WID.world WORKING PAPERS SERIES N° 2017/20

The elephant curve of global inequality and growth

Facundo Alvaredo
Lucas Chancel
Thomas Piketty
Emmanuel Saez
Gabriel Zucman

December 2017

The Elephant Curve of Global Inequality and Growth*

Facundo Alvaredo (Paris School of Economics, and Conicet); Lucas Chancel (Paris School of Economics and Iddri Sciences Po); Thomas Piketty (Paris School of Economics); Emmanuel Saez (UC Berkeley and NBER); Gabriel Zucman (UC Berkeley and NBER)

The dynamics of global inequality have attracted growing attention in recent years. However, we still know relatively little about how the distribution of global income is evolving. Income inequality is increasing in many countries, but large emerging countries like India and China are catching up and might drive global inequality down. Recent studies of global inequality combine household surveys and provide valuable estimates (Lakner and Milanovic 2016, Liberati 2015, Ortiz and Cummins 2011). Surveys, however, are not uniform across countries, they cannot capture top incomes well, and are not consistent with macroeconomic totals.

In this paper, we report on new estimates of global inequality presented in the World Inequality Report 2018 (Alvaredo et al., 2018). These estimates are based on recent, homogeneous inequality statistics produced for a number of countries in the World and Wealth Income Database (WID.world). We find that the global top 1% has captured twice as much total growth than the global bottom 50% between 1980 and 2016. We also analyze different projected trajectories for global inequality in the coming decades.

1. Global income inequality dynamics (1980-2016)

We estimate income per adult with equal splitting for married couples, before taxes and before government transfers, but after the operation of private and public retirement systems. The best way to make estimates comparable across countries is to distribute total national income, as recorded in the internationally-harmonized national accounts of each country. To do so we

* Alvaredo: Paris School of Economics, 48 Boulevard Jourdan, 75014 Paris, (e-mail: alvaredo@pse.ens.fr); Chancel: Paris School of Economics, 48 Boulevard Jourdan, 75014 Paris, (e-mail: lucas.chancel@psemail.eu); Piketty: Paris School of Economics, 48 Boulevard Jourdan, 75014 Paris, (e-mail: piketty@psemail.eu); Saez: University of California, Berkeley, CA 94720, (e-mail: saez@econ.berkeley.edu); Zucman: University of California, Berkeley, CA 94720, (e-mail: zucman@berkeley.edu). We acknowledge funding from the Berkeley Center for Equitable Growth, the European Research Council (Grant 340831), the Ford Foundation, the Sandler Foundation, and the Institute for New Economic Thinking.

combine survey, tax, and national accounts data in a systematic manner. This general methodology is presented in detail in Alvaredo et al. (2016) and has already been applied to a number of countries: the United States in North America; France in Europe;[1] China and India in Asia; Brazil in South America; Russia; and the Middle East. Inequality estimates for these countries are homogenous, distribute 100% of national income, and capture the top of the distribution well, overcoming weaknesses from previous studies.

Using simple assumptions, we estimate the evolution of incomes in the rest of the world so as to distribute 100% of global income. We start with aggregate national income and adult population in all countries and assume that countries with missing inequality information have the same level of inequality as other countries in their region.[2] This is obviously an over simplification and our estimates will be refined as better data become available for more countries. Complete methodological details and detailed robustness checks are presented in Chancel and Gethin (2017a, b); all data and programs are available online at WID.world.

Our exploration of global inequality dynamics starts in 1980 because of data availability limitations. 1980 is also the turning point in inequality and policy in many countries (the Reagan-Thatcher revolution in the Western world, deregulation in China and India).

Figure 1 displays the evolution of inequality in various regions of the world. As shown by Panel A, the top 10% income share has increased almost everywhere since 1980 but with large variations in magnitude across countries or regions. In Europe, the rise was moderate. It was much more dramatic in North America, India, China, and even more so in Russia. By 2016, the top 10% income share stands at about 41% in China, 46% in Russia, 47% in North-America, and 56% in India.

The magnitude of the rise in inequality correlates with policy changes in each country: the Reagan revolution in the United States, the transition away from communism in China and

[1] In the case of Germany and the United Kingdom, the national income distribution is inferred using earlier top fiscal income shares (see Chancel and Gethin 2017a for details).

