

# Why is Europe More Equal than the United States?

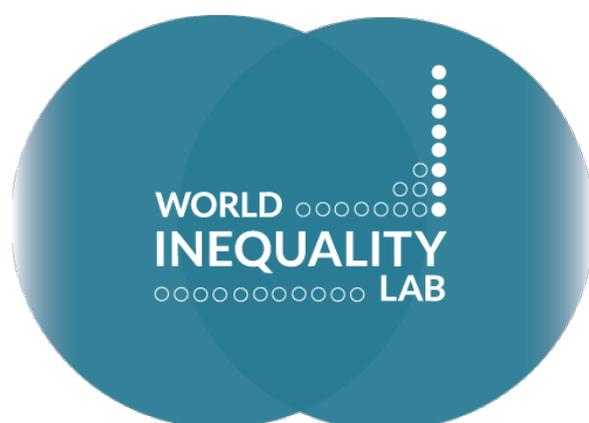
Thomas Blanchet

Lucas Chancel

Amory Gethin

This version: 9 November 2021

First draft: September 2020



**WID.WORLD**  
THE SOURCE FOR  
GLOBAL INEQUALITY DATA

World Inequality Lab

# WHY IS EUROPE MORE EQUAL THAN THE UNITED STATES? \*

THOMAS BLANCHET

LUCAS CHANCEL

AMORY GETHIN

## Abstract

This article combines all available survey, income tax, and national accounts data to produce pretax and posttax income inequality series in twenty-six European countries from 1980 to 2017. Our estimates are consistent with macroeconomic growth rates and comparable with US distributional national accounts. Inequality grew in nearly all European countries, but much less than in the US. This rise was concentrated at the top end of the income distribution and was most pronounced in Eastern Europe. Contrary to a widespread

\*Thomas Blanchet, Paris School of Economics – EHESS, World Inequality Lab: [thomas.blanchet@wid.world](mailto:thomas.blanchet@wid.world); Lucas Chancel, World Inequality Lab, Paris School of Economics and IDDRI, SciencesPo: [lucas.chancel@psemail.eu](mailto:lucas.chancel@psemail.eu); Amory Gethin, World Inequality Lab – Paris School of Economics: [amory.gethin@psemail.eu](mailto:amory.gethin@psemail.eu). This is a revised and extended version of the work by the same authors that previously circulated under the title “How Unequal is Europe? Evidence from Distributional National Accounts, 1980-2017.” We thank Daron Acemoglu, Facundo Alvaredo, Andrea Brandolini, Bertrand Garbinti, Jonathan Goupille-Lebret, Antoine Bozio, Stefano Filauo, Ignacio Flores, Branko Milanovic, Thomas Piketty, Dani Rodrik, Emmanuel Saez, Wiemer Salverda, Daniel Waldenström, and Gabriel Zucman for helpful comments on this paper. We are also grateful to Alari Paulus for his help in collecting Estonian tax data. Matéo Moisan provided useful research assistance. We acknowledge financial support from the Ford Foundation, the Sloan Foundation, the United Nations Development Programme, the European Research Council (ERC Grant 856455), and the Agence Nationale de la Recherche (EUR Grant ANR-17-EURE-0001).

view, we demonstrate that Europe’s lower inequality levels cannot be explained by more equalizing tax-and-transfer systems. After accounting for indirect taxes and in-kind transfers, the US redistributes a greater share of national income to low-income groups than any European country. “Predistribution”, not “redistribution”, explains why Europe is less unequal than the United States.

JEL codes: H23, H24, H51, H52, H53, E01.

## I. INTRODUCTION

The evolution of inequality in Europe and the United States has attracted considerable attention in recent academic and policy debates, yet basic questions about the distribution of growth in the two regions remain unanswered. How did Europe and the US compare in terms of their distributional outcomes? What have been the respective roles of pretax income inequality and redistribution in explaining differences between the two regions? The comparative study of the distribution of growth, taxes, and transfers can provide critical insights into such debates. However, because of a lack of conceptual and empirical consistency, existing estimates of the income distribution have been hard to interpret and compare across countries. These shortcomings have led to a series of misunderstandings on the drivers of inequality in rich nations.

The standard source to compare economic growth across countries is the national accounts, while the standard source to measure inequality and redistribution is household surveys. Surveys are known to underrepresent top incomes and do not add up to macroeconomic income totals, leading to potential inconsistencies in the study of growth, inequality, and redistribution. In order to address some of these limitations, [Piketty, Saez, and Zucman \(2018\)](#) and [Alvaredo et al. \(2020\)](#) developed Distributional National Accounts (DINA) that combine various sources to distribute the entirety of a country’s net national income, and established guidelines to carry out this work.

This new methodology has attracted significant interest, but unfortunately, with the exception of the United States ([Piketty, Saez, and Zucman, 2018](#)) and France ([Bozio et al., 2018](#); [Garbinti, Goupille-Lebret, and Piketty, 2018](#)), similar work

in comparable countries remains rare.<sup>1</sup> In Europe, the absence of estimates of the income distribution that integrate survey, tax, and national accounts data are not the result of a lack of data *per se*. In fact, there is a fair amount of data available, at least since the 1980s. The problem is that these data are scattered across a variety of sources, taking several forms and using different concepts and methodologies. As a result, researchers and policymakers find themselves with a disparate set of indicators that are not always comparable, are hard to aggregate, provide uneven coverage, and can tell conflicting stories.

