The Unintended Consequences of Globalization and Technological Progress

Riccardo Cristadoro

Abstract This chapter reviews the current debate on inequality with a focus on the main global trends and their likely causes. Notwithstanding significant progress, data challenges still limit the degree of confidence one should have on the evidence concerning the evolution of inequality between and, especially, within countries. Finding common causes for the heterogeneous experiences across countries might be unfounded, however it is important to focus on the two main overarching explanations proposed in the literature for the recent evolution of inequality, technology and trade. These two elements are surely and everywhere important drivers of inequality, although their interaction with each country's institutions and policies is an equally relevant factor.

1 Introduction

Over the last 30 years, there has been an unprecedented reduction in global inequality, which over the preceding 150 years had instead been increasing almost uninterruptedly (IMF 2017; World Bank 2016). The driving force of this change in secular patterns has been the economic progress of population-rich countries starting from the late 1980s: China, India, former Soviet Union states and Brazil, to name some prominent examples. This has been a remarkable success of the "high globalization" period (Milanovic 2016) that started with the fall of the Berlin wall and the liberalizations in China and India: more than 1 billion people were lifted from a condition of extreme poverty (defined as living with less than 1.90 USD per day at the 2011 PPP; World Bank 2016).

Arguably, the concept of "global inequality", i.e. income or wealth disparities across the entire world population, is itself a product of the changes in our view of

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the world, brought about by both globalization and the wider and faster sharing of information across the globe granted by the ICT revolution.

However, as distances *between* countries were shrinking, inequalities *within* countries, especially in advanced economies, increased. It should be immediately added that while the former fact is quite uncontroversial, the actual direction of within-country inequality is less clear-cut (IMF 2017).

It is evident, however, that a significant increase in inequality took place in some advanced economies and that a widespread discontent towards globalization has taken hold in most democracies, leading to mass protests against economic integration and trade liberalization as well as to a rising demand for inward-oriented and protectionist policies (OECD 2015; Autor 2016; Biancotti et al. 2017).

The fight against domestic inequality and for inclusive growth has therefore become a priority in the political agenda of most nations and it is a much-discussed topic in international fora. Former U.S. president Barack Obama stated that income inequality is the "defining challenge of our time" (Obama 2013). In 2017 the World Economic Forum listed "rising income and wealth disparity" as the first of the top five risks to the global economy; the Italian Presidency of the G7 made inclusive growth and inequality reduction a priority and promoted a *Bari Policy Agenda on growth and inequalities*[1]; the G20[2] and other international organizations[3] have published several reports documenting surging inequality trends and pressing nations to act to revert them.

This shift in political priorities follows a slower movement in economic research that has progressively raised the study of inequality from a rather neglected field to a core topic. For a long time, economists considered the study of the distribution of income and wealth among individuals of secondary importance. The predominant attitude toward distributive issues was that the focus of economic research should be on how to increase the size of the pie rather than on how to divide it: "*Of the tendencies that are harmful to sound economics, the most seductive, and in my opinion the most poisonous, is to focus on questions of distribution… The potential for improving the lives of poor people by finding different ways of distributing current production is nothing compared to the apparently limitless potential of increasing production*." (Lucas 2003). The strong rise in inequality in the United States and in other advanced countries that started nearly four decades ago and, more recently, the fallout from the global financial crisis in terms of household income and wealth, have made "questions of distribution" more relevant. Documenting the observed trends, discussing the causes of rising inequality and proposing measures to reduce it are now high on the research agenda.

Different explanations have been proposed for the surge in income inequality that affected most advanced economies over the past decades. Part of the literature argues that skill-biased technological change is the main factor (Acemoglu 2002) and that

[1] http://www.g7italy.it/sites/default/files/documents/Bari%20Policy%20Agenda%20final%20.pdf.

[2] Hamburg Action Plan (link).

[3] The IMF, the WBG and the OECD have all contributed to this call for political action: see IMF (2017), World Bank (2016) and OECD (2015).

the "race between education and technology" (Goldin and Katz 2008) has seen a strong acceleration in the pace of technological progress and possibly a significant change in the mix of skills required (Autor et al. 2006). Some researchers have revisited the evidence on the effect of trade with developing countries on wages in advanced economies (Krugman 2008), partially reverting the dismissive conclusions reached by the first studies in the 1990s.

The relative demerits of technological progress and globalization are at the forefront in the attempts to explain the rise in inequality. Other factors have been investigated too, like the evolution of policies and institutions, with particular emphasis on taxation, and the changes in family structure (OECD 2011; Zucman 2015). Piketty, starting from evidence of persistent high inequality over the last 200 years—interrupted only by the "exceptional" 1950–80 period—, argues against any purely technological explanation of inequality (like the Kuznets curve), maintaining that there is a tendency of the capitalist economy to generate large and persistent disparities, against which changes in social norms, institutional factors and therefore policies play a major role (Piketty 2013).

The lack of consensus in identifying the causes is reflected in the debate concerning the most appropriate policies to curb inequalities, with recipes ranging from better and broader education, to higher taxes, to trade protectionism.

In the rest of the chapter we will first discuss some problems related to the measurement of inequality and the progress made in the recent decades, briefly describing the main databases available for the analysis of income and wealth distribution. We will then illustrate the available evidence on the evolution of global inequality, mainly taking stock of studies by the OECD, the World Bank and by prominent researchers in this field. Finally, we will review the discussion among economists on the likely causes behind the observed trends.

2 Data

In measuring inequality the first, and perhaps foremost, question is "*inequality of what?*", (Sen 1997; Atkinson 2015). Economists have traditionally focused on the *outcomes* of economic activity, such as personal income, consumption and accumulated wealth, rather than on *opportunities* that individuals get to participate in production (e.g. access to basic health or education), or their abilities to transform the fruits of their work into actual wellbeing.[4] This latter consideration is central to Sen's *capabilities and functioning* approach, and leads him to argue that considering solely economic means acquired through the market by individuals provides only a very partial assessment the degree of inequality in a given society (Sen 1997).

Economists' traditional focus on income and wealth is not without reasons, though, and can be defended (Atkinson 2015) since income and wealth are the main means to acquire needed goods and services and they are also highly correlated with

[4] A. Sen (1997), p. 198.

other social and health indicators (Chetty et al. 2014; Cutler et al. 2006; Cannari and D'Alessio 2016; Case and Deaton 2017).[5] Large inequalities in income and wealth tend to reflect similar disparities in other metrics; they are not the sole cause of asymmetries in well-being, but they might still be an acceptable proxy. A second question of particular concern when looking at inequality across the globe is "*inequality among whom?*". Up until about fifteen years ago, economists either measured the dispersion of household incomes within a given country (*within country* inequality) or that of per-capita GDP across a sample of countries (*between country* inequality). Starting with the seminal work by Bourguignon and Morrisson (2002), more studies have been published that look at "global inequality", considering all individuals as inhabitants of the same world, independent of the country where they happen to live (Bourguignon 2015; Milanovic 2016). Such a cosmopolitan view can be challenged as not useful for policy design: redistributive mechanisms are established at the national level; there is no global government responsible and accountable for the wellbeing of world citizens. On the other hand, it can be argued that fast communication and international sharing of information are creating a "global village" in which people's perception of inequality on the world scale is sharpening (Milanovic 2005) and its moral relevance increasing.[6] Large disparities in income and wealth across countries also contribute to the rising tide of migrants. So, on the one hand public conscience is maturing a different attitude toward "global inequality", on the other the dividing line between national and international responsibilities for inequality is becoming blurred.