[2] For example, we know the average income level in Malaysia, but not (yet) how national income is distributed to all individuals in this country. We assume that the distribution of income in Malaysia is the same, and has followed the same trends, as in the region formed by China and India. For Sub-Saharan Africa, we have fiscal income series only for South Africa and Ivory Coast. Therefore, we relied on household surveys available from the World Bank (these estimates cover 70% of Sub-Saharan Africa's population and yet a higher proportion of the region's income). These surveys were matched with fiscal data available for Ivory Coast from WID.world so as to provide a better representation of inequality at the top of the distribution.

Russia, the shift to a deregulated economy in India. Policies and institutions matter: rising inequality cannot be viewed as a mechanical, deterministic consequence of globalization or technological change, as most economic models assume.

There are exceptions to the general pattern of increasing inequality. In the Middle East, Brazil, and sub-Saharan Africa, income inequality has remained relatively stable at extremely high levels since 1990, the first year for which we can construct estimates for these regions. In effect, for various historical reasons and in contrast to the other countries shown in Figure 1, these three regions never went through the post-war egalitarian regime and have always been at the world's high-inequality frontier.

As shown by the Panel B of Figure 1, the share of income accruing to the bottom 50% looks like the mirror image of the top 10% income share. The bottom 50% income share is lowest in places where the top 10% share is highest (Middle East, Brazil, Sub-Sahara Africa) and vice-versa (Europe). The bottom 50% share has also fallen most in countries where the top 10% has increased the most (Russia, China, India, and the United States). It has remained stable in places where the top 10% income has also been stable.

Table 1 decomposes income growth within China, Europe, India, Russia, and North America, by income group. Real average national income per adult grew at very different rates in the five regions from 1980 to 2016: an impressive 831% in China and 223% in India, a moderate 40% in Europe, 34% in Russia, and 63% in North America. In all these countries, income growth is systematically higher for upper income groups. In China, the bottom 50% grew 417% while the top 0.001% grew more than 3750%. The gap between the bottom 50% and the top 0.001% is even more important in India. In Russia, the top of the distribution had extreme growth rates too while bottom 50% incomes fell; this reflects the shift from a regime in which top incomes were constrained by the communist system towards a market economy with few regulations limiting top incomes. In line with Figure 1, Europe stands as the region with the lowest growth gap between the bottom 50%, the full population, and the top 0.001%.

Table 1 also presents the growth rates of different groups for the world as a whole. These growth rates are obtained once all the individuals of the different regions are pooled together using

purchasing power parity exchange rates to construct global income groups.[3] Average global growth is relatively low (60%) compared to emerging countries' growth rates. Interestingly enough, at the world level, growth rates do not rise monotonically with income. Instead, we observe high growth for the bottom 50% (94%), low growth in the middle 40% (43%), and high growth for the global top 1% (101%)—and especially the top 0.001% (235%).

A powerful way to visualize the evolution of global income inequality dynamics is to plot the growth rate of at each percentile following Lakner and Milanovic (2016). We do this in Figure 2. The top percentile of the global income distribution earns over 20% of total global income today, and has captured about 27% of total income growth from 1980 to 2016. To reflect its outsized importance, we further split it into 28 finer groups: P99-99.1, …, P99.8-99.9, P99.9-99.91, …, P99.98-99.99, P99.99-99.991, …, P99.999-100. Growth rates are low at the very bottom due to low growth in the poorest countries (mostly in sub-Saharan Africa). Growth rates are quite high around percentiles 20 to 60 due to fast growth in large emerging countries such as China and India. They are low around percentile 70 to 90 due to modest growth of the incomes of the poor and middle classes in advanced economies. Finally, they are extremely high among top earners due to the explosion of top incomes in many countries. Therefore, this curve has the shape of an elephant (Lakner and Milanovic 2016)—with a long trunk.

Figure 3 shows the evolution of the global top 1% and bottom 50% income shares between 1980 and 2016. The global top 1% income share rose from about 16% in 1980 to more than 22% in 2007. It was then slightly reduced to 20.4% in 2016. The bottom 50% income share oscillated around 9% with a very slight increase between 1985 and 2016. Throughout the period, the top 1% earns in total about twice as much income as the bottom 50%, a group by definition 50 times more numerous. Hence, incomes of the global top 1% income are on average 100 times those of the global bottom 50%. Another notable finding is that neither high growth in emerging countries since 2000 nor the global financial crisis of 2008 stopped the rise in global income inequality. Whether future growth in emerging countries will be enough to invert this trend is a key question to which we now turn.

