6.41 (91%)
Total	668	

Source: Authors' calculations.

For countries with no top income data we impute top 1% shares using a pooled OLS regression as follows:

$$topone_{it} = a + b_1 topten_{it} + b_2 meaninc_{it} + b_3 gov_{it} + b_4 LAC + b_5 year + \varepsilon_{it}$$

[9] See Piketty et al (2016). In their estimates of total income, including imputations for non-taxed capital income, the share of the top 1% is slightly higher still at about 13%.

[10] The augmented total income is calculated by assuming that the top 1%'s share of 'control' income as given in WTID is equal to its share of this augmented total income.

where *i* indexes the country, *t* indexes the year, *topone* is the income share of the top 1% (from WTID, in percentage points), *topten* is the income share of the top decile (from household surveys, in percentage points), *meaninc* is mean survey income, *gov* is government expenditure as a percent of GDP, and *LAC* is the regional dummy (for Latin America and the Caribbean). The regression observations are 128 country-years across 28 countries, and we obtained the following regression estimates (with standard errors in parentheses):

$$topone_{it} = -182 + 0.265 topten_{it} + 0.165 meaninc_{it} - 0.236 gov_{it} + 4.65 LAC + 0.0933 year$$

(0.0378) (0.0351) (0.0432) (1.00) (0.0263)

All regressors are significant at the 1% level, and all have positive coefficients except for *gov*, which is negative. The R^2 is 0.66, implying that the regression explains two-thirds of the variation in the share of the top 1%. For countries that have top income data in some but not all years we run a fixed-effects regression. See Appendix 2 for the complete table of regression results and a brief discussion on them.

Having imputed top 1% shares across our dataset, the final step in constructing our country-year distributions is to refine the top end of each distribution. For some countries the smallest groups at the top of the distribution are large in absolute terms compared with the size of the global top 1% or the global top 0.1%, whose composition we wish to identify. China is the obvious case, where the top 1% in 2012 has over 13 million people, or about 0.2% of the world's population. For a more fine-grained analysis, we estimate a Pareto coefficient for the top 10% for each country-year using the income shares of the top 10% and the top 1% (from the data, or estimated as above). We then break down the top 10% into 1,000 groups each of size 0.01% from percentile 90.00 to percentile 99.99, and use the estimated Pareto coefficients to calculate their respective income shares.[11]

[11] Atkinson (2007: 24) shows that $S_i/S_j = \left(H_i/H_j\right)^{\frac{a-1}{a}}$ where S_i and S_j are the income shares of the top groups with population shares H_i and H_j, and a is the Pareto coefficient. We estimate the Pareto coefficient for each country-year by inverting this formula and using the income shares of the top 10% and top 1%. We then use the formula to partition the top 10% into 0.01% groups by using the top 10% share and the Pareto coefficient to calculate the implied shares of the top 9.99%, the top 9.98%, and so on, subtracting sequentially to obtain 0.01% shares. Thus the share of percentile 90.01 is equal to the share of the top 10% minus the share of the top 9.99%, the share of percentile 90.02 is equal to the share of the top 9.99% minus the share of the top 9.98%, and so on.

Lakner and Milanovic (2013, 2015) take a different approach to imputing top income shares in estimating global inequality between 1988 and 2008.[12] Whereas their main results are based on household surveys alone, they present alternative estimates which adjust higher incomes as follows. Following Banerjee and Piketty's (2010) finding that in India a significant part of the discrepancy between estimates of household final consumption expenditure in the national accounts (HFCE) and in household surveys can be accounted for by missing or under-reported top incomes, Lakner and Milanovic (2013, 2015) attribute the difference between HFCE and survey incomes (when the latter is smaller than the former) *entirely* to the top decile of the national distribution in each country-year, and add this residual to the income of the top decile reported in the survey. They then smooth the top decile using a Pareto distribution, also following the procedure described in Atkinson (2007).[13] Their method assumes that HFCE per capita is the correct measure of mean consumption expenditure (or income) when, and only when, it is larger than the corresponding survey mean.

Anand and Segal (2008, 2015) provide reasons to prefer survey consumption expenditures (incomes) to HFCE from the national accounts. Recent revisions of national accounts estimates have also highlighted the unreliability of national accounts in developing countries, particularly in the poorer countries (Jerven 2013). Lakner and Milanovic (2013, 2015) themselves point out that their assumption is "excessive" in some cases. For example, in 2008 in India – the country that motivated their procedure – they find the survey mean to be only 53% of HFCE per capita, so they attribute the remaining 47% of total HFCE entirely to the top decile. This adjustment does seem excessively large to us. Conversely, for China in both 1988 and 2008, HFCE is smaller than survey income, so no adjustment is made by these authors for under-reporting or under-sampling of top incomes.

Our estimates, on the other hand, suffer from the fact that top income data refer to pre-tax income of taxable units – which are usually individuals but in some cases are households –whereas household surveys refer either to post-tax disposable income or to consumption expenditure. By using the top income shares rather than the absolute incomes reported in the top incomes data we avoid conflating the *levels* of post-tax and pre-tax income, but differences between the *distributions* of pre-tax income and consumption expenditure or post-tax income will be a source of error in our estimates.

[12] The following two paragraphs draw on Anand and Segal (2015).

[13] They calculate a Pareto coefficient for each country-year distribution on the basis of the unadjusted survey incomes in the ninth and tenth deciles and use it to estimate income shares for the income groups P90-P95 (i.e., percentile 90 to percentile 95), P95-P99 and P99-P100, yielding 12 income groups per country-year including deciles D1 to D9.

More generally, as Bourguignon (2015: 45) observes, "procedures of estimating global standard of living inequality are approximate". Anand and Segal (2008: 87ff) describe a variety of sources of error inherent in any estimation of global inequality, including those due to errors in surveys, noncomparability of surveys, errors in national accounts, and errors in PPP exchange rates. As they also point out, there appears to be no procedure for estimating standard errors that would account for all these sources of error.

3. Results

Global inequality: declining at last?

We provide all estimates based on global distributions in PPP$, and in some cases we also provide estimates based on market exchange rates (FX$). For the measurement of global interpersonal income inequality there is limited justification in using the FX$ distribution (Anand and Segal 2008). However, we have already mentioned that the global top 1% and global top 0.1% are likely to have more international lifestyles than the rest of the population, suggesting that a possibly-significant portion of their expenditures should be priced at market exchange rates.[14] Thus a rich Indian who can enjoy the real consumption of the global top 1% in her own country will find her spending power severely curtailed when she travels to a developed country which may be three or four times more expensive at market exchange rates. Thus, for comparison we estimate the composition of the global top 10%, top 1% and top 0.1% in both FX$ as well as PPP$.