In any case, the discussion and analysis of "global inequality" relies on the availability of data on which it can be measured. In principle one would like to have a reliable database covering income, wealth, tax and transfers for a representative sample of individuals, including the very poor and the very rich, within as many nations as possible and for a significant time span. This is still a long way ahead, despite the progress made in data collection (and analysis) over the last decades.

Historically, the measurement of income and wealth inequality can be traced back to Vilfredo Pareto and Simon Kuznets. Pareto used tax data collected at the end of the 19th century in a number of European countries to estimate the distribution of income among their citizens. He found an empirical regularity characterizing within-country income distributions across time and space: the richest 20% received about 80% of aggregate income, but he did not suggest any economic explanation for this fact (Milanovic 2005). Tax data (income or inheritance), like those used by Pareto, have long been the main source of information on inequalities.

Starting in the 1950s and 60s, fresh evidence on income and wealth distribution has become available through household surveys,[7] which offer a richer set of individual

[5]This is not to say that focusing on these aspects is sufficient to describe, analyse and reduce inequality.

[6]The implicit assumption of perfect symmetry among world citizens implicit in the construction of most global inequality indicators can be relaxed allowing for the fact that "national borders matter and cannot be ignored in setting the principles of international distributive justice"(Brandolini and Carta 2016).

[7]For an historical sketch of household surveys see I. Visco (2015) and the literature cited therein.

data to accompany recorded income or consumption. Kuznets pioneered the use of survey data in the study of income distribution. Contrary to Pareto, he found that inequality does change over time, according to a dynamic law that leads inequality to follow an inverse U curve as a country industrializes (Kuznets 1955). Inequality is low in poor, mainly agricultural countries. Then it soars as industrialization brings rapid growth, hefty profits, rising wage differentials between rural and urban areas and greater job diversification within cities. When the process is over, most people are allowed to share in the higher standard of living produced by industrialization, and inequality returns to lower levels. Kuznets was aware of the limitations imposed by the restricted geographic coverage of his data "In concluding this paper I am acutely conscious of the meagreness of reliable information presented. This is perhaps 5% empirical information and 95% speculation […]".[8]

Since Kuznets' times, the practice of studying inequality with data collected through surveys spread; first in advanced countries, then among developing ones. Survey data on key flow variables, such as income and consumption, are now available for most countries. Conversely, micro-level information on wealth is still scarce and it typically covers shorter timespans. Despite its importance for the measurement of overall wellbeing, it has received less attention because of intrinsic measurement challenges, mostly on the asset side.

The longest standing surveys that cover both income and wealth are the **Bank of Italy's Survey of Household Income and Wealth** (SHIW), launched 1966, and the **Federal Reserve's Survey of Consumer Finances**, launched 1983, with a test run in 1962. Some other OECD countries, e.g. the United Kingdom and Spain, started similar endeavours in later decades. Several national surveys exist that cover income and consumption, but not wealth. Lately, Piketty and his co-authors promoted a revival in studies based on tax-files data (Atkinson et al. 2011; Piketty and Saez 2014). These two sets of data are the modern basis for the analysis of inequality at a global level.

Both data sources have shortcomings. Tax data have been collected for a much longer period, compared to survey data. However, contrary to surveys, they offer little information on personal characteristics that help understand the determinants of inequality, such as household structure, education and income sources, and exclude a large part of the less well off: those that do not file for taxes. These data are also sensitive to legal changes and—especially for the top incomes—might be affected by elusion and other practices to evade taxes. Household survey data do cover a larger set of the population (in terms of income and wealth) and give vital information on personal characteristics. But they also suffer from under-reporting or even refusal to participate in the survey by top income earners.

When computing inequality measures at the global level, some comparability issues exist. As a general rule, information on developing countries is less detailed and less reliable than data from advanced economies. Even for countries that are

[8] Kuznets (1955), p. 26. For the bulk of his analysis, he used data for the United States, the United Kingdom and two German states (Prussia and Saxony) from the end of the 19th century to 1950 (with differences across countries).

otherwise similar, definitions of some items (e.g. gross vs net income) and correction models for non-response and under-reporting may vary widely. Well-documented discrepancies between survey-based data and national accounts (Deaton 2005)[9] add another layer of complication: should the former be adjusted to align with the latter or vice versa? "The practical importance of these choices for the measured level of inequality is significant" (Brandolini and Carta 2016).

There are nowadays several international data sets of income inequality. A first distinction that can be made is between primary and secondary (derived) sources. Primary data sets contain micro-level data on personal income (or consumption) and can be harmonized ex ante or ex post.[10] Secondary dataset report only some key summary statistics on inequality within surveyed countries (typically Gini coefficients and some percentile ratios). The main advantage of secondary datasets is the large number of countries covered and the ease with which they allow comparison among them with ready-to-use summary statistics; on the downside care must be taken since there is little possibility of controlling data quality and consistence across time and space.

Primary sources are, most of the time, collections of harmonized country micro-data from existing surveys. The first attempt at constructing this kind of database is the **Luxembourg Income Study** (LIS), launched 30 years ago, and the **Luxembourg Wealth Study** (LWS). As mentioned above, income and wealth variables are sometimes measured based on different definitions in different countries: in the LIS/LWS database, they are mapped onto harmonized ones. The LIS spans about 50 countries, with data waves starting from 1970, but time coverage varies by country. The LWS so far covers Australia, Canada, Finland, Greece, Italy, the United Kingdom, the United States and Norway.[11] Data are available for research and other non-commercial uses.

The **World Bank's Living Standards Measurement Study** (LSMS) is the richest source of survey-based harmonized micro-data for less-developed nations. Along with income and consumption data, it recently started to record also information on durable assets and on productive capital owned by farming households.

The **European Union Statistics on Income and Living Conditions** (EU-SILC) was launched in mid-2000s. It is a harmonized household survey, coordinated by Eurostat, and carried out by national statistical institutes in European Union member states[12]; it provides a "common framework" to collect data on income, poverty, social exclusion and living conditions. Also in this case, data are standardized ex post.

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[9] Typically income or consumption per capita estimated in the national account are higher than the respective mean per capita measured derived from surveys; Deaton argues that the latter are to be preferred over the former for developing countries.