[3] Chancel et al. (2018) show that using market exchange rates would magnify global inequality as poorer countries have lower exchange rates relative to purchasing power parity.

2. Projecting the future of global income inequality

We present different possible global income inequality scenarios between now and 2050. Our projections are attempts to better understand the role played by key determinants. The number variables that we consider in our analysis is limited. This makes our projections straightforward and simple to understand, but also limits their predictive power.

Our projections are based on combining the demographic projections of the United Nations (UNDESA 2017) with the OECD growth forecasts (OECD 2017)[4] and simple assumptions on how growth will be distributed within each country. We consider three scenarios on growth distribution within countries. All three scenarios have the same between-country inequality evolutions (i.e., a given country has the same average income growth rate in all three scenarios).

Our first scenario represents an evolution based on "business as usual". That is, we assume that economic growth within each country will be distributed across percentiles in the same way as it has been distributed since 1980. For instance, we know that the bottom 50% income earners in China captured 13% of total Chinese growth over the 1980–2016 period. We thus assume that bottom 50% Chinese earners will capture 13% of Chinese income growth up to 2050. The second scenario illustrates a high within-country inequality trend. It assumes that all countries will follow the same inequality trajectory as the United States over the 1980–2016 period. The third scenario considers a low inequality trend by assuming that all countries follow the same inequality trajectory as the European Union over the 1980–2016 period.

Under the business-as-usual scenario, the income share of the bottom 50% of the world population slightly decreases from approximately 10% today to less than 9% in 2050 (see Figure 3). The top 1% share rises from less than 21% today to more than 24% of world income. Global inequality thus rises steeply in this scenario, despite strong growth in emerging countries. The progressive catching-up of low-income countries will not be sufficient to counter the continuation of worsening of within-country inequality.

In the US-style inequality scenario, the global top 1% would earn close to 28% of global income by 2050, while the bottom 50% would earn close to 6%, less than in 1980 (before large emerging

[4] The growth rates we use are voluntarily more optimistic than the rates assumed by the OECD to compute their total global income in 2050 for Africa, Latin America, and Asia. Assuming higher growth rates increases the force of convergence between countries and hence tends to reduce global inequality. Therefore, we take a conservative approach to the rise of global inequality in the coming decades (see Chancel and Gethin 2017a for complete details).

countries started to catch up with the industrialized world). In this scenario, the increase in the top 1% income share is largely, but not entirely, made at the expense of the bottom 50%.

The last scenario shows that global inequality can be reduced if all countries align on the European inequality trajectory—or more equitable ones. In this scenario, the bottom 50% income share rises from 10% to approximately 13% in 2050, whereas the top 1% decreases from 21% to 19% of total income. Even more equitable growth trajectories would be needed for the global bottom 50% share to catch up with the top 1% income share by mid-century. Whatever the scenarios followed, global inequalities will remain substantial.

It can be argued that what matters for individuals—in particular for those at the bottom of the social ladder—is not the share of income their capture, but their absolute income level. Figure 4 depicts the evolution of the average real income of the bottom half of the global population in the three scenarios. This income has almost doubled from €1,600 in 1980 to €3,100 in 2016. In the business-as-usual scenario, by 2050, the bottom half would see its income double again, to €6,300. In the US-style unequal scenario, the bottom half of the world population would earn €4,500 per year and per adult. In the EU-style equal scenario, average income of the global bottom half would reach €9,100. Therefore, average income of the global bottom 50% would be twice higher in the EU scenario than in the US scenario. This shows that within-country inequality trajectories matter substantially for poverty eradication. High-growth in emerging countries is not sufficient by itself to lift the global bottom half out of poverty. Reducing inequality within countries is also critically important.

References

Alvaredo, Facundo, Anthony B. Atkinson, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman. 2016. “Distributional National Accounts (DINA) Guidelines: Concepts and Methods used in WID.world.” WID.world Working Paper 2016/1.

Alvaredo, Facundo, Lucas Chancel, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman. 2018. The World Inequality Report 2018, Cambridge: Harvard University Press. Online at http://wir2018.wid.world/

Chancel, Lucas and Amory Gethin. 2017a. “Building a Global Income Distribution Brick by Brick.” WID.world Technical Note 2017/5.

Chancel, Lucas and Amory Gethin. 2017b. “Global inequality User Guide.” WID.world Technical Note 2017/9.

