GLOBAL INEQUALITY AND POLICY[‡]

The Elephant Curve of Global Inequality and Growth[†]

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The dynamics of global inequality have attracted growing attention in recent years (Piketty 2014). 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 Inequality Database (WID.world). We find that the global top 1 percent has captured twice as much total growth than the global bottom 50 percent between 1980 and 2016. We also analyze different projected trajectories for global inequality in the coming decades.

I. 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 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 homogeneous, distribute 100 percent 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 percent of global income. We start with aggregate national income and adult population in all countries and assume that countries with missing inequality information

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[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).

have the same level of inequality as other countries in their region.[2] This is obviously an oversimplification 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).
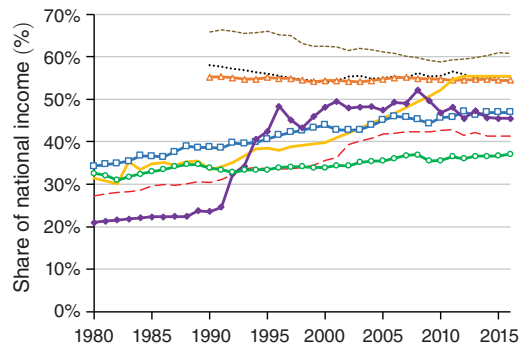
Figure 1 displays the evolution of inequality in various regions of the world. As shown by panel A, the top 10 percent income share has increased almost everywhere since 1980 but with large variations in magnitude across countries or regions. In Europe, the rise was moderate. It was much more dramatic in North America, India, China, and even more so in Russia. By 2016, the top 10 percent income share stands at about 41 percent in China, 46 percent in Russia, 47 percent in North-America, and 56 percent 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 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

Panel A. Top 10% national income shares

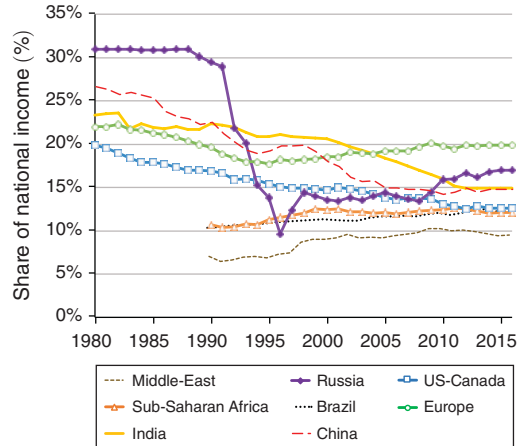Panel B. Bottom 50% national income shares

FIGURE 1. TOP 10 PERCENT AND BOTTOM 50 PERCENT INCOME SHARES ACROSS THE WORLD, 1980–2016

Notes: Panels A and B depict the share of total national income earned by the top 10 percent and bottom 50 percent 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

[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 percent 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.

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 percent looks like the mirror image of the top 10 percent income share. The bottom 50 percent income

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%	1,316	58	469	190	123	70
Including top 1%	1,920	72	857	686	206	101
Including top 0.1%	2,421	76	1,295	2,562	320	133
Including top 0.01%	3,112	87	2,078	8,239	452	185
Including top 0.001%	3,752	120	3,083	25,269	629	235

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

share is lowest in places where the top 10 percent share is highest (Middle East, Brazil, sub-Saharan Africa), and vice-versa (Europe). The bottom 50 percent share has also fallen most in countries where the top 10 percent has increased the most (Russia, China, India, and the United States). It has remained stable in places where the top 10 percent 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 percent in China and 223 percent in India, a moderate 40 percent in Europe, 34 percent in Russia, and 63 percent in North America. In all these countries, income growth is systematically higher for upper income groups. In China, the bottom 50 percent grew 417 percent while the top 0.001 percent grew more than 3,750 percent. The gap between the bottom 50 percent and the top 0.001 percent is even more important in India. In Russia, the top of the distribution had extreme growth rates too while bottom 50 percent incomes fell; this reflects the shift from a regime in which top incomes were constrained by the communist system toward 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 percent, the full population, and the top 0.001 percent.

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 percent) 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 percent (94 percent), low growth in the middle 40 percent (43 percent), and high growth for the global top 1 percent (101 percent)—and especially the top 0.001 percent (235 percent).

A powerful way to visualize the evolution of global income inequality dynamics is to plot the growth rate of each percentile following Lakner and Milanovic (2016). We do this in Figure 2. The top percentile of the global income distribution earns over 20 percent of total global income today, and has captured about 27 percent 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

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[3] Alvaredo 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.
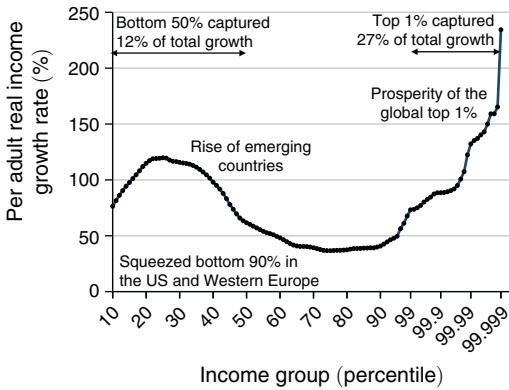
FIGURE 2. TOTAL INCOME GROWTH BY PERCENTILE ACROSS
ALL WORLD REGIONS, 1980–2016