[10] For a more detailed assessment of available data sources for international comparison of income distributions see Forster and Toth (2015).

[11] In 2013, the OECD published non-binding guidelines on the measurement of household wealth at the micro level, followed by the Framework for Statistics on the Distribution of Household Income, Consumption and Wealth.

[12] EU-SILC was launched in 2003 on the basis of an agreement between Eurostat, six Member States (Austria, Belgium, Denmark, Greece, Ireland, Luxembourg) and Norway. It was later expanded to cover all of the EU Member States.

As a rare example of ex-ante standardized primary source, the European Central Bank co-ordinates the euro area **Household Finance and Consumption Survey** (HFCS), that collects comparable results from 20 national surveys mostly run by central banks, based on a common core questionnaire; the first results, covering the 2008–2010 period, were published in 2013.[13] Non-euro area European countries, such as Denmark, soon replicated the effort. The main aim of the HFCS is to gather micro-level structural information on euro area households' assets and liabilities. The survey also collects other data in order to analyse the economic decisions taken by households and to evaluate the impact of shocks, policies and institutional changes.

The **OECD Income Distribution Database** (IDD) is based on data collected from national household surveys and administrative records according to common definitions. It includes 38 countries. The fundamental variable is household disposable income adjusted using an equivalence scale.[14] It does not allow access to underlying microdata, but provides a rather rich set of income distribution and poverty indicators, and the possibility of analysing income dispersion both before and after tax and transfers. In a sense—as Forster and Toth 2015 observe—the IDD "constitutes its own category between primary and secondary data sets." The **OECD Wealth Distribution Database** exploits national sources from 18 OECD members, collecting data on the distribution of real and financial assets and liabilities across households. A subset of these data is available to users.

The following are the main secondary data sources.

The United Nations University World Institute for Development Research (WIDER) **World Income Inequality Database** (WIID), launched in the late 1990s, provides a set of inequality indicators (Gini coefficients, decile and quintile shares, survey means and medians, income shares of the richest 5% and the poorest 5%) for almost 200 advanced, developing, and transition countries and for an extended period, starting in the 1960s in some cases. It builds on the historic Deininger-Squire Data Set (Measuring Income Inequality Database), the first to introduce minimum quality standards. It is a collection of Gini coefficients and cumulative quintile shares for almost 140 countries and includes information on population coverage, whether data are based on income or consumption and so forth. Data only cover the period between the 1960s and early 1990s and are freely available from the World Bank website.

The **All the Ginis** (ATG) data set has been put together by Branko Milanovic and collects harmonized Gini coefficients from seven original sources: the LIS, the Socio-Economic Database for Latin America, the EU-SILC, the World Bank Europe and Central Asia dataset, the World Income Distribution (WYD), World Bank PovCal, and the WIDER.

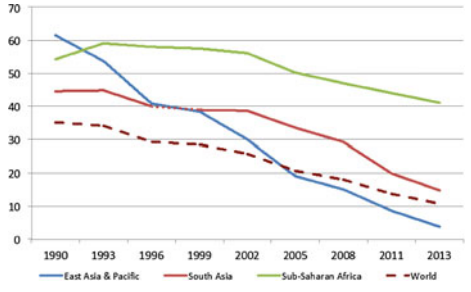
Recently an international team led by Atkinson, Piketty and other researchers has built a large dataset, the **World Wealth and Incomes Database** (WID)[15] that

[13] The first wave included only 17 countries.

[14] Variables like disposable income or consumption are divided by the square root of the number of family members.

[15] http://www.wid.world/.

A. Headcount ratios (% of total regional population)



B. Absolute number of Poor (millions)

	1990	2013	Diff.
East Asia & Pacific	983.6	73.9	-909.7
South Asia	505.4	249.1	-256.3
Sub-Saharan Africa	278.1	390.3	112.2
RoW	*100.1*	*55.2*	-44.9
World	1867.2	768.5	-1098.7
% of poor in world population	35.3%	10.7%	

Fig. 1 World and Regional Trends, Poverty Headcount and Headcount Ratio, 1990–2013. (*Note* Author computation on World Bank Data, http://iresearch.worldbank.org/PovcalNet/ (accessed on October 26, 2017) and World Development Indicators (for total world population). Poverty is measured using the US$1.90-a-day 2011 purchasing power parity (PPP) poverty line. Latest available estimates are dated 2013. *RoW* indicates Rest of the World.)

combines national accounts, survey and fiscal data to measure both wealth and income inequality between and within countries for an extended time period (over a century of data). There are still large differences in the quality and amount of data available across countries.

3 Evolution of Global Inequality

Since the 1990s, rapid growth in a number of countries with a large and relatively poor population has greatly contributed to a reduction in the income gap between rich and poor nations and to a decline in global inequality.

The most striking effect of this "high globalization period" has been the sharp reduction in the number of poor in the world. More than 1 billion people escaped extreme poverty since 1990; which is even more remarkable considering that over the same period (1990–2013) the world population increased by almost 2 billion people (World Bank 2016). This reduction has been uneven. The greatest progress has been recorded in South East Asia, with China having the lion's share and in South Asia, with India playing this role. The one exception is Sub-Saharan Africa that now accounts for more than half of the total number of poor, with an incidence on total regional population of more than 40% (Fig. 1).[16]

This remarkable success and the sharp reduction in "global inequality" was reached notwithstanding the increase in inequality among households within many advanced and developing countries. Global inequality results from the composition of *between-country inequality* (differences in mean national incomes, population-

[16]Latin America whose poors' headcount ratio fell by about 10% points (from more than 15% in 1990 to almost 5% in 2013) is included in the "RoW" (Rest of the World) aggregate

weighted) and *within-country inequality* (dispersion of income among citizens of each country, again, population-weighted). Only the first was clearly reduced by globalization. So a sharp fall in poverty headcount and headcount ratios, and a rapid convergence in income levels among (some) developing and developed economies, coexisted with rising inequality is some advanced countries.[17]

A global inequality measure is obtained converting the incomes all world citizens in a common *numeraire*—the international dollar—based on purchasing power parities (PPP).[18] In a seminal paper, Bourguignon and Morrisson (2002) combined national income distributions for almost 180 countries,[19] summarized by the first nine decile income shares and the top two ventile shares, with national account statistics (per capita GDP) expressed in U.S. dollars at 1990 PPP to obtain the aggregate world distribution of incomes. With data covering the 1820–1992 period, they found a steady increase in world inequality up to the 1950s and a subsequent flattening of inequality. Following similar or alternative methods to estimate relative global inequality, several authors have extended and updated Bourguignon and Morrisson's results.

Recently the World Bank (building on Lakner and Milanovic 2016) has published estimates of world inequality updated to 2013. According to this analysis, between- and within-country inequality followed opposite trajectories over the last 25 years: the reduction in between-country inequality largely offset the increase in the "within" component, leading to a fall in global inequality. As stated above, this fall is mainly due to the improvement of living standards in South-east Asia, Russia and parts of Latin America.