Lakner, Christoph and Branko Milanovic. 2016. “Global Income Distribution: From the Fall of the Berlin Wall to the Great Recession.” World Bank Economic Review 30(2), 203-232.

Liberati, Paolo. 2015. “The World Distribution of Income and Its Inequality, 1970–2009.” Review of Income and Wealth, 61: 248–273. doi:10.1111/roiw.12088

OECD (2017) “GDP long-term Forecast.” online at http://dx.doi.org/10.1787/d927bc18-en

Ortiz, Isabel and Matthew Cummins. 2011. “Global Inequality: Beyond the Bottom Billion – A Rapid Review of Income Distribution in 141 Countries.” UNICEF Social and Economic Working Paper.

Piketty, Thomas. 2014. Capital in the 21st Century, Cambridge: Harvard University Press.

UNDESA (2017) “UN Population Prospects.” Online at https://esa.un.org/unpd/wpp/

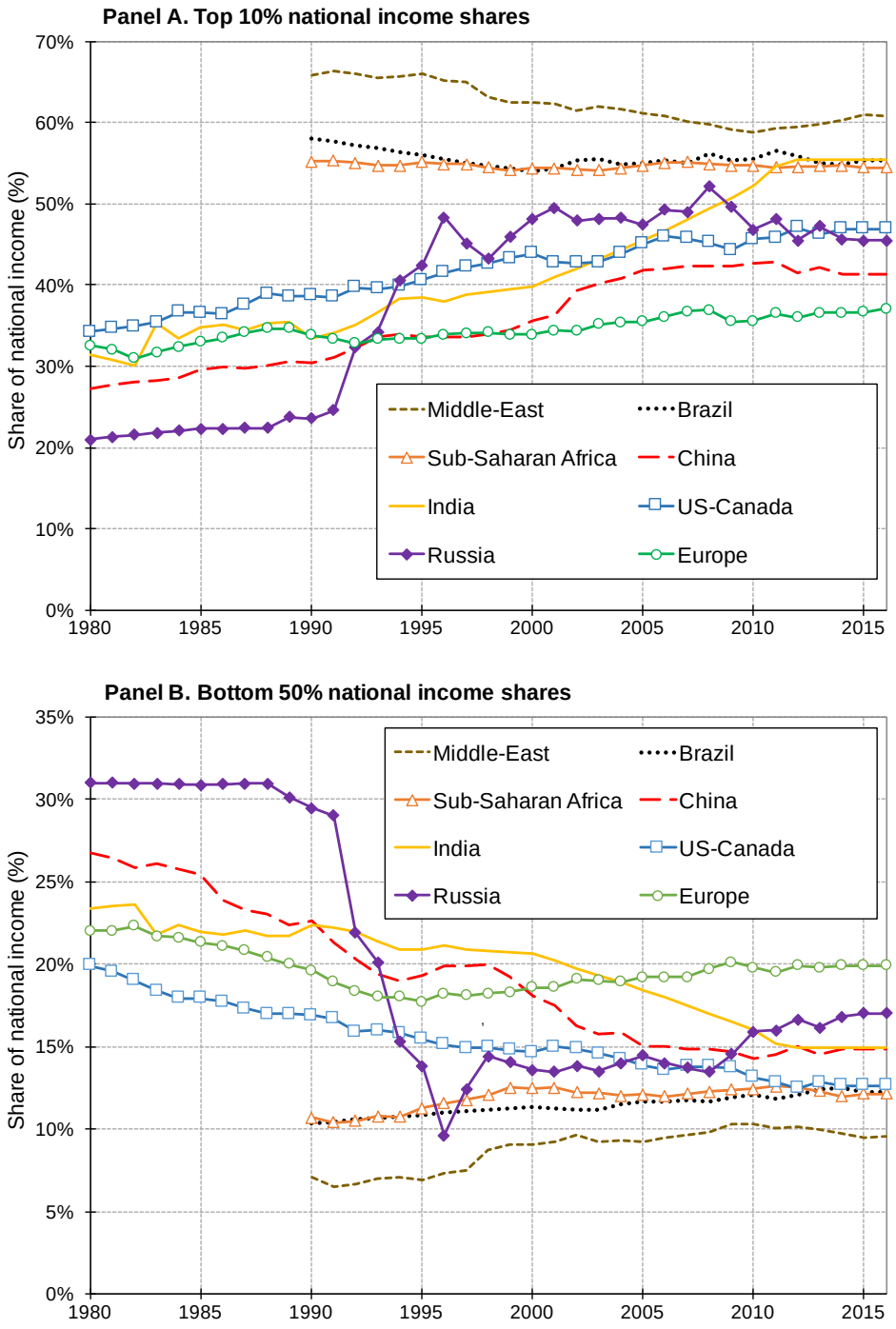

Figure 1. Top 10% and bottom 50% income shares across the world, 1980-2016