This article addresses these substantive and methodological issues by constructing distributional national accounts for twenty-six European countries from 1980 to 2017. To our knowledge, this is the first attempt at doing so. Our estimates combine virtually all existing data sources on the income distribution of European countries in a consistent way. These include household surveys, tax data, and national accounts, but also additional databases on social insurance benefits and contributions, and government spending on health that have been compiled by several institutions over the years (OECD, Eurostat, WHO). Our methodology exploits the strengths of each data source to correct for the weaknesses of others, making all assumptions explicit and as transparent as possible. It avoids the kinds of systematic errors and implausible assumptions that arise from the comparison of different income concepts, statistical units, or methodologies. Crucially, our series are fully comparable with recently produced US distributional national accounts, allowing us to compare the dynamics of inequality and redistribution in the two regions in great detail.

Two key findings emerge from the analysis of our new database.

First, we show that, over the past four decades, inequality has increased in nearly all European countries as well as in Europe as a whole, both before and after

<sup>1</sup>Statistical institutes, international organizations, and researchers have increasingly recognized the need to bridge the micro-macro gap in inequality studies. Since 2011, an expert group on the Distribution of National Accounts mandated by the OECD has been working on methods to allocate gross disposable household income to income quintiles (Fesseau and Mattonetti, 2013; Zwijnenburg, Bournot, and Giovannelli, 2019). In a similar fashion, experimental statistics on the distribution of personal income and wealth have been recently published by Eurostat (2018), Statistics Netherlands (2014), Statistics Canada (2019) and the Australian Bureau of Statistics (2019). These exercises have improved upon traditional survey-based estimates, but do not make systematic use of tax data and are restricted to the household sector.

taxes, but much less than in the United States. Between 1980 and 2017, the share of pretax income that accrued to the richest 1% Europeans rose from 8% to 11% before taxes and transfers and from 7% to 9% after taxes and transfers. In the US, the top 1% pretax income share rose from 11% to 21% over the same period, and the top 1% posttax income share from 9% to 16%. We also find that European inequality increased between 1980 and 1990, but less so afterwards, while the rise was sustained in the US. In Europe as a whole, inequality levels are mostly explained by within-country inequality, rather than by average income differences between Western, Northern, and Eastern European countries.<sup>2</sup> Between-country average income differentials are also found to explain close to none of the inequality trends observed in Europe in the past four decades. Still, regional dynamics vary: Eastern Europe has experienced the highest inequality increase, while the trend has been more muted in Western Europe. Northern Europe also experienced a significant increase in inequality but remains the most equal region, both before and after redistribution.

Second, the main reason for Europe's relative resistance to the rise of inequality has little to do with the direct impact of taxes and transfers. While Western and Northern European countries redistribute a larger fraction of output than the US (about 47% of national income is taxed and redistributed in Europe versus 35% in the US), the distribution of taxes and transfers does not explain the large gap between Europe and US posttax inequality levels. Quite the contrary: after accounting for all taxes and transfers, the US appears to redistribute a greater fraction of its national income to the poorest 50% than any European country. This finding stands in sharp contrast with the widespread view that "redistribution", not "predistribution", explains why Europe is less unequal than the US (e.g., [OECD, 2008; 2011](#)). In other words, Europe has been much more successful than the US at ensuring that its low-income groups benefit from relatively good-paying jobs. We show that the differences between our conclusions and those of the OECD are driven by several factors, including the greater underrepresentation of top incomes in US surveys, the fact that we account for indirect taxes and in-kind transfers, which are more

<sup>2</sup>In 2017, more than 80% of European inequality is due to within-country differences according to a Theil index decomposition. See [Figure IV](#).

progressive in the US than in Europe overall, and the inclusion of pensions in the definition of pretax income.

This paper contributes to the existing literature on the evolution of income inequality in Europe and the US in three ways.

First, we provide novel estimates on the distribution of growth in Europe as a whole and within European countries. While it has generally been acknowledged that income inequality has grown in Europe since the 1980s (OECD, 2008), little is known of how this rise compares across countries, across income groups in the distribution, or across time periods. The efforts made by the Luxembourg Income Study (LIS) to harmonize existing surveys, for instance, have been extremely helpful to improve the comparability of pre-2000 inequality statistics in Europe. Yet, because of sampling issues and misreporting at the top of the income distribution, surveys can picture evolutions that are inconsistent with those suggested by tax data. In this paper, we combine for the first time all these sources in a meaningful way, using new techniques and a consistent methodology. We show that correcting for the weaknesses of existing estimates does lead to substantively different conclusions on the level and evolution of inequality in Europe, the distributive impact of taxes and transfers, and how inequality and redistribution compare across European countries.