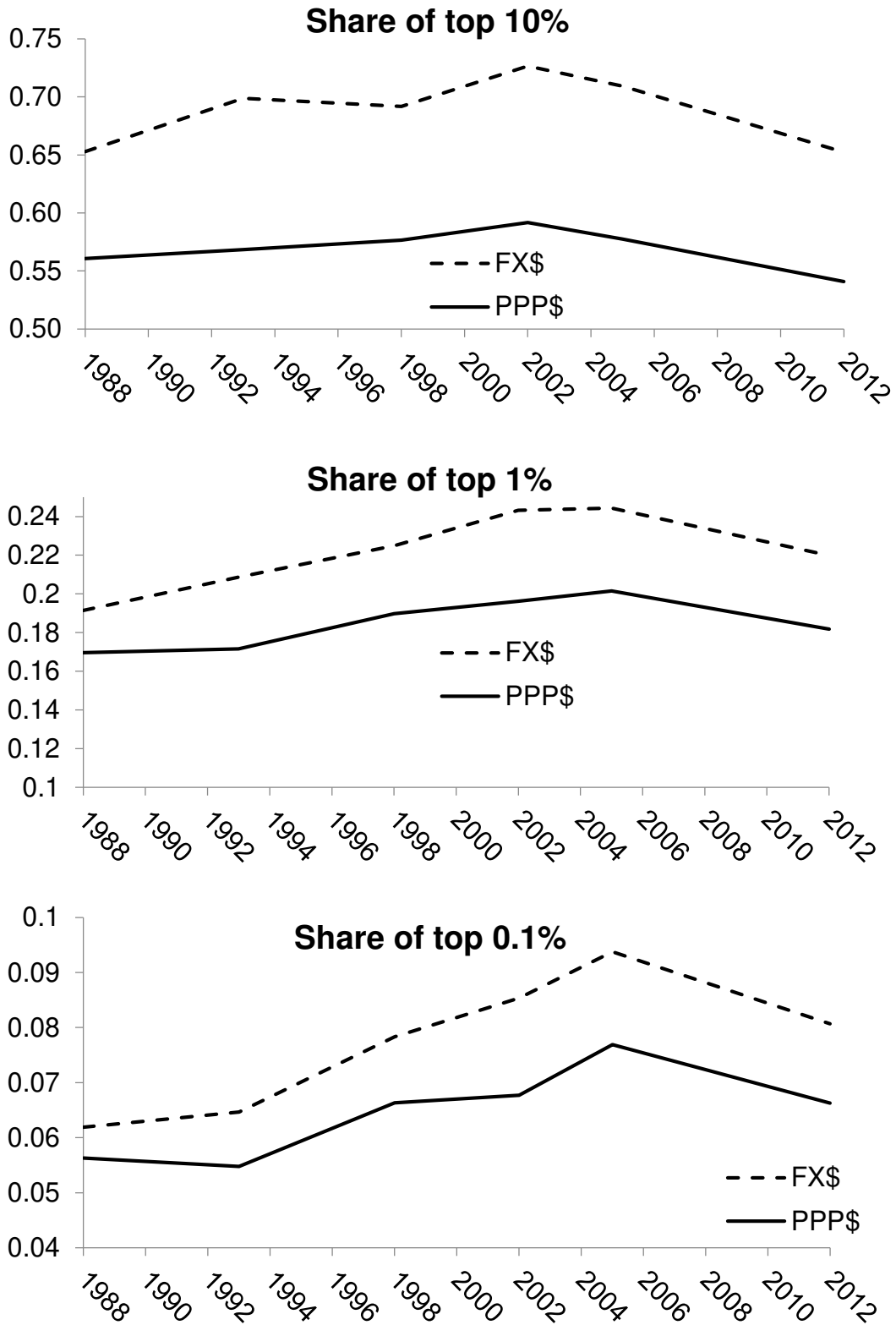
Figures 1 and 2 and table 3 show inequality trends between 1988 and 2012. Global inequality measured by the Gini, MLD (i.e. Theil *L*), and Theil *T* changed very little between 1988 and 2005, but declined in 2012. The decline in the Gini coefficient is greater than 0.03, which is Atkinson's (2015) threshold for 'salience'. The two decomposable measures, MLD and Theil *T*, show that within-country inequality was rising up to 2005 – which was offset by declining between-country inequality – but that from 2005 to 2012 even within country inequality declined. However, for both measures, within-country inequality remained higher in 2012 than in any year prior to the peak of 2005 (table 3).

[14] Such expenditures might typically include inter alia the purchase of homes, children's education, holidays, and medical expenditures in foreign countries.

Figure 1: Global inequality indices, 1988–2012

Source: Authors' calculations.

Figure 2: Global top income shares, 1988–2012



Source: Authors' calculations.

Table 3: Global inequality 1988–2012, PPP$ unless specified as FX$

	Income share of top 10%	Income share of top 10%, FX$	Income share of top 1%	Income share of top 1%, FX$	Income share of top 0.1%	Income share of top 0.1%, FX$	Gini	MLD	Between-country MLD	Within-country MLD	Theil *T*	Between-country Theil *T*	Within-country Theil *T*
1988	56.1%	65.3%	17.0%	19.1%	5.6%	6.2%	0.701	1.014	0.742	0.272	1.061	0.678	0.383
1993	56.8%	69.9%	17.2%	20.9%	5.5%	6.5%	0.702	1.013	0.687	0.326	1.062	0.653	0.409
1998	57.7%	69.2%	19.0%	22.5%	6.6%	7.8%	0.696	0.971	0.637	0.334	1.100	0.648	0.452
2002	59.2%	72.7%	19.6%	24.3%	6.8%	8.5%	0.708	1.006	0.669	0.337	1.149	0.690	0.459
2005	57.8%	70.9%	20.2%	24.4%	7.7%	9.4%	0.702	1.023	0.639	0.384	1.150	0.635	0.515
2012	54.1%	65.2%	18.2%	22.0%	6.6%	8.1%	0.668	0.874	0.511	0.363	1.012	0.508	0.503

Note: FX$ signifies market foreign exchange rates.

The income shares of the top 10%, the top 1% and the top 0.1% also rise and then decline, peaking in 2002 for the top 10% and in 2005 for the top 1% and the top 0.1% (figure 2 and table 3). The global top 1% in 2012 comprised 64.2 million people in our sample of countries, and we find that an individual needed an annual per capita household income of approximately PPP$50,600 (i.e., PPP$202,000 for a family of four) in order to be included.[15] The top 0.1% comprised 6.4 million people, with a threshold annual per capita household income of PPP$181,200. In 2012 the income share of the global top 1% was 18.2% for the PPP$ distribution and 22.0% for the FX$ distribution. This implies that the average incomes of the top 1% are 18 to 22 times higher than the world average, depending on the exchange rate used to define the distribution. Average incomes of the top 0.1% are 66 times higher than the world average for the PPP$ distribution, and 81 times higher for the FX$ distribution. Incomes in richer countries relative to poorer countries are higher at market exchange rates than at PPP exchange rates. Thus global top income shares are higher using FX$ than PPP$ because the majority of individuals in the global top income groups belong to the richer countries.