Notes: The top and bottom panel depict the share of total national income earned by the top 10% and bottom 50% of adults in various countries or regions from 1980 to 2016. Income is before taxes and transfers but after the operation of public and private retirement and unemployment insurance systems. For married couples, income is split equally across spouses. Source: WID.world.

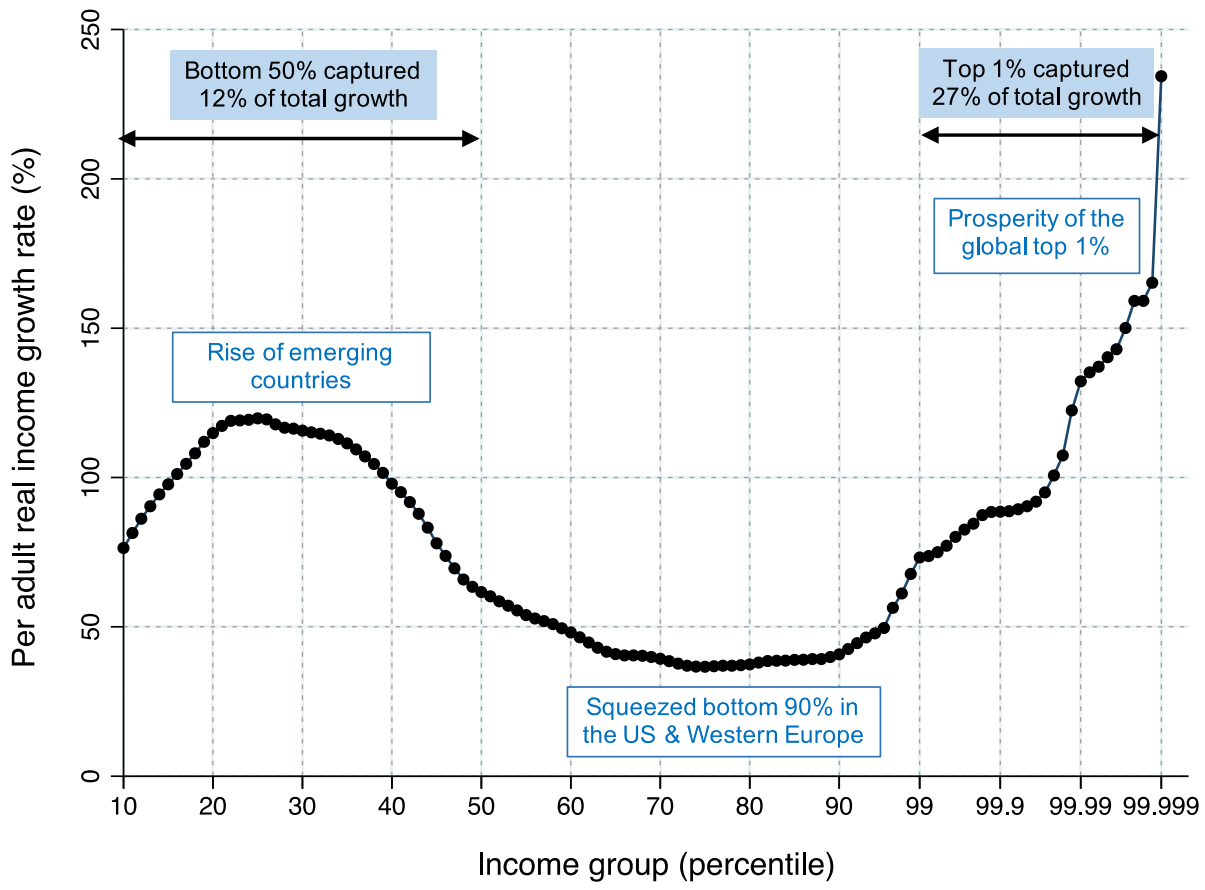

Figure 2. Total income growth by percentile across all world regions, 1980-2016

The vertical axis shows the total real income growth between 1980 and 2016 for each percentile of the global distribution of income per adult. The bottom 10 percentiles are excluded as their income levels are close to zero. The top 1% is divided into smaller groups (up to the top .001%) so as to better account for its share in total global growth captured. Source: WID.world.