Notes: 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 percent is divided into smaller groups (up to the top
0.001 percent) so as to better account for its share in total
global growth captured.
Source: WID.world

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 coun-
tries. 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 percent and bottom 50 percent income shares
between 1980 and 2016. The global top 1 per-
cent income share rose from about 16 percent
in 1980 to more than 22 percent in 2007. It was
then slightly reduced to 20.4 percent in 2016.
The bottom 50 percent income share oscillated
around 9 percent with a very slight increase
between 1985 and 2016. Throughout the period,
the top 1 percent earns in total about twice as
much income as the bottom 50 percent, a group
by definition 50 times more numerous. Hence,
incomes of the global top 1 percent income are
on average 100 times those of the global bot-
tom 50 percent. 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
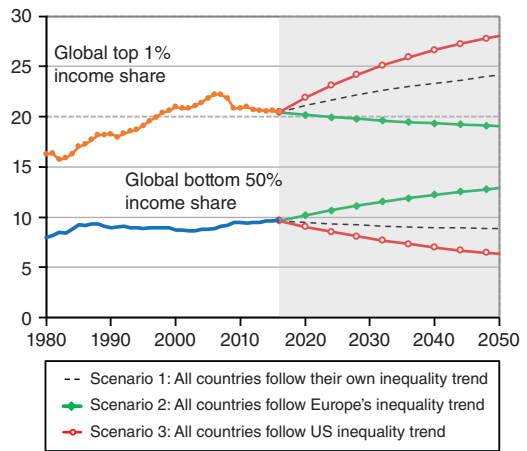will be enough to invert this trend is a key ques-
tion to which we now turn.

FIGURE 3. TOP 1 PERCENT VERSUS BOTTOM 50 PERCENT
SHARES OF GLOBAL INCOME, 1980–2050

Notes: This figure displays the global top 1 percent and bot-
tom 50 percent income shares with actual data from 1980
to 2016 and as projections from 2016 to 2050 under three
scenarios for inequality: (i) Business as usual, (ii) European
scenario, and (iii) US scenario. If all countries follow the
inequality trajectory of the United States between 1980 and
2016 from 2017 to 2050, the income share of the global top
1 percent will reach 28 percent by 2050.
Source: WID.world

II. 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 of
variables that we consider in our analysis is lim-
ited. 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 fore-
casts (OECD 2017)[4] and simple assumptions

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[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 conver-
gence 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).

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 percent income earners in China captured 13 percent of total Chinese growth over the 1980–2016 period. We thus assume that bottom 50 percent Chinese earners will capture 13 percent 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 percent of the world population slightly decreases from approximately 10 percent today to less than 9 percent in 2050 (see Figure 3). The top 1 percent share rises from less than 21 percent today to more than 24 percent 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 percent would earn close to 28 percent of global income by 2050, while the bottom 50 percent would earn close to 6 percent, less than in 1980 (before large emerging countries started to catch up with the industrialized world). In this scenario, the increase in the top 1 percent income share is largely, but not entirely, made at the expense of the bottom 50 percent.

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 percent income share rises from 10 percent to approximately 13 percent in 2050, whereas
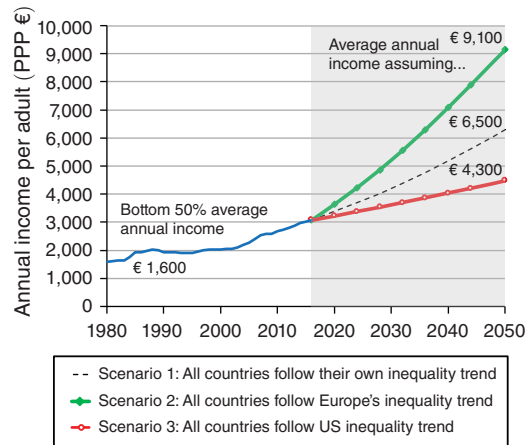

FIGURE 4. GLOBAL BOTTOM 50 PERCENT AVERAGE INCOME, 1980–2050

Notes: The figure displays the average real income of the global bottom 50 percent with actual data from 1980 to 2016 and as projections from 2016 to 2050 under three scenarios for inequality: (i) Business as usual, (ii) European scenario, and (iii) 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 percent 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

the top 1 percent decreases from 21 percent to 19 percent of total income. Even more equitable growth trajectories would be needed for the global bottom 50 percent share to catch up with the top 1 percent 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 they 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 percent 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 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. *World Inequality Report 2018*. Paris: World Inequality Lab.

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): 203–32.

Liberati, Paolo. 2015. "The World Distribution of Income and Its Inequality, 1970-2009." *Review of Income and Wealth* 61 (2): 248–73.

Organisation for Economic Cooperation and Development. 2017. *GDP Long-Term Forecast*. Paris: Organisation for Economic Cooperation and Development.

Ortiz, Isabel, and Matthew Cummins. 2011. *Global Inequality: Beyond the Bottom Billion. A Rapid Review of Income Distribution in 141 Countries.* New York: United Nations Children's Fund.

Piketty, Thomas. 2014. *Capital in the Twenty-First Century*. Cambridge, MA :Harvard University Press.

United Nations Department of Economic and Social Affairs. 2017. *World Population Prospects 2017.* https://esa.un.org/unpd/wpp/.