Lakner and Milanovic (2015) similarly find little movement in the Gini up to 2003, and a decline by all measures from 2003 to 2008. In conjunction with our findings, this suggests that the turning point for global inequality is around 2005. However, we find the level of inequality to be higher than Lakner and Milanovic's estimates, presumably because of our inclusion of top income data (see their table A.3[16]). Our Gini coefficients are only slightly higher, on the order of 0.01, but our Theil *T* estimates are more than 10% higher. The larger difference with the Theil *T* is probably due to the fact that this measure is more sensitive than the Gini to inequality at the top end of the distribution. Similarly, our top 1% share is substantially higher at 17.0% in 1988 compared to their 11.8%, peaking at 20.2% in 2005 compared to their peak of 15.7% in 2008.[17]

A more detailed picture of changes in the global distribution over the whole period of 1988–2012 emerges in the growth incidence curve of figure 3, which shows income growth by decile, with the top decile partitioned into the percentile group 91-99 and the top 1%, and with the top 0.1% shown separately. This reveals that the decline in

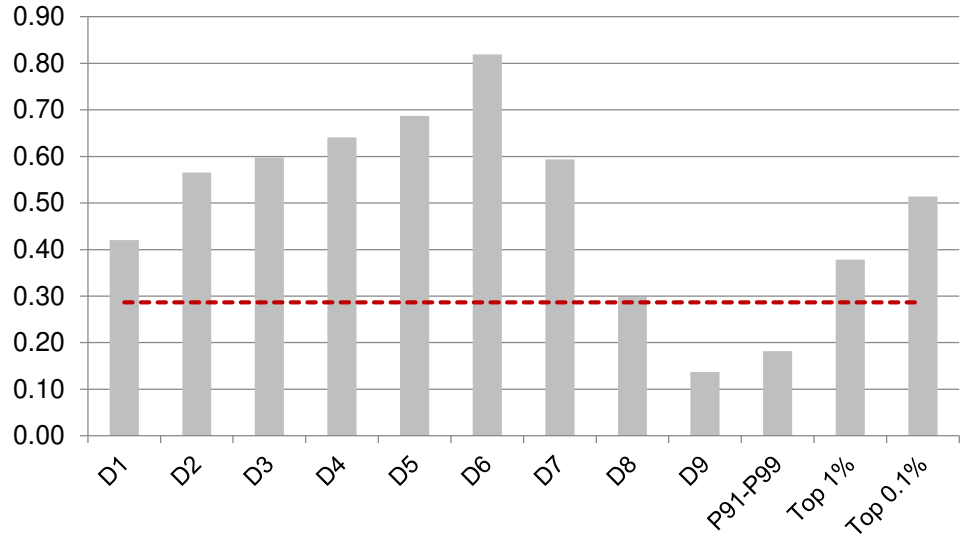
[15] Milanovic (2011), using household surveys alone, found that the threshold for the global top 1% in 2005 was an annual per capita household income of PPP$34,000, based on PPPs from the 2005 ICP.

[16] This table uses 2011 PPPs so it is more comparable with our estimates than are their main results, which use 2005 PPPs.

[17] Their top 1% share estimates, however, are calculated using 2005 PPPs (their table 3), and are not given in 2011 PPPs. They find inequality to be lower using 2011 PPPs than 2005 PPPs so presumably their top 1% shares would be lower still using 2011 PPPs, implying a still-larger difference with our estimates.

inequality shown by the three inequality indices in figure 1 is driven by the fact that only deciles 9 and 10, but excluding the top 1% (and top 0.1%), saw their incomes grow by less than the global mean. Put another way, changes in the *relative* distribution were equivalent to transfers away from this group and towards others, both poorer (deciles 1 to 8) and richer (top 1%). Inequality among the bottom 6 deciles unambiguously increased with higher deciles showing faster growth. The dominant picture is one of 'middle-class growth', with deciles 4, 5 and 6 seeing the highest rates of growth at over 60% compared to a global average growth of 29%. While the global top 1% did better than average at 38% growth, and better than the rest of the 9th and 10th deciles, their incomes grew by less than that of any of the bottom 7 deciles.[18] The global top 0.1% did substantially better than average at 51%, but were still surpassed by deciles 2 to 7.

Figure 3: Cumulative growth rate 1988–2012, by income group

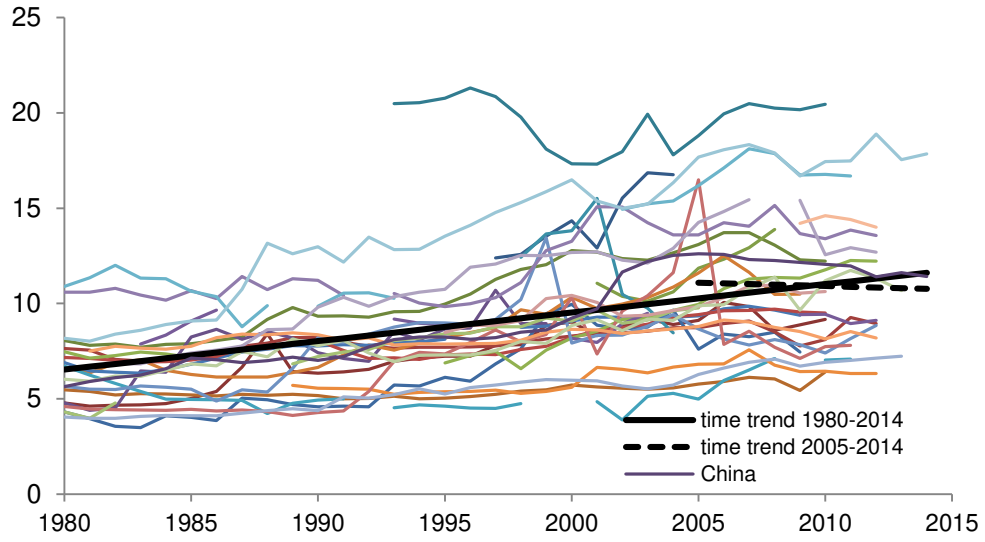


Source: Authors' calculations

Note: D1 to D9 are deciles 1 to 9. P91-P99 represents 9% of the population from the 91st percentile to the 99th percentile. The red dashed line shows mean income growth over the period.

Figure 4: Income shares (%) of top 1% in 30 countries 1980–2014, with estimated time trends

[18] Figure 3 can be contrasted with Lakner and Milanovic's (2015: 27, figure A1) growth incidence curve for 1988–2008, which is based on household surveys alone. The shape is similar, except that in their estimates the top 1% enjoys much higher growth of about 63% over their period. However, in their estimates the income share of the global top 1% remains substantially smaller than in our estimates, as noted above.



Source: World Top Incomes Database and authors' calculations.

Note: Time trends estimated using fixed-effects OLS regression. See text for details.

The income share of the global top 1% declined between 2005 and 2012, but what about the income shares of the top 1% *within* each country? These top income shares increased on average between 1980 and 2014, rising substantially in some countries, including the Anglo-Saxon countries, while remaining fairly flat in others (Roine and Waldenström 2015: 492-3). However, we find that the income shares of the top 1% within countries start to trend downwards after 2005 (figure 4) – around the same time as global inequality, within-country inequality, and the income share of the global top 1%, start to decline (table 3). In particular, country-fixed effects regressions of the income share of the top 1% on year yield positive coefficients for every sub-period 1980–2014, 1981–2014 up to 2004–2014, turning negative for the sub-period 2005–2014 and later.[19] Figure 4 plots these top income shares and the estimated time trends for 1980–2014 and 2005–2014. China, the most populous country in the world, exemplifies this aggregate trend: its top 1% share of taxable income rose to a peak in 2005 and declined every subsequent year to 2012.

[19] For each period from year *t* to year 2014, where *t* = 1980 to 2007, we regressed country top 1% shares on the year and a set of country dummies. The coefficient on the year is positive and significant for every sub-period up to 2003–2014; it is positive and insignificant for 2004–2014; and negative starting in 2005 (for which sub-period there are 26 countries with data). The negative coefficient becomes significant at the 5% level for 2007–2014 (where there are 26 countries with data).