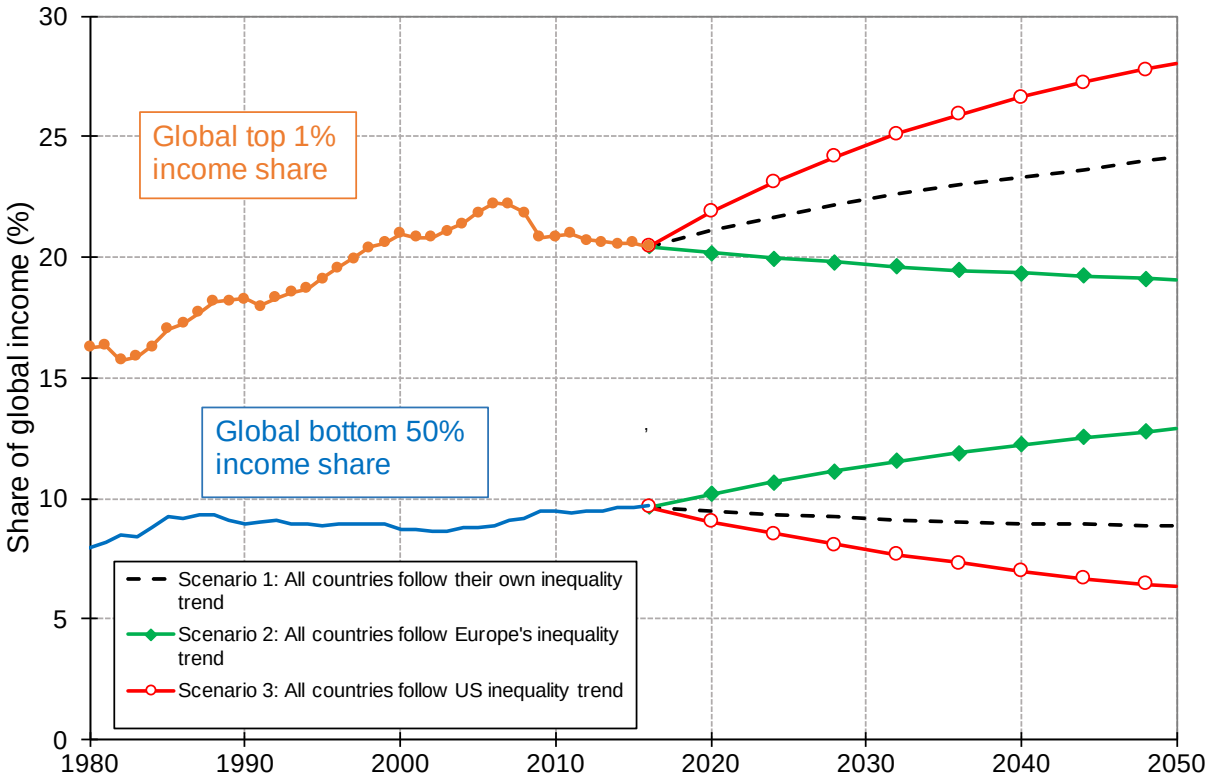

Figure 3. Top 1% versus bottom 50% shares of global income, 1980–2050

Notes: This figure displays the global top 1% and bottom 50% income shares with actual data from 1980 to 2016 and as projections from 2016 to 2050 under three scenarios for inequality: 1. Business as usual, 2. European scenario, 3. US scenario. If all countries follow the inequality trajectory of the US between 1980 and 2016 from 2017 to 2050, the income share of the global top 1% will reach 28% by 2050. Source: WID.world.