Second, we compare how growth has been distributed before and after taxes in Europe and the United States since 1980. While most studies suggest that posttax income inequality is greater in the US than in European countries today, it remains unclear whether this gap is due to differences in pretax income inequality or to differences in government redistribution. International organizations such as the OECD (OECD, 2008; 2011), in line with other research (e.g., Jesuit and Mahler, 2010; Immervoll and Richardson, 2011), find that the lower posttax income inequality levels of European countries are mostly due to redistribution. This contrasts with Bozio et al. (2018), who use the DINA methodology, distribute all taxes and transfers and find that redistribution reduces inequality less in France than in the US.<sup>3</sup> Whether the US is more unequal than Europe as a whole (i.e., as a region)

<sup>3</sup>See also Guillaud, Olckers, and Zemmour (2019), who find results similar to Bozio et al. (2018) without using the DINA framework.

also remains an open question.<sup>4</sup> Thanks to our new dataset, we are able to provide new insights into these questions, decomposing precisely the contributions of spatial integration, pretax income inequality, and redistribution in explaining differences between Europe and the US and their evolution over time.

Third, we contribute to the distributional national accounts literature by enriching its methodology. [Piketty, Saez, and Zucman \(2018\)](#) and [Garbinti, Goupille-Lebret, and Piketty \(2018\)](#) start with tax data, to which they progressively add information from surveys and national accounts. This “top-down” approach exploits all the richness of tax microdata and yields very detailed and precise estimates. However, while this type of work should be extended to as many European countries as possible, there are many countries and time periods for which tax microdata are simply not available. This justifies our “bottom-up” approach, which starts from surveys and gradually incorporates information from top incomes shares, estimated from income tax tabulations, and unreported national income components. As such, we view our methodology as well-suited to estimating the distribution of national income in countries gathering a mix of survey microdata, tabulated tax returns, and a variety of other heterogeneous data sources. This case corresponds to the majority of countries beyond Europe and the US.<sup>5</sup>

The rest of this paper is organized as follows. Section [II](#) presents our conceptual framework, data sources, and methodology. Section [III](#) summarizes our findings on the distribution of pretax incomes in Europe. Section [IV](#) discusses the impact of taxes and transfers on inequality in Europe and the US. Section [V](#) concludes.

## II. DATA SOURCES AND METHODOLOGY

This section introduces the data sources and methodology used to estimate the distribution of national incomes in Europe. Section [II.A](#) outlines our conceptual

<sup>4</sup>Works on the distribution of income in the EU-15 ([Atkinson, 1996](#)) or the Eurozone ([Beblo and Knaus, 2001](#)) suggested that income inequality was higher in the US, but recent studies extending the analysis to new, poorer Eastern European member states have found mixed results (e.g. [Brandolini, 2006](#); [Dauderstädt and Kelttek, 2011](#); [Salverda, 2017](#); [Filauro and Parolin, 2018](#)).

<sup>5</sup>In a similar fashion, [Piketty, Saez, and Zucman \(2019\)](#) have recently proposed a simplified method for recovering estimates of top pretax national income shares based on the fiscal income shares of [Piketty and Saez \(2003\)](#) and very basic assumptions on the distribution of untaxed labor and capital income components. Our methodology follows the same spirit.

framework and the assumptions used to distribute the components of net national income. Section [II.B](#) presents the data sources used. Section [II.C](#) explains how we harmonize and combine these data sources to derive estimates of factor income, pretax income, and posttax income inequality.

### *II.A. Conceptual Framework*

**Universe** We study the distribution of national income in twenty-six European countries from 1980 to 2017. The choice of countries considered in this paper has been dictated by the availability of comparable, high-quality data sources allowing us to estimate pretax and posttax inequality statistics with a sufficient degree of certainty.<sup>6</sup> Our geographical area of interest includes all fifteen members of the European Union before its 2004 extension (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom), seven Central and Eastern European countries that joined the EU in 2004 or in the years that followed (Croatia, the Czech Republic, Estonia, Hungary, Poland, Romania, and Slovenia), and four countries that are not part of the EU but have maintained tight relationships with it (Iceland, Norway, Serbia, and Switzerland).

**Methodological Framework** We follow the principles of the DINA guidelines ([Alvaredo et al., 2020](#)), which provide a set of methods to distribute the totality of net national income—GDP minus capital depreciation plus net foreign income—in a way that is consistent with the concepts defined in the System of National Accounts ([United Nations Statistics Commission, 2008](#)). The DINA framework acknowledges three levels of distribution: factor national income, pretax national income, and posttax national income. We report in [table I](#) how these concepts are derived, which data sources are used to allocate their various components, the

<sup>6</sup>More precisely, we exclude from our sample all European countries for which no tax data was available to correct incomes at the top end of the distribution: Albania, Bosnia and Herzegovina, Bulgaria, Cyprus, Kosovo, Lithuania, Latvia, Malta, Moldova, Montenegro, North Macedonia, and Slovakia. However, we still provide results for each of these countries in appendix section 4, estimated with and without an imputed top income correction profile. Including or excluding these countries from the analysis barely affects our estimates of European income inequality (see appendix figures A.2.1.14 and A.2.1.15).

distributional assumptions made in this paper to do so, and the share of national income they represent.

**Factor Income** Factor national income corresponds to all income flows that accrue to individuals before any form of government redistribution.<sup>7</sup> It is equal to the sum of the primary incomes of the different sectors of the economy: households, corporations, and the government.

The primary income of households (79% of national income on average across European countries) can be decomposed into four main components: compensation of employees, mixed income, net property income, and the net imputed rents of owner-occupiers. The distribution of these income flows is generally observed in survey and tax data, although data on imputed rents are not systematically collected and are usually not included in inequality measures published by statistical institutes or international organizations.