Regional and country composition of global top income groups

Figure 5 plots the regional population shares of the global top 1% between 1988 and 2012. The advanced economies account for a large majority of the population of the global top 1%, but whereas their share in the PPP$ distribution varied within a narrow range of 85.5% to 87.7% from 1988 to 2005, it dropped substantially to 77.4% in 2012. Latin America and the Caribbean is the region with the next largest share in the PPP$ distribution, which declined from 11.6% in 1988 to 6.5% in 2005 and then rose to 8.5% in 2012 – still well below its share in 1988. The biggest regional rises since 2005 are for the Commonwealth of Independent States, driven by Russia, and East Asia and the Pacific, driven by China. China enters the global top 1% in the PPP$ distribution in 1993, but only with its top 0.01%, the finest division in our estimates. These 118 thousand Chinese people comprised 0.2% of the population of the global top 1% in 1993. Only in 2002 do additional Chinese groups enter the global top 1%, and by 2012 the top 0.22% of the Chinese national distribution reaches that level, comprising 4.6% of the population of the global top 1%.

Unsurprisingly, the US has the largest number of people in the global top 1%, with US citizens comprising 37.0% of this group in 2012 (table 4). However, this is a substantial decline from its peak of 49.2% in 1998. The US is also the country with the highest share of its own population in the global top 1%: in 2012, 7.7% of the US population was in the global top 1% (see table 5). Switzerland comes in a close second with 7.1% of its population in the global top 1%, but since it is a much smaller country, these rich Swiss comprise only 0.9% of the global top 1%.

The developing country with the largest share of the global top 1% is Brazil, with 4.7% in 2012 – just above China's 4.6%. This is because it is not only large and relatively prosperous, but its very high level of inequality also implies that rich Brazilians are particularly rich (while the non-rich are correspondingly poor), allowing more of them to cross the threshold. China and Brazil were in fourth and fifth place in 2012, surpassing the three G7 countries Canada, Italy and the UK. India, with the second largest population in the world, just misses inclusion in tables 4 and 5 with the 21st largest share of the population of the global top 1%, at 0.58%% in 2012, representing the top 0.3% of its national distribution. Over the period 1988 to 1998 only the top 0.1% of India's national distribution passed the threshold, comprising 0.2% of the global top 1%.

The global top 0.1% is dominated by the US, which comprised 48.7% of this group in 2012. China accounted for 4.2%, with Brazil's share dropping to 2.5%.

For the FX$ distribution, developing countries are virtually excluded from the top 1%, with the advanced economies accounting for between 93.8% and 97.0% over 1988 to 2005 – though even for this distribution their share declined after 2005, down to 91.0% in 2012. As in the PPP$ distribution, in 2012 the US dominates, accounting for 36.1% of the population of the global top 1% – with 7.5% of its own population in this group. The US share of the global FX$ top 1% was down in 2012 from its peak of 50.1% in 2002. Both Australia and Switzerland had higher shares of their own populations in the global top 1%, at 10.9% of the Australian population (3.7% of the global top 1%) and 23.8% of the Swiss population (3.0% of the global top 1%) – see tables 4 and 5. These exceptionally high numbers were due to temporarily-high valuations of their currencies: for Australia in particular the share of the global top 1% in FX$ was much smaller in previous years (table 4).

Table 4: Country population shares of global top 1%, 1988–2012

	Country population share of PPP$ global top 1% (%)						Country population share of FX$ global top 1% (%)					
	1988	1993	1998	2002	2005	2012	1988	1993	1998	2002	2005	2012
United States	41.6	42.0	49.2	46.3	45.0	37.0	36.3	36.2	47.5	50.1	43.2	36.1
Japan	8.1	8.3	7.1	8.0	6.7	8.3	22.5	24.7	15.6	16.3	10.4	12.7
Germany	8.7	6.5	5.6	5.1	7.1	5.6	9.1	7.6	6.2	4.8	8.3	6.3
France	4.2	5.7	3.6	7.2	4.3	5.5	5.2	7.4	4.3	6.2	5.8	7.1
Brazil	4.6	3.2	3.8	3.3	2.9	4.7	1.6	1.1	2.8	0.7	1.0	3.4
China	0.0	0.2	0.2	0.9	3.1	4.6	0.0	0.0	0.0	0.2	0.7	1.5
UK	3.7	4.8	4.4	5.3	7.1	4.6	3.4	4.0	5.2	5.8	9.1	5.8
Russia	0.0	2.9	0.3	0.3	0.8	3.1	0.0	0.1	0.0	0.0	0.1	0.6
Canada	3.8	3.0	2.5	2.3	2.9	2.8	3.5	2.6	1.8	1.9	3.0	4.1
Korea, Rep.	2.6	2.7	1.3	1.9	2.3	2.4	0.7	1.2	0.3	1.0	1.6	1.6
Australia	1.6	1.0	1.2	1.1	1.0	2.1	1.5	0.7	0.8	0.8	1.3	3.7
Italy	2.5	2.4	4.2	2.2	2.9	2.1	2.4	1.9	3.7	1.8	3.6	2.2
Spain	1.2	1.5	1.1	1.9	1.5	1.1	0.8	1.0	0.7	1.0	1.4	1.1
South Africa	0.0	0.1	0.8	0.1	0.0	1.0	0.0	0.0	0.2	0.0	0.0	0.5
Mexico	2.2	2.2	1.4	0.9	1.2	0.9	1.0	1.1	0.5	0.7	0.6	0.4
Switzerland	1.6	1.4	1.2	0.9	0.7	0.9	3.1	2.9	2.1	2.0	2.0	3.0
Netherlands	0.4	1.2	0.7	0.8	1.0	0.8	0.4	1.2	0.7	0.7	1.2	1.0
Colombia	1.1	0.8	0.4	0.5	0.4	0.8	0.2	0.2	0.1	0.1	0.1	0.4
Malaysia	0.0	0.2	0.4	0.1	0.1	0.7	0.0	0.0	0.0	0.0	0.0	0.1
Chile	0.2	0.5	1.5	0.2	0.5	0.6	0.1	0.2	0.9	0.1	0.2	0.4
Total of above 20	87.9	90.8	90.9	89.5	91.4	89.7	91.8	94.0	93.6	94.1	93.6	92.0