It should be kept in mind that the gap between rich and developing economies is still large. Per capita income growth in populous countries like India and China was phenomenal, especially in China where it rose almost 10-fold between 1990 and 2016, greatly contributing to a reduction in poverty rates. However, per capita GDP, measured in 2011 international dollars, is still well below that of advanced countries: about one fourth of US per capita GDP for China, little more than one-tenth for India (Table 1).

While there is little doubt concerning the between-country component of global inequality, there is much uncertainty concerning the actual increase in the within-country component, and hence the final effect on global inequality.

Generally speaking, evidence from survey data suggests that inequality worsened in US, UK and some advanced European nations, and, among emerging economies, in Asia and Eastern Europe; in Latin America the evidence is mixed, and in Brazil inequality declined.

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[17] As noted in Atkinson and Brandolini (2010) "*people are interested in both world inequality and world poverty, but the two literatures are separate… with an uneasy relationship between them*".

[18] One cannot simply sum income differences by converting all incomes in a common currency, say, the U.S. dollar; to aggregate world citizens in a single global measure one must take into account the differences in what a dollar can buy in different countries. This gives rise to quite complicated measurement issues; the construction of a different *numeraire* can have strong effects on the relative position of citizens of some countries and hence on the global measure.

[19] Some lumped into "country groups".

Table 1 GDP in constant international dollars per person

Country	1980	1990	2000	2016	1990–2016 (1)
China	721.6	1,515.5	3,681.7	14,274.7	9.4
% of US	***2.5%***	***4.1%***	***8.0%***	***26.7%***	***22.6***
India	1,297.2	1,801.7	2,546.4	6,206.9	3.4
% of US	***4.4%***	***4.9%***	***5.5%***	***11.6%***	***6.8***
United States	29,276.5	36,999.1	45,964.2	53,417.0	1.4

Source IMF, World Economic Outlook, October 2017
(1) For per capita GDP level, ratio of 2016 on 1990; for per capita GDP ratio with respect to US level, difference in percentage points between 2016 and 1990

These figures should be taken with a measure of caution because they are likely to incorporate a distortion, but the sign is unknown. On the one hand, inequality estimates from survey data generally suffer from downward bias, because the very rich under-report income and wealth, and the very poor - such as the homeless or undocumented immigrants—are excluded from the sampling frames. Moreover, in developing countries there is a scarcity of income and wealth data so most estimates are based on consumption, which in turn tends to reduce interpersonal differences as affluent families consume a much smaller share of their income compared to poor ones. On the other hand, the practice of aggregating data from different countries using a single PPP exchange rate per country may produce an upward bias: especially in poor countries, imposing the same "price level" on the whole territory may lead to underestimation of living standards in rural areas, and overestimation of inequality (this is the reason why for China and India overall inequality is split into rural and urban population inequality in the World Bank analysis).[20]

Finally, the choice of the index that measures inequality matters, since different indices correspond to different weights given to individuals in the population. In this case, the Gini index (blue line in Fig. 2) suggests a smaller reduction compared to the Theil index (mean log deviation, given by the height of the bars in the same figure).

No widely agreed-upon and fully satisfactory solution to these problems exists. A general caveat is that, while the analysis of overall trends is obviously relevant in a world where economies and citizens are ever more connected, it can be misleading and a deeper look at national microdata is necessary to have a better assessment of inequality dynamics (Atkinson and Brandolini 2000).

Lakner and Milanovic (2016) proposed an anonymous[21] "Growth Incidence Curve" that assesses the increase in real incomes for different percentiles of the world income distribution and attempts to square the evidence on the evolution of

[20] See Lakner and Milanovic (2016) and—for a similar argument concerning the use of the main city price level in the World Bank Doing Business data—Borin et al. (2014).

[21] This curve is "anonymous" as it does not tell what actually happened to people that were in a given decile of the income distribution in 1988 over the next 20 years since the regional composition of the different global income groups changed radically, because growth was uneven across regions.

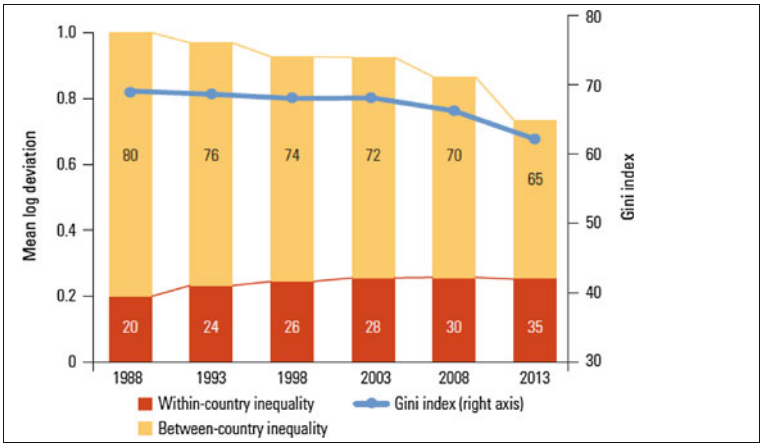

Fig. 2 Global, between and within countries inequality, 1988–2013. (*Source* World Bank. 2016. Poverty and Shared Prosperity 2016: Taking on Inequality. Washington, DC: World Bank. https://doi.org/10.1596/978-1-4648-0958-3. *Note* Household income or consumption per capita is obtained from national surveys and converted with 2011 PPP exchange rates; within-country distributions are based on deciles. The blue line (right axis) shows the level of global inequality measured by the Gini index, the height of the bars shows that measured in mean log deviation (Theil index). The latter is split into inequality within countries, population-weighted (red bars), and between-country (yellow bars), which captures differences in average incomes across countries. Numbers on the bars measure the relative contribution (in %) of these two sources to global inequality.)

between- and within-country inequality in a consistent picture that highlights globalization's winners and losers.

The curve is reported in Fig. 3. It is obtained putting together the results of about 600 household surveys from more than 100 advanced and developing countries,[22] covering the "high globalization period" (1988–2008). Survey data are centred at benchmark years at five years intervals for the period under exam, all after-tax real income data are expressed in international dollars at the 2005 PPPs, and individuals are ranked by their real household per capita income.

On the y-axis is reported the difference between real per capita income[23] of a given ventile of world's population in 2008, with that of the "same" ventile, *that does not necessarily comprise the same people nor the same countries*, in 1988. This computation is repeated for each successive ventile up to the top, singling out the richest 4 and 1% of the world population.

Milanovic (2016) stresses three facts that emerge from the graph (also dubbed "Elephant curve"):

- People around the global median (point A) have made large real income gains. They are, in a proportion of about 90%, from the middle classes of Asian emerging

[22] This dataset covers more than 90% of world GDP and 95% of world population.