The primary income of corporations (8%) corresponds to the income that companies retain after having paid suppliers, employees, shareholders, and corporate taxes, and that we also refer to as “retained earnings” or “undistributed profits”. Following other DINA studies, we consider that the undistributed profits of privately owned corporations belong to the owners of these corporations. We separate the share of retained earnings that accrues to shareholder households, to the government, and to pension funds, proportionally to the total amount of equity they own. We distribute the retained earnings of shareholder households proportionally to their equity ownership. We distribute the retained earnings that accrue to pension funds proportionally to wage and pension income. And we distribute the government’s

<sup>7</sup>We refer in this paper to “redistribution” as the operation of the tax-and-transfer system, measured by the difference between pretax and posttax income inequality. By contrast, “predistribution” refers to all forms of government interventions (such as labor market regulations, minimum wages, educational investments, etc.) that drive pretax inequality levels (see section IV as well as [Hacker and Pierson \(2010\)](#) for a discussion of these concepts).

share like the primary income of the government.<sup>8,9</sup>

The primary income of the general government (12%) is the sum of taxes less subsidies on production and imports and of net property income. In our benchmark series, we distribute it proportionally to pretax income, in line with DINA recommendations (Alvaredo et al., 2020).<sup>10</sup>

**Pretax Income** Pretax income corresponds to income after the operation of social insurance systems, but before other types of redistribution. It is equal to factor income, plus pension benefits (17% of national income on average) and unemployment and disability benefits (1.7%), minus the social contributions that pay for them. Contributions and transfers are generally observed in survey data and can therefore be directly removed from or added to individual factor incomes.

Notice that for pretax income to sum up to national income, it is important to remove the same amount of social contributions as the amount of social benefits that we distribute. In most countries, social contributions exceed pension and unemployment benefits, because contributions also pay for health or family-related benefits that we classify as non-insurance-based redistribution. In these cases, we only deduct a fraction of social contributions from pretax income (their “contributory” part). On the contrary, in a few countries such as Denmark, social contributions are virtually non-existent. In these cases, we assume that social insurance is financed by the income tax by deducting a fraction of the income tax from factor income to get to pretax income.

<sup>8</sup>This can be justified by the fact that retained earnings correspond to profits that are kept within the company rather than distributed to shareholders as dividends. This income ultimately increases the wealth of shareholders and therefore represents a source of income to them. Several papers have documented the impact of including retained earnings in the United States (Piketty, Saez, and Zucman, 2018), Canada (Wolfson, Veall, and Brooks, 2016), and Chile (Atria et al., 2018; Fairfield and Jorratt De Luis, 2016). In Norway, Alstadsæter et al. (2017) showed that the choice to keep profits within a company or to distribute them is highly dependent on tax incentives, and therefore that failing to include them in estimates of inequality makes top income shares and their composition artificially volatile.

<sup>9</sup>This approach assumes that the wealthiest shareholders do not own stock in companies that systematically have higher retained earnings than the rest.

<sup>10</sup>We provide variants in which taxes on products are distributed proportionally to consumption in the appendix (see appendix figure A.2.1.16).

**Posttax Income** Posttax income accounts for other forms of redistribution operated by the government. We consider two types of posttax income concepts. Posttax disposable income removes all taxes from pretax income but only adds back cash transfers and therefore does not sum up to national income. Posttax national income also adds back collective government expenditure and therefore adds up to national income.

To move from pretax to posttax income, we first remove all taxes and social contributions that remain to be paid by individuals. These include non-contributory social contributions (1% of national income) and direct taxes on income and wealth (11%), which are directly observed in survey and tax data. They also include indirect taxes (14%) and corporate income taxes (3%), which are not directly observed. We assume that indirect taxes are paid by consumers and distribute them proportionally to household final consumption expenditure. Corporate income taxes are paid out of corporate profits, so we distribute them similarly to undistributed profits.

We then allocate all types of government transfers to individuals. Social assistance transfers (5% of national income) are observed in survey data, so they can be added directly to individual incomes. We distribute other public spending proportionally to posttax disposable income (17% of national income), with the exception of public health expenditure (8%), which we distribute in a lump-sum way, considering that the insurance value provided by health systems is similar for everyone. While this remains a simplification, the existing literature suggests that it does represent a good first-order approximation of who benefits from the public healthcare system.<sup>11</sup> We use the proportionality assumption for non-health in-kind transfers as a benchmark for simplicity, transparency, and comparability with US distributional national accounts (Piketty, Saez, and Zucman, 2018), but we discuss at greater length the robustness of our findings to this assumption in section IV. In particular, we consider an alternative scenario in which all collective expenditure is distributed on a lump-sum basis and find that it does not alter our main conclusions.<sup>12</sup>

<sup>11</sup>See in particular Germain et al. (2020), who combine household surveys and administrative data with a simulation model of health payments to distribute health expenditure in France.

<sup>12</sup>This assumption affects the levels of posttax inequality but is unlikely to affect the trends, as government final expenditures have remained fairly stable in Europe with no major changes in their decomposition by functions: see figure A.2.1.2 in appendix.