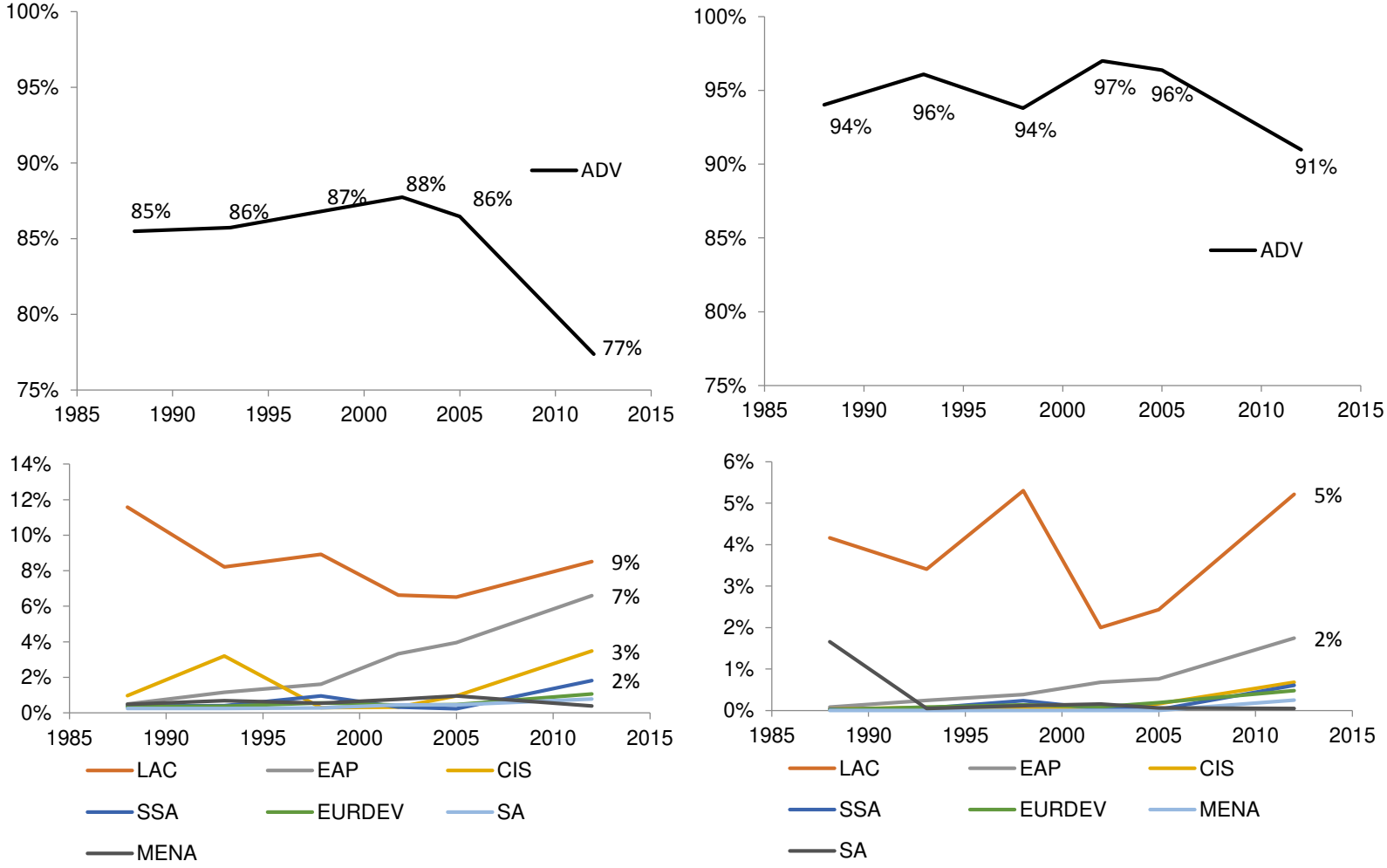
Note: In both panels countries are ranked according to their population share in the PPP$ global top 1% in the year 2012.

Table 5: Characteristics of top 20 countries in 2012

	PPP$ global distribution								FX$ global distribution				
	Country's share of global sample population	Population share of global top 10%	Population share of global top 1%	Population share of global top 0.1%	% of country's population in global top 10%	% of country's population in global top 1%	Top 1% threshold in LCU, per capita household income	Top 0.1% threshold in LCU, per capita household income	Population share of global top 1%	% of country's population in global top 1%	Top 1% threshold in LCU, per capita household income	Population share of top 0.1%	Top 0.1% threshold in LCU, per capita household income
United States	4.8%	29.1%	37.0%	48.7%	60.4%	7.7%	50,635	181,217	36.1%	7.5%	51,438	49.1%	180,388
Japan	2.0%	11.1%	8.3%	6.2%	55.4%	4.2%	5.706m	20.422m	12.7%	6.3%	4.104m	9.8%	14.393m
Germany	1.3%	7.1%	5.6%	6.1%	55.4%	4.4%	41,371	148,059	6.3%	4.9%	40,019	7.1%	140,342
France	1.0%	5.4%	5.5%	3.0%	52.4%	5.3%	44,854	160,528	7.1%	7.0%	40,019	4.0%	140,342
Brazil	3.1%	3.1%	4.7%	2.5%	10.0%	1.5%	86,735	310,414	3.4%	1.1%	100,462	1.9%	352,310
China	21.0%	5.3%	4.6%	4.2%	2.5%	0.2%	188,173	673,443	1.5%	0.1%	324,693	2.1%	1.139m
UK	1.0%	4.5%	4.6%	4.2%	45.5%	4.6%	38,812	138,901	5.8%	6.0%	32,563	5.6%	114,194
Russia	2.2%	3.1%	3.1%	1.8%	13.9%	1.4%	847,444	3.033m	0.6%	0.3%	1.586m	0.4%	5.563m
Canada	0.5%	2.9%	2.8%	2.8%	55.4%	5.2%	65,299	233,698	4.1%	7.7%	51,396	4.2%	180,241
Korea, Rep.	0.8%	3.1%	2.4%	2.2%	40.6%	3.2%	46,177,386	165.262m	1.6%	2.0%	57.943m	1.4%	203.202m
Australia	0.3%	1.9%	2.1%	1.3%	55.4%	6.2%	77,375	276,916	3.7%	10.9%	49,679	2.8%	174,219
Italy	0.9%	2.8%	2.1%	1.6%	30.7%	2.2%	42,529	152,206	2.2%	2.4%	40,019	1.8%	140,342
Spain	0.7%	1.9%	1.1%	0.6%	25.7%	1.6%	39,062	139,797	1.1%	1.5%	40,019	0.6%	140,342
South Africa	0.8%	0.8%	1.0%	0.6%	10.0%	1.3%	265,607	950,570	0.5%	0.6%	422,304	0.2%	1.481m
Mexico	1.9%	1.1%	0.9%	0.6%	6.0%	0.5%	464,741	1.663m	0.4%	0.2%	677,409	0.4%	2,375,611
Switzerland	0.1%	0.9%	0.9%	0.8%	71.2%	7.1%	78,653	281,487	3.0%	23.8%	48,233	2.1%	169,147
Netherlands	0.3%	1.4%	0.8%	0.3%	55.4%	3.1%	44,611	159,657	1.0%	4.0%	40,019	0.4%	140,342
Colombia	0.7%	0.6%	0.8%	0.9%	7.7%	1.0%	61.266m	219.262m	0.4%	0.5%	92.429m	0.4%	324.138m
Malaysia	0.4%	0.7%	0.7%	0.2%	15.8%	1.5%	79,986	286,260	0.1%	0.2%	158,881	0.0%	557,182
Chile	0.3%	0.3%	0.6%	0.5%	11.9%	2.3%	19.827m	70.959m	0.4%	1.3%	25.023m	0.3%	87.754m
Total of above 20	44.2%	87.0%	89.7%	88.9%					92.0%			94.6%	

Note: In both panels countries are ranked according to their population share in the PPP$ global top 1% in the year 2012.

Figure 5: Regional composition of PPP$ global top 1% (left panel) and FX$ global top 1% (right panel)



Note: ADV is Advanced Economies; LAC is Latin America and the Caribbean; EAP is East Asia and the Pacific (developing only); CIS is Commonwealth of Independent States; SSA is Sub-Saharan Africa; EURDEV is Emerging and Developing Europe; MENA is Middle East and North Africa; SA is South Asia.