[23] Expressed in dollar terms, at 2011 PPP.

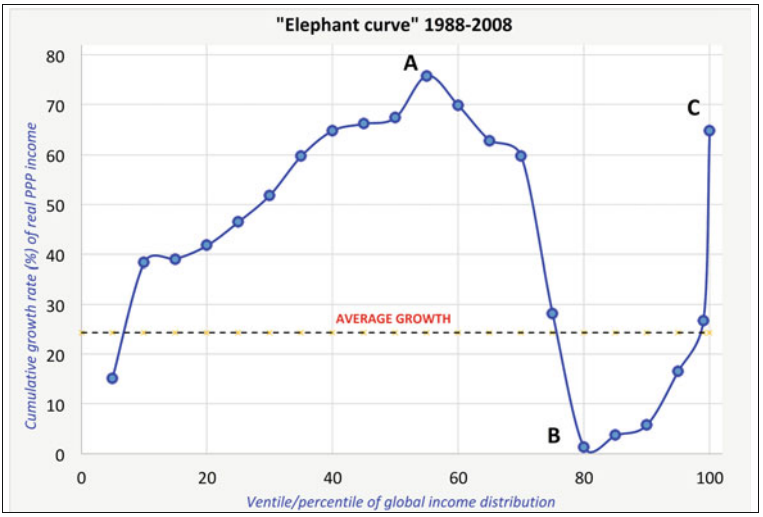

Fig. 3 Cumulative real income growth between 1988 and 2008 at various percentiles of the global income distribution. (*Source* based on Lakner and Milanovic (2016))

economies, mostly China and India. Milanovic labels this the **emerging global middle class**, mainly constituted by individuals resident in "resurgent Asia", but whose per capita income is still low (less than 15 international dollars per day) if compared to the rich-world median income.

- People around the 80–85th percentile of the distribution (point B) have seen little or no increase in their per capita income. About three-quarters of them belong to the "old rich" OECD countries,[24] where they constitute the middle to lower middle class.[25] This group of people can be dubbed the **lower middle class of the rich world**.
- Finally, the very top of the world distribution (point C) saw a rise in real income similar to the middle class in resurgent Asia. This is at least partly consistent with Piketty's claim that much of the action in the rich world has been at the very top of the distribution. People at the top of the world income distribution are mainly the very rich of advanced economies (United States has the lion's share here, accounting for one half of the group), and to a lesser extent the wealthy of some emerging nations (Brazil, South Africa and Russia). This group can be named the **global plutocrats**.

[24] Western Europe, North America, Oceania and Japan.

[25] The concept of "class" here must be interpreted with some care, first of all because the "anonymity" of the clusters does not allow for a clear identification of who is in each income bracket in a given year. Furthermore, to identify in a more convincing fashion a "class", one should examine other dimensions beyond income, like the role of property and of occupations (Atkinson and Brandolini 2011).

The losers of globalization are to be found in the ranks of the lower middle class in the rich world, while the clear winners have been the poor and middle classes of emerging markets (Asian countries in particular) and the very rich (global plutocrats).

The interpretation of these results has been criticized[26] since many other factors might explain the shape of the curve: demographic shifts, stagnation in Japan, and former Soviet Union satellite states that contributed to depress "middle class" incomes. Removing Japan, former Soviet Union satellite states and China results in a substantially flat curve, where most people saw a 40% increase in income apart from the very top (higher increase) and very bottom (lower increase) of the distribution. Considering the different patterns followed across countries by income growth and inequality, it seems difficult to reduce to the unique action of globalization what is more likely due to a combination of global and country-specific factors.

Figure 3—however—summarizes known facts that have been examined separately in the literature and highlights divergences: the unprecedented growth of China and other large countries that were not rich and whose income gap with the West narrowed substantially over the last three decades; the stagnating median income in many advanced countries and the diminished expectations of the middle classes there; the widening gap in those countries with respect to the top 1% of the distribution.

Another indication we can derive from the chart is that, if we take a fully cosmopolitan view treating all individuals the same irrespective of their citizenship, a large share of world population that was in the central clusters of the distribution has fared very well, reducing the gap with respect to the richer world. Valuing a given percentage gain in income more when it accrues to a poor person than to a rich one, and considering that no income group had a decline in real income, we should confirm our positive judgement on the "high globalization period", already suggested when looking at poverty reduction.

The situation changes if one analyses the data from the point of view of nation states in the advanced world: here, working class income has suffered, if not a contraction, a prolonged stagnation. As seen in Fig. 2, within-country inequality rose over the last 25 years and now accounts for about 35% of global inequality, up from 20% in 1980. According to OECD data, income inequality in OECD countries is at its highest level over the past half century. The average income of the richest 10% of the population is about nine times that of the poorest 10% across the OECD, while this ratio stood at 7 to 1 in the 1980s.

The global financial crisis worsened the socio-economic situation of large swaths of the population in most advanced countries, aggravating discontent and pushing up the number of people at risk of poverty. The crisis did not affect all citizens in the same way: manufacturing workers have been more likely to experience displacement and wage cuts; youths have been hit harder than elders, lacking their social protection and suffering the permanent damages coming from unemployment or careers made of temporary, low-quality jobs.

The most striking divergence is portrayed by the evolution of the wealth distribution in the US. According to recent estimates by the Federal Reserve (Fig. 4), wealth

[26] Corlett (2016).

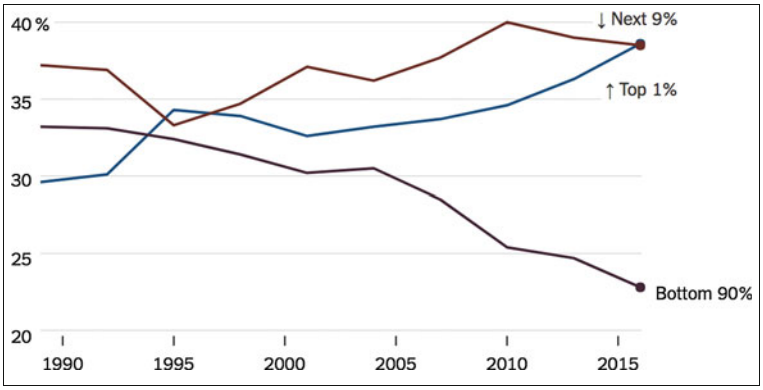

Fig. 4 Wealth shares by wealth percentile in U.S., 1989-2016 surveys. *Source* Survey of Consumer Finances (Federal Reserve Bulletin, Sept. 2017)

of the top 1% accounts for almost 40% of the total (data referring to 2016), while the share of the poorest 90% has been constantly falling since the end of the 1980s. The amount of total wealth accruing on the P90-P99 percentiles has been rising until 2010, then it experienced a fall as a consequence of the global financial crisis.