We distribute the budget balance of the government (the discrepancy between what it collects in taxes and what it pays in transfers, representing -0.7% of national income on average) proportionally to posttax disposable income.

**Unit of Analysis** In our benchmark series, the statistical unit is the adult individual (defined as being 20 or older) and income is split equally among spouses.<sup>13</sup>

## *II.B. Data sources*

**National Accounts** For total net national income, we use series compiled by the World Inequality Database based on data from national statistical institutes, macroeconomic tables from the United Nations System of National Accounts, and other historical sources (see [Blanchet and Chancel, 2016](#)). For the various components of national income, we collect national accounts data from Eurostat, the OECD, and the UN. Additional data comes from the OECD health and social expenditures databases. We provide a detailed view of the coverage that these data provide in the appendix.

**Survey Microdata** We collect and harmonize household survey microdata from several international and country-specific datasets. Our most important source of survey data is the European Union Statistics on Income and Living Conditions (EU-SILC), which has been conducted on a yearly basis since 2004 in thirty-two countries. We complement EU-SILC by its predecessor, the European Community Household Panel (ECHP), which covers the 1994-2001 period for thirteen countries in Western Europe. Our second most important source of survey data is the Luxembourg Income Study (LIS), which provides access to harmonized survey microdata covering twenty-six countries since the 1970s. Most Western European countries are covered from 1985 until today, and several countries from Eastern Europe have been surveyed since the 1990s.

<sup>13</sup>We also compute additional series in which income is split between all adult household members, not just members of a couple (i.e., a “broad” rather than a “narrow” equal-split)—see appendix figure A.2.1.17.

**Survey Tabulations** We complement survey microdata sources with a number of tabulations available from the World Bank’s PovcalNet portal, the World Income Inequality Database (WIID), and other sources. PovcalNet provides pre-calculated survey distributions by percentile of posttax income or consumption per capita. The WIID gathers inequality estimates obtained from various studies, and gives information on the share of income received by each decile or quintile of the population. Finally, we collect historical survey data on posttax income inequality in former communist Eastern European countries provided by [Milanovic \(1998\)](#). In all cases, we use generalized Pareto interpolation ([Blanchet, Fournier, and Piketty, 2017](#)) to recover complete distributions from the tabulations.

**Tax Data** To better capture the evolution of incomes at the top end of the distribution, we rely on known top income shares estimated from administrative data and compiled in the World Inequality Database. In general, tax data is only reliable for the top of the distribution, and this is why these series do not cover anything below the top 10%. At the time of writing, data series were available for nineteen European countries. We complete this database by gathering and harmonizing a new collection of tabulated tax returns covering Austria (1980–2015), East Germany (1970–1988), Estonia (2002–2017), Iceland (1990–2016), Italy (2009–2016), Luxembourg (2010, 2012), Portugal (2005–2016), Romania (2013), and Serbia (2017). We use these tabulations to add new top income shares to our database (see appendix section 1.7).

### *II.C. Methodology*

We now explain how we combine these various data sources to estimate the distributions of factor income, pretax income, and posttax income in Europe. First, we derive measures of household income inequality from survey microdata. Second, we train a machine learning algorithm to correct conceptual inconsistencies in survey tabulations. Third, we combine survey data with tax data to correct incomes at the top end of the distribution. Fourth, we combine external data sources with national accounts aggregates to distribute unreported national income components. We summarize the different steps of this methodology in table [II](#). Similar tables for each of the countries covered in this paper are available in the appendix.

**1) Direct Measurement of Income Concepts in Survey Microdata** When we have access to survey microdata (from EU-SILC or LIS), we can in most cases estimate income concepts that are close to our concepts of interest. As a result, we have survey data on both pretax and posttax income inequality for almost all countries since 2007, and for a longer period of time for a number of countries.

A significant exception concerns employee and employer social contributions in EU-SILC, which are not always reported separately from income and wealth taxes. We use the social contribution schedules published in the OECD Tax Database to impute social contributions separately. This only has a marginal effect on estimates of pretax income inequality.

**2) Harmonization of Survey Tabulations** Contrary to microdata, tabulations only provide distributions covering specific income concepts and equivalence scales. For these data sources, as well as for survey microdata for which information on taxes and transfers is incomplete, we have to develop a strategy to transform the distribution of the observed “source concept” (e.g., posttax income among households) into an imputed distribution measured in a “target concept” (pretax or posttax income per adult).

To tackle this prediction problem, we choose to rely on XGBoost ([Chen and Guestrin, 2016](#)), a state-of-the-art implementation of a standard, high-performing machine learning algorithm called boosted regression trees. The key idea behind our harmonization procedure is that while the income or consumption concepts we observe are different, they are also related. Using all the cases in which the income distribution is simultaneously observed for two different concepts, we can thus map the way they tend to relate to one another, and convert any source concept to our concept of interest. We provide a detailed overview of the method and results of this imputation procedure in appendix section 1.3. In particular, we show that this approach performs better than more naive ones, such as assuming a single correction coefficient by percentile.<sup>14</sup> Overall, this harmonization only has a small impact on

<sup>14</sup>While this approach is certainly not perfect, the existing literature has often chosen to ignore these issues altogether, and directly compare and combine, say, income and consumption data (e.g. [Lakner and Milanovic, 2016](#)). We feel that our approach is preferable, because it corrects at least for what can be corrected.

our results, given that we observe both pretax and posttax income in the majority of cases and that corrections to equivalence scales only have limited impact on estimates of the income distribution.