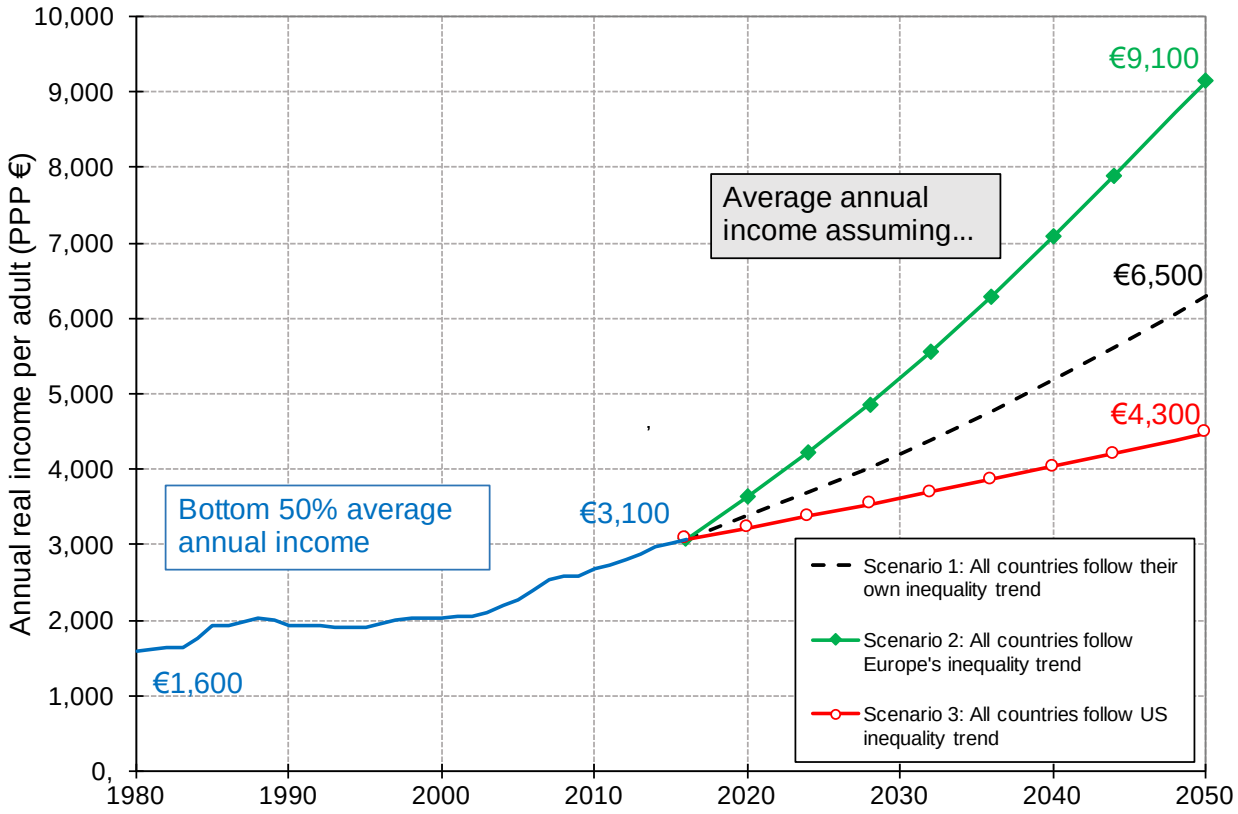

Figure 4. Global bottom 50% average income, 1980–2050

Notes: The figure displays the average real income of the global bottom 50% with actual data from 1980 to 2016 and as projections from 2016 to 2050 under three scenarios for inequality: 1. Business as usual, 2. European scenario, 3. US scenario. If all countries follow the inequality trajectory of Europe between 1980 and 2016 from 2017 to 2050, the average income of the bottom 50% of the world population will be €9,100 by 2050. Income estimates are calculated using Purchasing Power Parity (PPP) euros. For comparison, €1=$1.3. Source: WID.world.

Table 1. Global income growth and inequality, 1980–2016

Income group (distribution of per-adult pretax national income)	**China** (%)	**Europe** (%)	**India** (%)	**Russia** (%)	**US-Canada** (%)	**World** (%)
Full population	**831**	**40**	**223**	**34**	**63**	**60**
Bottom 50%	417	26	107	-26	5	94
Middle 40%	785	34	112	5	44	43
Top 10%	1316	58	469	190	123	70
incl. Top 1%	*1920*	*72*	*857*	*686*	*206*	*101*
incl. Top 0.1%	*2421*	*76*	*1295*	*2562*	*320*	*133*
incl. Top 0.01%	*3112*	*87*	*2078*	*8239*	*452*	*185*
incl. Top 0.001%	*3752*	*120*	*3083*	*25269*	*629*	*235*

Notes: The table shows real income growth per adult from 1980 to 2016 by percentile group for various countries/regions and worldwide. Source: WID.world.