4. Alternative identifications of the global elite: wealth, WEF, and executive compensation

We can also compare our global top income estimates at market exchange rates with the global wealth estimates produced for the bank Credit Suisse by Davies et al. (2012), also at market exchange rates. However, while our data are provided in terms of household income per capita, giving children the same weight as adults, Davies et al. (2012: 6) use income per *adult*, with adults defined as individuals aged at least 20. First consider the thresholds for entering the global top 1% by income and the global top 1% by wealth. At market exchange rates we find the threshold for the global top 1% by annual income is US$51,400 per capita household income, or about US$206,000 for a family of two adults and two children. Davies et al. (2012: 92) find the threshold for the global top 1% in wealth to be US$710,000 per adult, or US$1.42 million for such a household. A real return of 5% on this wealth would be US$71,000, not nearly enough to reach the top 1% in the global income distribution at FX$. This reflects the fact that most of the income of rich, if not super-rich, households is salary or labour income.[20]

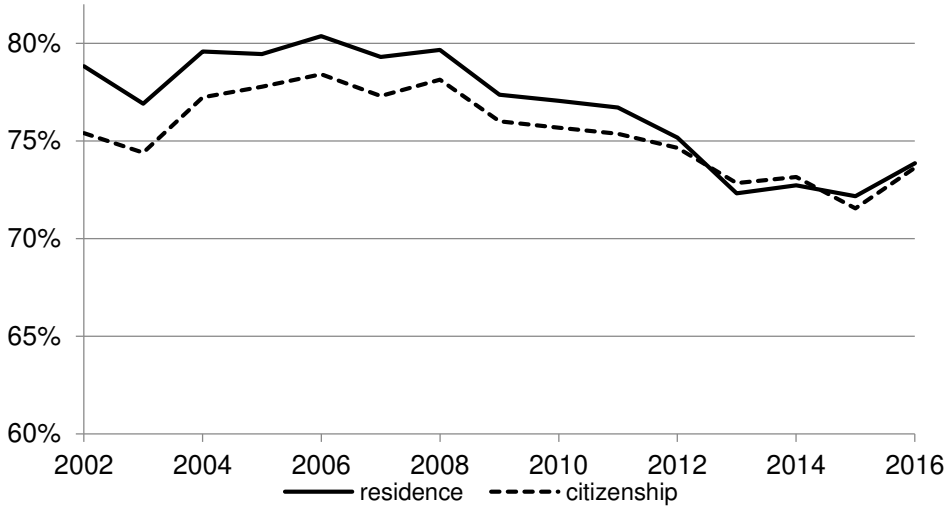
We can also compare the country composition of the global top 1% by income and that of the global top 1% by wealth. Using market exchange rates, Davies et al. (2012: 101) find that in 2012 US residents comprised 35.7% of the global top 1% by wealth, China accounted for 3.3%, and India 0.5%. The US figure is similar to its value for the global top 1% by income at FX$ (table 4). For China and India these shares by wealth are more than double their shares by income at FX$, which are respectively 1.5% (table 4) and 0.2% (not shown).

The pattern is different again at the very top of the global wealth distribution, according to Forbes's global estimates of the numbers of (wealth) billionaires. China's share of the world's billionaires in 2012 was substantially higher than its share of the global top 1% of income or of wealth – at 95 out of a total of 1,226, or 7.7% (Kroll 2012). In 2016 China's share of billionaires rose to 14%, India's to 4.6%. These findings imply that both China and India are more represented in the global top 1% by wealth than by income, and more represented again at the level of global billionaires. This implies that their wealth distributions are particularly unequal at the very top, relative to other countries.

[20] Piketty (2014: 277) finds that in France in 2005 capital income exceeds labour income only for those in the richest 0.1% of the income distribution. In 1932 this applied to the top 0.5%, and in the Belle Epoque to the entire top percentile. The figure of 5% as a typical real return on wealth is also proposed by Piketty. However, we would note that standard income surveys that include capital income do not account for the erosion of wealth by inflation and report nominal, not real, income from wealth, which is correspondingly higher (e.g. a return of 7% if the real return is 5% and inflation is 2%).

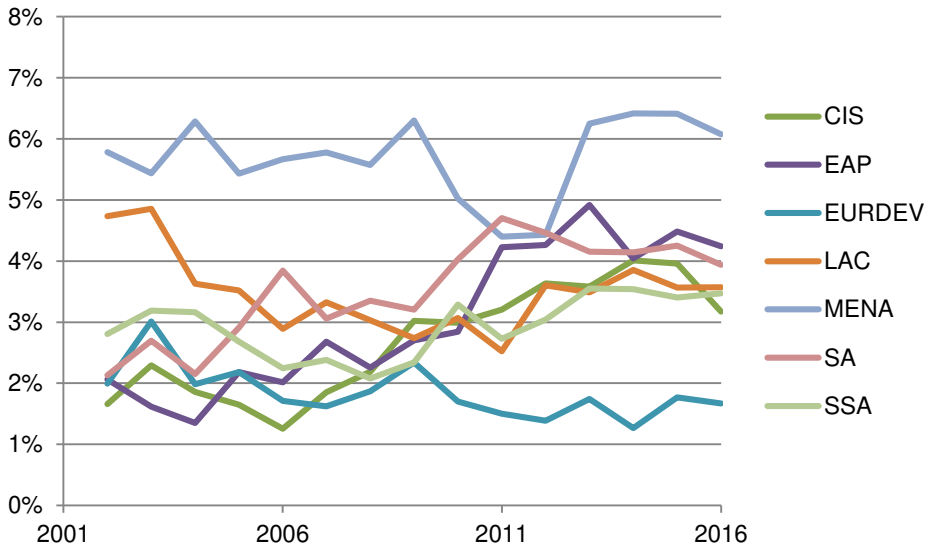
Beyond the question of wealth, the World Economic Forum (WEF) meeting at Davos represents a different set of the global super-elite and includes policy makers as well as business people. We find that the composition of this group has changed less than membership of global top income groups. Figure 6 shows the share of attendees at the WEF with citizenship of advanced economies, and who are resident in advanced economies, for the period 2002–2016. The advanced economies' share of attendees has declined since its peak in 2006 from 78% by citizens or 80% by residents, to 74% for both in 2016. This decline coincides with the decline in their share of the global top 1% shown in figure 5, but is less pronounced.

Figure 6: Share of World Economic Forum attendees with residence in or citizenship of advanced economies, 2002–2016



Source: Authors' calculations and Event registration, World Economic Forum, Switzerland.

Figure 7: Share of World Economic Forum attendees by region of residence, 2002-2016



Source: Authors' calculations and Event registration, World Economic Forum, Switzerland.

Note: ADV is Advanced Economies; LAC is Latin America and the Caribbean; EAP is East Asia and the Pacific (developing only); CIS is Commonwealth of Independent States; SSA is Sub-Saharan Africa; EURDEV is Emerging and Developing Europe; MENA is Middle East and North Africa; SA is South Asia.

Figure 7 shows the shares of WEF attendees of other regions over the same period. Most saw a rise in their share, with the Commonwealth of Independent States, South Asia, and East Asia and the Pacific all more than doubling their shares during 2002–2016. Only Emerging and Developing Europe and Latin America and the Caribbean saw their shares decline. The trends by citizenship, rather than residence, are similar but show slightly smaller rises (as implied by figure 6). It is also notable that of 132 of the 2016 attendees with Indian nationality, only 98 were resident in India, indicating that Indians have taken up elite positions in other countries. China, on the other hand, is an importer of such elites, with 76 attendees resident in China but only 66 Chinese nationals.