The rise of income and wealth share at the top is not confined to the U.S. (Piketty and Saez 2014) and also calls into question other factors. The OECD observes (OECD 2015) that in many advanced economies tax and transfers did not reverse the increase in market income inequality, as redistributive measures have been weakened by policies adopted in the past.

The debate among economists is far from having reached a definite conclusion on the effects of the integration of emerging markets in the global economy. Before turning to this topic it is worth stressing once more that—from a global perspective—the overall effect of globalization on the economic wellbeing of world citizens has been clearly positive, irrespective of one's assessment of the relation between gains and losses.

4 Causes of Rising Within-Country Inequality

There is a lively, ongoing discussion among economists concerning the main forces underlying the rise in inequality. No general agreement has been reached on the key causes and on whether these common causes even exist. Country-specific explanations might play a greater role: there are dissimilarities across countries in the evolution of inequality, and one needs to account for different starting points, situations and institutions. A non-exhaustive list of potential drivers of inequality would comprise: (1) globalization and trade; (2) technological change, in particular progress in information and communication technologies (ICT); (3) changes in policies and

social attitudes (like tax rates, redistributive policies or pay norms); (4) a reduced role of trade unions.

By far the bulk of the economic literature has focused on the rising skill premium (i.e. the gap between market wages of college and high school graduates) in the US. The US economy offers a very rich and reliable set of data, even compared to other OECD members, and is in many respect the most developed industrial country. In this sense it is a good place to study and compare alternative explanations. However, it is risky to generalise results valid for the US to the rest of the advanced economies, let alone to the emerging ones, that also experienced a surge in inequality. The rising skill premium is less controversial as a focal point since it has been recorded in many advanced economies, and wage dispersion is a natural candidate for explaining rising inequality since almost ¾ of household income in OECD countries consists of labour earnings. This notwithstanding, one should bear in mind that wage dispersion does not map one-to-one with *ex post* inequality of disposable income at the household level, which is the concept adopted in computing statistics on inequality. In fact in the US, after the "great compression"[27] of wage earnings that took place in the interwar period, pay differentials started to widen again, but it was not until the early 1980s that this rising dispersion in market earnings translated into widening inequality.

There are two main explanations of the widening skill premium offered by the literature; the first looks at globalization and trade, the second at skill-biased technological progress. Following the literature, we will consider the two explanations in turn. But a more plausible account would start from considering technical change as endogenous (and related to globalisation) rather than exogenous. Technical change should be thought as the consequence of choices made by firms concerning what to produce and how to produce it. These choices depend on the economic environment in which firms operate, and firms will choose technologies that exploit the opportunities given by a globalized world, in turn changing the pattern of globalization.[28]

A first strand of the globalization literature, originating in the late 1980s and early 1990s, focused on the Hecksher-Ohlin model and the Stolper-Samuelson theorem as a general, simplified framework to analyse the effect on inequality of the entry of developing countries with large endowments of unskilled labour into the international market.

The Stolper-Samuelson theorem shows that in a world where there are two factors of production, skilled and unskilled labour, which can move freely within a country so that wages for each type of labour are the same, and two goods are produced under constant returns to scale with different skill intensity, there is a one to one relationship between the relative price of the goods and that of the labour types:

$$\hat{p}_H - \hat{p}_L = \left(\theta_{H,H} - \theta_{H,L}\right)\left(\hat{w}_H - \hat{w}_L\right)$$

[27] Goldin and Margo (1992).

[28] Technological innovation in products like the iPhones or Boeing airplanes cannot be separated from the fact that their production process is fragmented internationally, thanks to globalization, which enables the exploitation of costs reduction opportunities and productivity gains from increased specialization.

where $\theta_{H,H}$ and $\theta_{H,L}$ are the shares of skilled labour in the production of the two goods, $\hat{p}_H$ and $\hat{p}_L$ the percentage changes in high skill-intensive and low skill-intensive good prices and $\hat{w}_H$ and $\hat{w}_L$ the percentage changes in their respective wages.

In this context, cheaper imports of low-skill labour intensive goods from developing countries into advanced economies would increase the relative price of skill-intensive products and, under Stolper-Samuelson hypothesis, the relative wage of skilled workers, thus increasing inequality.

Several papers, relying on the Stolper-Samuelson framework, have tried to estimate the labour content of imports in advanced nations (mainly the U.S.) to assess its impact on the wage structure of the importing country. Cline (1997) surveyed a number of researches in this strand of literature, concluding that trade could explain only about one fifth of the increase in inequality since the 1980s. Hence, the late 1990s consensus was that skill-biased technological change, rather than North-South trade[29], was the main cause of rising wage inequality in the US.

Later studies, using data for the second half of the 1990s and the first decade of the 2000s, did not reach dramatically different conclusions. However, Krugman (2008) suggested—without computing precise estimates—that the rising importance of US trade with developing countries might have given trade a greater weight in US inequality in 1990s and 2000s.

These conclusions might surprise on the downside, given the magnitude of the underlying changes in the global economy. From the end of the 1980s North-South trade increased dramatically: it can be estimated that by 2001, when China joined the WTO, almost 1.5 billion workers[30] had integrated into the world economy labour force, doubling its size with respect to a decade before (Freeman 2008).

The share of imports from developing countries into the US kept rising over this period, and most of the increase came from imports originating in countries with very low wages compared to the US: as of 2012 China's hourly compensation costs were still below 10% of US costs (Fig. 5).

The increase in imports from countries rich in low-skill labour is not a phenomenon confined to the US: in the generality of advanced economies we can observe a sharp growth of the unskilled labour content in manufacturing goods consumed there. Most of the increase is due to imports from China and India; in 2008 these two countries accounted for almost 80% of total unskilled labour content in goods consumption, up from less than 60% in 1995 (Fig. 6).

From a theoretical point of view, the simplifying assumption in the Heckscher—Ohlin model with 2 goods and 2 countries, used as a reference framework in this literature, are quite strong and might not fully capture some relevant aspects of the effect of trade on inequality. In particular perfect substitution between imported and domestic goods, identical technologies across countries and perfect competi-

[29] Also related phenomena, like immigration and weaker trade unions, were taken into consideration.

[30] These are mainly workers from China, India and former Soviet Union bloc, which up until the late 1980s were de facto excluded from international markets.