**3) Combination of Surveys and Tax Data** Survey data are known to often miss the very rich. For our purpose it is important to distinguish two reasons for that: non-sampling error and sampling error.

*Non-Sampling Error.* Non-sampling error refers to the systematic biases that affect survey estimates in a way that is not directly due to sample size. These mostly include people refusing to answer surveys and misreporting their income in ways that are not observed, and therefore not corrected, by survey producers. We correct the survey data for non-sampling error by combining them with top income shares estimated from tax data using standard survey calibration methods. Statistical institutes already routinely apply these methods to ensure survey representativity in terms of age or gender. We directly extend them to enforce representativity in terms of income, by adding top income shares based on tax data as a calibration margin.<sup>15</sup>

*Sampling Error.* Sampling error refers to problems that arise purely out of the limited sample size of survey data. The sample size of surveys varies a lot and can sometimes be quite low: this, in itself, can affect estimates of inequality at the top. Borrowing methods from extreme value theory, we correct sampling error by modeling the top 10% of the income distribution as a generalized Pareto distribution (see appendix section 1.4). Note that by construction, this adjustment has no impact on the top 10% income share (which we know from the tax data), but only refines the income distribution within the top 10%.

Correcting survey-based estimates using top income shares derived from tax data has a large impact on our estimates of the income distribution, because surveys tend

<sup>15</sup>One advantage of calibration procedures, in particular, is that they allow to perform survey correction with a taxable income concept that may differ from the income concept of interest—either in terms of income definition or statistical unit. Accordingly, we always perform the correction by matching income concepts in the tax data and in the survey data. Importantly, this allows us to account for top incomes while retaining the wealth of information included in the surveys, notably on taxes and transfers, so that we can still calculate both pretax and posttax incomes after correction. For the historical period (typically before 2007), for which we do not have survey microdata to match precisely to the tax data concepts, we reinterpolate the adjustment observed in recent years to the tax-based top share series (see appendix section 1.4.3).

to significantly underestimate both the level of top income inequality and its rise since the 1980s in most European countries.

**4) Distribution of Unreported National Income Components** Once we have harmonized and corrected survey data with tax data, we find ourselves with more accurate and comparable inequality series. However, these series still lack some components of national income from the household sector (imputed rents), the corporate sector (undistributed profits), and the government sector (taxes on products and government spending) (see table I).

*Imputed Rents.* Imputed rents are not always recorded in household surveys, and they are not included in the income concepts used in survey tabulations. To distribute them, we rely on EU-SILC surveys, which do record imputed rents, and perform a simple statistical matching procedure, using income as a continuous variable, to add imputed rents to the rest of our series (see appendix section 1.5). The method preserves the rank dependency between income and imputed rents in EU-SILC, the distribution of imputed rents in EU-SILC, the distribution of income in the original data, and the imputed rents total in the national accounts.

*Undistributed Profits.* As we explain in section II.A, undistributed profits are distributed partially in proportion to the ownership of corporate stocks (including both private and public shares held directly or indirectly through mutual funds), partially in proportion to labor and pension income (for the fraction that accrues to pension funds), and partially like government primary income (for the fraction that accrues to the government). These respective shares correspond the fraction of corporate equity owned by households, governments and pension funds. The distribution of stock ownership comes from the Household Finance and Consumption Survey (HFCS).<sup>16</sup> We first calibrate that survey on the top income shares as we do for other surveys to make it representative in terms of income. We then use the same statistical matching procedure as above to allocate undistributed profits alongside the distribution of income.<sup>17</sup>

<sup>16</sup>In the United Kingdom we use its equivalent, the Wealth and Assets Survey (WAS).

<sup>17</sup>The HFCS only started around 2013, so before that year we keep the distribution of retained earnings constant and only change the amount of retained earnings to be distributed.

*Corporate Income Taxes.* Because the corporate income tax is paid out of corporate profits, we distribute it similarly to undistributed profits.

*Indirect Taxes.* Indirect taxes (including VAT and excise taxes) are eventually paid by consumers, so we allocate them proportionally to household final consumption expenditure. For that, we rely on the Household Budget Surveys (HBS) from Eurostat to get the distribution of consumption and its dependency to income. We then use the same statistical matching procedure as above to allocate indirect taxes to individuals.

#### *II.D. Validation of our Methodology*

**Impact of the Different Methodological Steps** Our estimates differ from existing survey-based estimates for two main reasons: because we use tax data at the top of the distribution, and because we incorporate forms of income that are traditionally absent from inequality statistics. How do these elements impact our results? Figure [1a](#) gives the answer.<sup>18</sup> Based only on survey data, which do not add up to national income, we would conclude that inequality has been slightly declining in Europe after a one-time increase in the early 1990s: the top 10% income share has been stable after 1995, while the bottom 50% share has been slightly but consistently on the rise. When using tax data to correct the top of the distribution, we get a fairly different picture: the increase in the top 10% share has been much more significant, while the share of the bottom 50% has been stable. Adding missing national income components further modifies the distribution of income. Some components (such as undistributed profits) have a strong unequalizing impact, while others (such as imputed rents) have more equalizing effects. Overall, we distribute between one fifth and one quarter of national income in the form of additional income components. This leads to our DINA series, which show a slightly higher top 10% income share in recent years than survey and tax data alone. Most of the difference with raw survey

<sup>18</sup>See the extended appendix for the impact of our different methodological steps country by country.

estimates, however, comes from tax data.<sup>19</sup>

**Comparison with Earlier Works** Existing studies comparing inequality levels between the US and Europe have typically relied on surveys.<sup>20</sup> This implies making strong assumptions on the distribution of missing incomes in one region or the other, typically considering that these sources of income are distributionally neutral. While our method is not perfect, it has the advantage of making these assumptions explicit and ground them in the latest empirical evidence.