We now turn to estimates of executive compensation to get a picture of the kinds of occupations that will secure an individual household a place in the global top 1%. The international recruitment agency Robert Walters runs surveys of salaries paid by large multinational and domestic firms, including in five of the developing countries in tables 4 and 5 – namely Brazil, China, Malaysia, South Africa and South Korea.[21] Salary ranges for the highest paid executives in each country are reported in table 6. We saw that in China, 0.22% of the population had an annual per capita household income above the threshold of ¥188,173 (table 5), or about ¥753 thousand for a four-person household. A single earner would need ¥1.05m to achieve this income after tax,[22] which is significantly less than the salary (excluding bonus) of a chief financial officer (CFO) with 18 years' experience in accounting and finance, who could earn up to ¥2.5m, or a country manager in sales and marketing (for the category of 'consumer – retail and luxury') who could earn up to ¥2.2m (table 6).

In Brazil, where 1.5% of the country's population are in the global top 1%, many senior executives are also likely to be included. There, to place a family of four in the global top 1% in 2012 required R$347,000 of disposable income (table 5), or about R$480,000 before tax. This would be towards the lower range of salaries for a CFO with over 12 years of experience in an accounting and finance firm, or a chief operating officer (COO) in banking and financial services. It would be mid-range for the Chief Information Officer in an information technology firm or near the top end for the Director of a human resources firm.

[21] Note, however, that South Korea has been classified as a 'high income' country by the World Bank continuously since 2001.

[22] See the Appendix for sources for personal income tax rates.

In Malaysia, where 1.5% of its population is in the global top 1%, the threshold is about MYR320,000 for a family of four, which could be achieved by a single earner with a gross salary of MYR484,000 before tax. This is near the top of the range for a CFO in accounting and finance; the top of the range for an experienced director in sales or marketing; and slightly more than a top-range salary for a Director in a human resources firm or a Chief Technology Officer in an IT firm. In South Africa the threshold would be about ZAR1.06m disposable income or ZAR1.65m gross, which is near the top end for a Corporate Finance CA, at the top end for an Audit/Tax/Accounting/Treasury/Senior Level Director in accounting, finance, banking or financial services, and about 15% above the top end for the General Manager of an engineering or natural resources firm. In South Korea, a family of four needs ₩185m disposable income, or ₩205m gross. This is a top-range salary for a CFO in accounting and finance or a Country Head in a small/medium sales and marketing firm. These data suggest that top executives in major firms in emerging economies tend to be around the borderline of the global top 1%, except in China where they are comfortably within that group.

Table 6: Executive compensation, 2012, with threshold for global top 1% (PPP$ distribution)

	Global top 1% threshold for 4-person household, LCU	Position	Salary range, LCU
Brazil (Rio de Janeiro)	Gross: R$480k Net: R$347k	Accounting and Finance – CFO (12+ years experience)	R$420k-R$600k
		Banking and Financial Services – COO (12+ years experience)	R$420k-580k
		Human Resources – Director (12+ years experience)	R$315-500k
		Information Technology – Chief Information Officer	R$400k-550k
China (Shanghai)	Gross: ¥1.05m Net: ¥753k	Accounting and Finance – CFO (18+ years experience)	¥1.5m-2.5m
		Sales and Marketing – General Manager	¥1.2m-2.2m
Malaysia (Kuala Lumpur)	Gross: MYR484k Net: MYR320k	Accounting and Finance – CFO	RM273k-500k
		Sales and Marketing – Director (10+ years experience)	RM300k-480k
		Human Resources – Director	RM265k-420k
		Information Technology – Chief Technology Officer	RM350k-420k
South Africa	Gross: ZAR1.65m Net: ZAR1.06m	Corporate Finance – CA	ZAR830k-1.8m
		Accounting, Finance, Banking and Financial Services – Senior Director	ZAR900k-1.6m
		Engineering or Natural Resources – General Manager	ZAR800k-1.4m
South Korea (Seoul)	Gross: ₩205m Net: ₩185m	Accounting and Finance – CFO	W130m-200m
		Sales and Marketing Firm – Small/ Medium Organisation Country Head	W150m-200m

Source: Robert Walters (2013). Note: CFO is Chief Financial Officer; COO is Chief Operating Officer. Figures usually exclude bonuses.

5. Conclusion

It is well established that the rise of the emerging economies has driven fundamental changes in the distribution of global income in terms of both poverty reduction and the changing composition of the global 'middle class'. We find that this change is also apparent in the ranks of the global rich, but to a moderate extent: the advanced economies, comprising only 14% of the world's population, still accounted for 77% of the global top 1% in 2012, at PPP$. But this was substantially lower than the 85-88% during 1988 to 2005. The rise of China is clear in these data, and in 2012 both China and Brazil surpassed three of the G7 countries in their shares of the global top 1%. The other giant of the developing world, India, has made limited incursions into the global top 1%, despite rapid economic growth over the past three decades. But both China and, to a lesser extent, India, are substantially more dominant at the level of wealth billionaires.

The turning point for the participation of the emerging economies in the global income rich appears to have been around 2005, which mirrors our finding that the advanced economies' share of WEF attendees peaked in 2006 and has been on a declining trend since then. Moreover, we find that global inequality starts to decline around the same time, and that top 1% income shares within countries start to decline also from 2005. This trend was no doubt sharpened by the global financial crisis in 2008, which is having a lasting effect of slow growth in the advanced countries. But many developing countries were already converging with the developed economies before that point. As long as emerging economies continue to grow faster than the developed countries – which seems likely for the near future – we can expect both trends to continue.

The increasingly international lives of the global rich imply that, as a class, they probably have more in common with each other than other quantiles of the global income distribution. In emerging economies like China, Brazil, Malaysia and South Africa, the members of the global top 1% include top executives in large firms, in addition to wealthy capital- and land-owning elites. Their professional lives will often involve international travel and deal-making associated with global commerce and investment, including (at the very top) at the World Economic Forum – fostering shared understandings and perhaps increasing awareness of common financial interests. We can only speculate about the consequences of the rising participation of the rich from poorer countries in international fora and the global elite. It is by no means clear that it will contribute to declining global inequality, or benefit the non-rich within developing countries. Senior executives and business owners from different countries may find that they share more interests with each other than with their own compatriots.

Appendix 1: Data

Sources

Household survey data in local currency up to 2005 are compiled by Banko Milanovic and downloaded from https://www.gc.cuny.edu/Page-Elements/Academics-Research-Centers-Initiatives/Centers-and-Institutes/Stone-Center-on-Socio-Economic-Inequality/Core-Faculty,-Team,-and-Affiliated-LIS-Scholars/Branko-Milanovic/Datasets.

For benchmark year 2012 we downloaded household survey data from Povcalnet, http://iresearch.worldbank.org/PovcalNet/. Most data were downloaded on 6 July 2015. Data for 8 countries that were previously unavailable were downloaded 3 November 2016. These are Australia, Austria, Belgium, Canada, France, Portugal, Sweden and Switzerland. The only country in benchmark 2012 not from the World Bank is Korea, for which we used data for 2008 from Milanovic above, updated to 2012 in the same way as other benchmark 2012 data. All household survey data are converted to 2012 international PPP$, based on the 2011 ICP inflated to 2012 prices using US CPI.