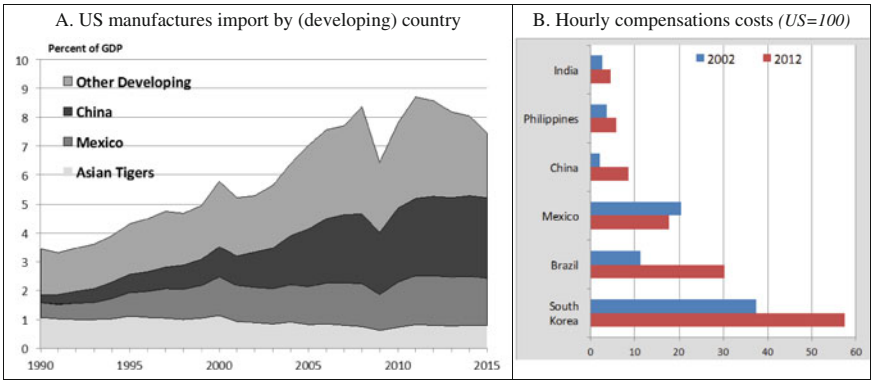

Fig. 5 US manufactures imports by country and relative compensation costs. (*Source* Based on OECD *Bilateral Trade in Goods by Industry and End-use (BTDIxE), ISIC Rev.3* and Conference Board, *International Labor Comparisons program*. *Note*: Compensation costs for China and India are not comparable with each other or with those of other countries.)

Fig. 6 Unskilled labour content in manufacturing goods consumed in advanced countries, by country of origin. (*Note* Computations on WIOD data, based on the methodology proposed by Borin and Mancini (2015))

tion (which implies no market power since prices are taken as given by agents) can seriously limit the analysis.

A more recent strand of the literature uses different theoretical and empirical approaches to assess the impact of imports from developing countries on income distribution in advanced countries, focusing in particular on the effect of trade on local labour markets.[31] Starting from the clear evidence of a decline in manufacturing employment in import-competing US industries that run parallel to the surge in China's trade, Autor *et al*. (2016) attempt to measure the impact of China's import competition on the employment and wage margin in local labour markets ("commuting zones", CZs). They find that (i) CZs that are more exposed to increased import

[31] Studies on the impact of globalization on inequality in developing economies find—in general—a stronger effect (Goldberg and Pavcnik 2007).

competition from China suffered larger reductions in manufacturing employment; (ii) that job losses for unskilled workers (less than college education) extended to non-manufacturing industries within the same CZ; (iii) proposed estimates of China's competition effects on jobs and salaries vary according to the method used. For manufactures directly competing with China, the China effect accounts for 10%[32] of total fall in manufacturing employment between 1999 and 2011; but the number doubles when the indirect impact is taken into account, and increases further if we move beyond the manufacturing sector (up to 2 million workers in the entire economy); the fall in wages is concentrated in the bottom four deciles of the distribution and outside the manufacturing sector.[33]

The results from this second strand of globalisation literature show that increased import competition from developing countries produced a significant effect in terms of job displacements and wages declines in advanced economies. This is not a direct estimate of the impact on inequality, since job losses and wage declines are—at least partially—compensated by increasing social transfers, but it is suggestive of a non-negligible impact.

The second approach explains the observed rise in the skill premium with skill-biased technical change. Returns to education—measured by the gap between wages of college and high-school graduates—has been increasing for most of the post WWII period in the U.S., suggesting that the demand for college-educated workers has outpaced the supply, that nonetheless grew for most of last century (Tinbergen's race between education and technology). Technological advances—in particular in the ICT sector starting from the 1990s—have increased labour productivity but also displaced low-skill workers, creating an ever-greater demand for higher skills. To gain a better insight into the determinants of the skill premium, researchers refer to the so-called "canonical model"[34] that assumes skilled and unskilled workers produce two imperfectly substitutable goods, technology is "factor-augmenting" (parameterized by a multiplicative factor A_H for high skill and A_L for low skill labour) and the aggregate production function takes a CES form. Assuming H and L are the supply of high and low skill labour respectively, we obtain the following law of motion for the relative wage of skilled versus unskilled workers:

$$ln\left(\frac{w_H}{w_L}\right) = constant + \frac{\sigma - 1}{\sigma} ln\left(\frac{A_H}{A_L}\right) - \frac{1}{\sigma}\left(\frac{H}{L}\right)$$

where σ is the elasticity of substitution between high and low skill labour, $\left(\frac{A_H}{A_L}\right)$ measures changes in the technology skill bias and $\left(\frac{H}{L}\right)$ those in the relative supply of high skill and low skill labour. As long as $\sigma > 1$, which is what is normally assumed in the literature, an increase in the technological skill bias will translate into a raise in the skill premium, holding $\left(\frac{H}{L}\right)$ constant. Goldin and Katz (2008)

[32] About 560 thousand jobs.

[33] The importance in the overall decline of earnings of the job-loss related fall in income is roughly 1.5 times that due to the fall in wages.

[34] See Acemoglu et al. (2012).

argue that the rising skill premium contributed between 60 and 70% to the observed increase in earnings inequality, joining a number of other influential studies arguing that the surge of inequality since the 1980s reflected a rise in the demand for skill that accelerated with the onset of the ICT revolution and met a slowdown in the growth of the relative supply of college-graduate workers during the same period.

But how far can this simple framework explain the skill premium dynamics? Card and DiNardo (2002) argue that the surge in inequality during the 1980s is explained by a fall in the real value of the minimum wage. However, earning dispersion continued to widen over the last two decades, so it is unlikely that a one-off event can explain a prolonged trend.

Assuming that the demand for skills follows a log linear trend ($ln\left(\frac{A_H}{A_L}\right) = a + bt$, t being time), as generally done in the literature, one obtains:

$$ln\left(\frac{w_{H,t}}{w_{L,t}}\right) = constant + \frac{\sigma - 1}{\sigma} bt - \frac{1}{\sigma}\left(\frac{H_t}{L_t}\right)$$

where the subscript t has been added to clarify time dependence. Estimating this model on microdata[35] for the period prior to 1987 produces a remarkably good fit (see Acemoglu and Autor 2012) but extrapolating results for the following years shows that the college—high school wage gap rose less than predicted by the model. This points to some limitations in what the model captures.

In particular, the skill bias story associated with the ITC revolution points to a more complex interaction between skills, labour demand and wages. In the 1980s, consistently with the "canonical model", we observed a monotone surge of inequality with upper incomes rising with respect to mid and lower incomes, and the gap between the median income and the lower percentiles of the distribution also increasing. Starting in early 1990s, the U.S. earnings distribution "polarized": a persistent rise in the gap between top and median incomes was accompanied by a contraction of that between median and low income. This wage polarization was associated with a job polarization, where high- and low-skill employment increasing faster than medium skill jobs.

This suggests that ICT substituted medium-skilled, repetitive routine workers, more than they did displace low-skill jobs. Furthermore, contrary to the implication of the canonical model, whereby only technological regress would produce a fall in real wages, real wages did fall in the case of less educated workers.

[35]CPS is the most commonly used survey for this purpose in the U.S.

5 Policy Options

The last ten to fifteen years has witnessed a noticeable change in attitudes toward economic inequality at both the academic[36] and the political level. This change happened while global disparities between citizens of the developed world and those living in developing countries went through the most remarkable reduction since the start of the industrial revolution.