In particular, we wish to provide results that are conceptually similar to other works on distributional national accounts, yet in practice our methodology is quite different. In France, [Garbinti, Goupille-Lebret, and Piketty \(2018\)](#) and [Bozio et al. \(2018\)](#) estimated the distribution of pretax national income and posttax disposable income using detailed tax microdata, combined with various surveys and microsimulation models for taxes and benefits, and rescaling income component by component to the national accounts. By contrast, we only use tax tabulations to correct survey data, and rescale our results to the national accounts at a coarser level. The advantage of our method is that it is applicable much more widely and rapidly, in particular in countries in which no tax microdata is available.

To what extent can our approach yield results that are comparable to more complex and detailed works? As figure [Ib](#) shows, we get results that are very similar to these earlier works in the case of France. Concretely, our methodological approach starts from the raw survey series shown on the bottom line, which suggest that the top 10% share has fluctuated between 22% and 26%. In a second step, we calibrate these distributions to the top income shares measured from tax data. In a third step,

<sup>19</sup>Moving from survey to DINA estimates does not only increase estimates of income concentration: it also significantly affects the ranking of European countries in terms of pretax income inequality and in terms of the intensity of the rise of top income concentration since the 1980s. See in particular appendix figures [A.2.1.10](#), [A.2.1.11](#), [A.2.1.12](#), and [A.2.1.13](#). In 2017, for instance, accounting for misreporting of top incomes in surveys and unreported national income components increases the estimated top 1% share by 10 percentage points in Poland, compared to only half a percentage point in the Netherlands. As a result of this correction, Poland moves from being one of the least unequal countries of Europe to the most unequal in terms of pretax income. More generally, surveys tend to better capture top incomes in Northern European countries, where survey responses are often corrected *ex post* using administrative data, than in Eastern Europe.

<sup>20</sup>See footnote 4.

we impute additional sources of income, such as retained earnings and imputed rents. This yields the DINA top 10% pretax income share, which closely follows the series estimated by [Garbinti, Goupille-Lebret, and Piketty \(2018\)](#). Finally, we impute all taxes and cash transfers to derive the top 10% posttax disposable income share, which is also remarkably similar to that obtained by [Bozio et al. \(2018\)](#).<sup>21</sup>

Notice in particular that we obtain these results in spite of the fact that our data sources for France are not of especially high quality and are also very different from the ones used by [Garbinti, Goupille-Lebret, and Piketty \(2018\)](#) and [Bozio et al. \(2018\)](#).<sup>22</sup> All these results provide strong evidence that our methodology performs very well at reproducing more detailed DINA studies, despite the differences between our “bottom-up” approach combining survey microdata with tabulated tax data and “top-down” approaches that rely primarily on tax microdata.

### III. THE DISTRIBUTION OF PRETAX NATIONAL INCOMES IN EUROPE AND THE UNITED STATES, 1980-2017

In this section, we show that pretax income inequality has risen much less in Europe than in the US since 1980. This is true for most European countries taken separately but also for Europe taken as a whole—a block that is broadly similar in terms of population size and aggregate economic output as the US. Section [III.A](#) presents results on the distribution of pretax income in Europe and the United States in 2017. Section [III.B](#) discusses the evolution of pretax income inequality in the two regions since 1980. Section [III.C](#) analyzes the role of spatial integration in accounting for the dynamics of inequality in Europe and the US.

<sup>21</sup>See appendix figure A.2.1.9 for similar results on the bottom 50% of the distribution.

<sup>22</sup>The SILC statistics for France are a transcription of a survey (called SRCV) that is used for its extensive set of questions on material poverty, but is not considered the best survey for income inequality. For that purpose, the French statistical institute relies on another survey, called ERFS. However, that survey is not part of any international scheme, such as EU-SILC, nor is it available through portals such as the Luxembourg Income Study, so we do not include it in our estimations. Before SILC is available, we rely on France’s Household Budget Survey, which has been made available through LIS. While France’s HBS is a key source for consumption data, it is not viewed as the best source for income data either. It is also separate from EU-SILC data, which explains the inconsistent trend. Therefore, there is no reason to think that our methodology would work better for France than other countries just because of the quality of the data in input.