Data on the income shares of the top 1% within countries were downloaded on 3 July 2015 from the World Top Incomes Database: http://topincomes.g-mond.parisschoolofeconomics.eu/. Estimates for China using income tax data were released on 26 December 2016 (Piketty et al. 2016) and were downloaded from the World Wealth and Income Database (beta), wid.world. We use the series for taxable (fiscal) income rather than for pre-tax national income to increase comparability with other countries. See Table A1 for the 128 country-years across 28 countries with both household survey and top 1% share data. Of these, 14 country-years across 8 countries have consumption surveys while the remainder are income surveys.

Table A1: Country-years with household survey data and income tax data for top 1% share

	1988	1993	1998	2002	2005	2012
Argentina			x	x		
Australia	x	x	x	x	x	x
Canada	x	x	x	x	x	x
China	x	x	x	x	x	x
Colombia		x	x	x	x	
Denmark	x	x	x	x	x	x
Finland	x	x	x	x	x	
France	x	x	x	x	x	x
Germany			x	x	x	
India	x	x	x			
Indonesia		x	x	x		
Ireland	x	x	x	x	x	
Italy	x	x	x	x	x	
Japan	x	x	x	x	x	x
Korea, Rep.	x			x	x	x
Malaysia	x	x		x	x	x
Netherlands		x	x	x	x	x
New Zealand	x	x	x			
Norway	x	x	x	x	x	x
Portugal		x	x		x	
Singapore	x	x	x	x		
South Africa		x		x		x
Spain	x	x	x	x	x	x
Sweden	x	x	x	x	x	x
Switzerland		x	x	x	x	
United Kingdom	x	x	x	x	x	x
United States	x	x	x	x	x	x
Uruguay						x

Other country-level variables including national accounts data and price indices are from the World Bank's World Development Indicators website, http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators

Data on income tax rates for table 6 are obtained from the following sources:

Brazil: We assume a personal income tax rate of 27.5%, which was the higher rate in Brazil in 2015 and would apply to almost all the income of an individual in the global top 1%. PWC Worldwide Tax Summaries, Brazil, http://taxsummaries.pwc.com/uk/taxsummaries/wwts.nsf/ID/Brazil-Individual-Taxes-on-personal-income

China: Piketty and Qian (2010: 48).

Malaysia: Malaysia Salary, http://www1.malaysiasalary.com/salary/salary-calculation-for-2012-in-malaysia.html

South Africa: Tax Pocket Guide 2012, http://www.treasury.gov.za/documents/national%20budget/2012/sars/Budget%202012%20Pocket%20Guide.pdf

South Korea: National Tax Service, Korea, 2012 Automatic Calculation, http://www.nts.go.kr/eng/help/help_53_2012.asp?top_code=H001&sub_code=HS05&ssub_code=HSE3

Appendix 2: Regressions for imputing top 1% income shares

In Anand and Segal (2015) we regressed the top 1% income share (WTID data) on the top 10% share from household survey data and on mean survey income, replicated in column (5) of table A2. Here we use additional covariates, with the results shown in table A2. For countries with no top income data we use the regression in column (6).[23] For countries that do have top income data, most have it for only a subset of the benchmark years; for the missing years for these countries we provide improved estimates by using the fixed-effects regression in column (7). In the fixed-effects regression meaninc is highly insignificant (not shown) so we drop it. Topten is significant at the 12% level and improves the R^2 so we retain it.

[23] The following are not shown in table A2: Age dependency ratios were insignificant, as were dummies for all regions except Latin America and the Caribbean (LAC). A small number of country-years without top income data also lack data on government expenditure as a share of GDP. For these countries we impute using regression (6) excluding the government share variable. We test for the effect of outliers by running a robust regression of column (6) in Stata, which iteratively excludes outliers. All coefficients keep the same signs and remain significant at 1%.

Table A2: Regressions of top 1% share

	(1) Pooled OLS	(2) Pooled OLS	(3) Pooled OLS	(4) Pooled OLS	(5) Pooled OLS	(6) Pooled OLS	(7) Fixed effects
Topten	0.3443***				0.4087***	0.2650***	0.08520
	(0.03423)				(0.0370)	(0.03775)	(0.05322)
Meaninc		-0.05852	-0.7543***		0.1384***	0.1649***	
		(0.04647)	(0.1602)		(0.0377)	(0.03505)	
Meaninc^2			0.03013***				
			(0.006678)				
Gov				-0.2822***		-0.2363***	-0.2500***
				(0.05957)		(0.04323)	(0.08758)
LAC						4.647***	
						(1.001)	
year						0.09327***	0.1483***
						(0.02626)	(0.01782)
constant	0.3969	10.40		14.66	-3.157	-182.1	-284.6
R^2	0.4454	0.0124	0.1507	0.1512	0.4993	0.6563	0.4334

Notes: All regressions have 128 observations across 28 countries. Topten is top decile share from survey data. Meaninc is mean survey income in thousands of constant PPP$. Gov is government expenditure as a share of GDP. LAC is a dummy for Latin American and the Caribbean. Standard errors in parentheses: * p<0.10, ** p<0.05, *** p<0.01.

Our purpose is imputation rather than causal analysis, but we make brief remarks on the results of these regressions. The top decile share (from surveys) is positive and highly significant in all these regressions. This is not surprising, since it means that more inequality on one measure (the top decile share) is associated with more inequality on another measure (the top percentile share). Mean income (from surveys) has no significant simple correlation with the top percentile share (column 2), but when we add its square both regressors are highly significant (column 3), indicating a U-shape. Once we include other covariates meaninc is highly significant, and positive, but meaninc squared loses significance (not shown). On the other hand, the top 10% share from surveys is negatively associated with mean income: a regression of topten on meaninc produces a negative and highly significant (p=0.000) coefficient (not shown). One purely statistical explanation could be that the very rich find it easier to avoid taxes in poorer countries, which have weaker enforcement capacity, leading to greater underestimation of the top 1% share in poorer countries. This would imply an upward bias in the coefficient relating the top 1% share and mean income, and would not affect the survey-based estimate of the top 10% share. On the other hand, the hypothesis that mean income levels are causally associated with inequality has a long pedigree going back to Kuznets (1955). Determining which mechanisms are at work is beyond the scope of this paper, but some association would not be surprising.

Two possible explanations for the negative coefficient on government expenditure as a share of GDP are as follows. First, countries with larger government expenditure tend to have more redistribution, and may therefore also be countries with more egalitarian norms and less social acceptance of excessive pay at the top of the distribution. Second, higher government expenditure is generally associated with higher marginal tax rates for the rich, and Piketty (2014) argues that these reduce the incentive for highly-paid individuals to further bargain up their pre-tax incomes. The LAC dummy is positive and significant. This region is well known to have high levels of inequality, and this finding tells us that top 1% shares are higher even after controlling for top 10% shares. That is, inequality is unusually high *within* the top 10%, and not just between the top 10% and lower income groups.

Appendix 3: Regional classifications

ADV is the IMF classification Advanced Economies, composed of 37 countries: Australia, Austria, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, San Marino, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Taiwan Province of China, United Kingdom, and United States.

EURDEV is the IMF classification Emerging and Developing Europe, composed of 13 countries: Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Kosovo, FYR Macedonia, Montenegro, Poland, Romania, Serbia, and Turkey.

CIS is IMF classification Commonwealth of Independent States, composed of 12 countries: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. Georgia, which is not a member of the Commonwealth of Independent States, is included in this group for reasons of geography and similarities in economic structure.

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