However, this reduction in global inequality overlapped with a widespread increase in income and wealth disparities within advanced economies and a surge in migration flows from poor to rich countries (IMF 2016). Both phenomena prompted a feeling of insecurity among the weaker strata of population in those countries, an insecurity that has been exacerbated by the effects of the global financial crisis.

While the study of inequality has gained prominence and reached the headlines in the political debate, we are still far from having a shared view on what should be done or—even—on whether anything should be done.

Critics of activist policies to reduce inequality, maintain that the real concern should be fighting poverty[37] and ensuring "equality of opportunities" rather than of outcomes. They argue that in a market economy achievements in business (or sport) are rewarded according to the benefits they provide to the buyers or society at large. Furthermore, high rewards provide incentives for talented entrepreneurs and innovators to devote efforts to what they can do best: "*a well-functioning economy needs the correct allocation of talent*" (Mankiw 2013). So—as long as inequality is efficient—it would be detrimental for society as a whole to try to reduce it. Critics also raise doubts on the soundness of inequality measures from a "moral" standpoint, citing as an example the fact that the most common measure, the Gini coefficient, violates the "Pareto principle", rising when the incomes of the rich increase even if the incomes of the poor remain the same.

A subtler argument stems from the observation that today's inequality in advanced economies is very different from that of last century. Differences in income in a modern advanced economy do not translate in equally large differences in wellbeing. Most of the people ranked poor in our statistics still enjoy a refrigerator and a car, although of lower quality compared to the rich; but the "*lived difference is rather smaller than that between having fresh meat and milk and having none*" or "*between motoring and hiking through the muck*" (The Economist 2007).

Those who argue in favour of a reduction in inequality would normally object that unequal distribution of income and wealth greatly affects equality of opportunity, not least since most empirical studies find a very strong correlation between parents' and

[36] "I was at the World Bank and a commission reviewed our work on inequality for the U.S. Congress or somebody, and the head of the commission said to us: '*You are spending taxpayer money to study issues like inequality? Which goes directly against capitalism and growth.*' That was the perception, that it should not be studied" (Branko Milanovic interview at PBS, Jun 29, 2017).

[37] "A common reaction in the popular press, in political debate, and in academic discussions is to regard the increase in inequality as a problem that demands new redistributive policies. I disagree. I believe that inequality as such is not a problem and that it would be wrong to design policies to reduce it. What policy should address is not inequality but poverty." (Feldstein 1999)

children's achievements in terms of education and income levels achieved as adults. Hence the place in society where one is born is a very strong predictor of one's future fortunes. This argument has an even stronger flavour, from a global perspective, as differences in wellbeing across countries account for about two thirds of global income inequality (OECD 2017). This is what Milanovic dubbed the "*citizenship rent*": the country one is born in greatly affects personal prospects concerning income, education, health and life expectancy.

Concerning the supposed trade-off between inequality and efficiency, the empirical literature has not reached a consensus, but it is fair to say that a growing number of researchers actually argue for a positive relationship between equality and economic growth. Too large a disparity in terms of income and wealth among citizens undermines health and education achievements of the disadvantaged, lowering human capital accumulation and thus affecting long-run growth. Beyond purely economic reasons, when inequalities are perceived as unjustified and too wide, social cohesion might be endangered and political stability weakened. This, in turn, has a negative impact on capital accumulation and growth. Inequality has also led to a demand for inward-looking policies that might damage economic prosperity.

As the IMF writes in its (IMF 2017) Fiscal Monitor: "*Rising inequality and slow economic growth in many countries have focused attention on policies to support inclusive growth. While some inequality is inevitable in a market-based economic system, excessive inequality can erode social cohesion, lead to political polarization, and ultimately lower economic growth.*"

The argument that large income inequalities no longer imply equally big differences in wellbeing might also be criticized. First, it underestimates the fact that, as the domain of the market economy spreads including goods and services once provided within families or by the State, the effect of income disparities is actually magnified, influencing access to healthcare, assistance for old age, education as so forth. Furthermore, on a political level, a very unequal society might mean a society where "the rich" have disproportionate power to influence the political agenda, leaving less space for the others to have their voice heard and taken into account.

With these premises, it should not surprise that proposal to address rising inequality vary widely among researchers and institutions. The IMF (2017) focuses on three key actions that fiscal policy can undertake: modifying tax rates at the top of the income distribution, introducing a universal basic income,[38] and more and better education and health programs. Only the third action is quite uncontroversial. If anything, the current debate is about lowering taxes for the rich and on capital (that, again, mainly affects the wealthier part of the population). Policy advice from the OECD (2011) also includes increasing the marginal tax rate, closing loopholes in the tax system that disproportionately benefit higher income groups and "reconsider" taxation on all forms of property and transfer of assets, including bequest. The G7 Bari Policy Agenda, reflecting a policy compromise, contains a less explicit call for "*higher spending in specific policy areas without necessarily altering the overall budget envelope.*" On the introduction of a universal basic income there is no agreement:

[38] An unconditional transfer paid to all citizens in a given country.

it is controversial for its potential impact on public finances and for its interaction with, and accommodation within, existing social protection schemes. Finally, while the general concept is clear, different solutions are debated for its translation into laws and for its practical implementation. The OECD (2017) concludes that while "a universal basic income is very simple […] existing social benefits are not, replacing them with a universal flat-rate benefit produces complex patterns of gains and losses." The proposed solution is to keep the door open to changes in existing social protection systems, while avoiding to point to a one-size-fits-all approach like universal basic income as the best policy option for all countries.

Among researchers, Milanovic suggested that to tackle within-country inequality it is best to strive for broader and better education of the labour force, rather than to raise income taxes. This solution would for sure meet less political opposition, but might sound insufficient or unconvincing to some (Piketty, Atkinson). Concerning between-country inequality, Milanovic advocates policies that foster faster growth of poor countries, which is quite uncontroversial. His second suggestion is more challenging: in line with his critique of the "citizenship rent", he favours a large, controlled migration from poor to rich countries.

Atkinson (2016) advocates a form of basic income, a "participation income" distributed to all those who contribute to society, which includes workers, unemployed, persons actively searching a job, caregivers, and those in education or job training programs. The others would be excluded, with the exception of the ill or disabled. He also suggests a stronger redistribution through taxation on both income and wealth and higher minimum wages. Atkinson has some more radical proposals, too. Moving from the consideration that globalization and technological progress are among the main drivers of rising inequality, but that they are not "*exogenous, uncontrollable forces*", he suggests governments should take direct action in those fields too. However it seems doubtful that Governments can effectively influence the direction of technological change, as Atkinson seems to imply.[39]

It is fair to say that some uncontroversial measures are shared by most proponents, while the presence of conflicting interests both within and among countries leaves ample room for controversies on a wider set of redistributive measures.

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[39] "[…] for instance, to shift priorities from driverless cars, which will likely reduce jobs, to technology that helps the elderly stay in their homes, which would increase the demand for caregivers." (Atkinson 2016 p. 30).

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