### *III.A. The Distribution of Pretax Income in 2017*

How do pretax incomes vary in Europe and the United States today? Table III provides a first answer to this question by displaying the average incomes and income shares of key income groups in Western Europe, Northern Europe, Eastern Europe, and the US in 2017. The average national income per adult stood at €52,700 in the US at purchasing power parity, compared to €44,900 in Northern Europe, €35,300 in Western Europe, and €21,700 in Eastern Europe. In Europe, only Norway (€55,000) and Luxembourg (€102,000) have higher average national incomes than the US.<sup>23</sup>

Things look very different at the bottom of the pretax income distribution. The bottom 50% earned only about €12,300 in the US in 2017, compared to €21,600 in Northern Europe and €14,600 in Western Europe. Of the twenty-seven countries considered in this paper, the US thus ranks third in terms of average national income per adult but nineteenth when it comes to the average income of the poorest 50%.<sup>24</sup> On average, pretax income inequality at the bottom is lowest in Northern Europe (with a bottom 50% share of 24%), followed by Western Europe (21%) and Eastern Europe (20%). With a bottom 50% pretax income share of only 11.7%, the US is by far the most unequal of all countries, followed by a distant Serbia (16%) and very far from the values observed in the Czech Republic, Iceland, Norway, and Sweden (all above 25%).<sup>25</sup> These differences appeared even more pronounced at the very bottom of the distribution: the average income of the poorest 20% was €11,600 in Northern Europe in 2017, more than three times larger than its counterpart in the United States (€3,800).

The same differences are visible at the top end of the distribution: the top 1% captured 21% of total pretax income in the US in 2017, compared to 12% in Eastern Europe, 11% in Western Europe, and less than 9% in Northern Europe. In 2017, the top 0.001% average pretax income exceeded €92 million in the US, nearly ten times the value observed in Northern Europe. The European countries with lowest top 1% income shares are the Netherlands, Slovenia, Iceland, Belgium, and Finland

<sup>23</sup>See appendix table 1.9.

<sup>24</sup>See appendix figure A.2.2.26.

<sup>25</sup>See appendix figure A.2.2.19.

(less than 9%), while those with highest top income concentration are Germany, the United Kingdom, Greece, and Poland (13-15%).<sup>26</sup>

In summary, while the US stands out as being richer than most European countries today, differences in average national incomes mask substantial heterogeneity. With inequality levels surpassing by far those observed in any European country, the US displays bottom pretax average incomes that barely exceed those observed in poorer Eastern European countries. In contrast, the lower inequality levels and higher average incomes observed in Northern Europe imply significantly better standards of living for the majority of the population than in the United States.

### *III.B. The Distribution of Pretax Income Growth*

We now turn to documenting the evolution of pretax income inequality in Europe and the US. Figure IIa shows the evolution of the top 10% pretax income share in the US, Eastern Europe, Western Europe, and Northern Europe from 1980 to 2017. The United States remained more unequal than most European countries throughout the entire period, but the gap between Europe and the US has widened significantly over time.<sup>27</sup> Indeed, the top 10% rose most rapidly and steadily in the US (from 34% to 48%), followed by Eastern Europe (from 24% to 36%), Western Europe (from 30% to 35%), and Northern Europe (from 26% to 31%). From 1980 to 2017, Eastern Europe shifted from being the least unequal to the most unequal European region. A significant part of this change occurred between 1989 and 1995, following the disintegration of the Soviet Union and the transition of Eastern European countries to market economies.<sup>28</sup>

<sup>26</sup>See appendix figure A.2.2.18.

<sup>27</sup>In 1980, the top 10% share was higher in Spain and Greece than in the US, and several Western European countries had inequality levels close to those observed in the US. This contrasts with the more recent period, when the US clearly stands out as being the most unequal of all countries studied in this paper: see appendix figure A.2.2.17.

<sup>28</sup>Let us stress here that we focus solely on monetary income inequality, which was unusually low in Russia and Eastern Europe under communism. Other forms of inequality prevalent at the time, in terms of access to public services or consumption of other forms of in-kind benefits, may have enabled local elites to enjoy higher standards of living than what their income levels suggest. That being said, the survey tabulations at our disposal do partially account for forms of in-kind income, so this limitation should not be exaggerated (see [Milanovic, 1998](#)). Furthermore, the top 10% income share did continue to rise in many Eastern European countries after 1995.

The rise of top incomes has been a widespread phenomenon, yet there has been significant heterogeneity in the intensity of this rise across countries. Figure [IIIb](#) plots the percentage point change in the top 10% pretax income share by country over the 1980-2017 period.<sup>29</sup> In Europe, inequality rose most strongly in Hungary, Poland, Romania, the Czech Republic, and Estonia, five Central and Eastern European countries that saw their economies shift from communist to capitalist systems during the 1990s. The US ranks third of all the countries considered here, with an increase in the top 10% share of almost 14 percentage points. In Western Europe, Germany is the country where the top 10% share grew the most (+ 9 percentage points), followed by Portugal and Italy (+ 8 pp). Meanwhile, several European countries saw pretax income inequality barely change in the past decades, including Spain, Greece, France, and Austria. In no European country, however, do we observe a significant long-run decline in the top 10% pretax income share.

Table [IV](#) provides a more detailed picture of the rise of pretax income inequality by showing the real average annual income growth of selected income groups in our four regions of interest over the 1980–2017 and 2007–2017 periods.<sup>30</sup> National incomes grew at a modest yearly rate in the past four decades in Europe and the US: 1% in Western Europe, 1.2% in Eastern Europe, 1.4% in the US, and 1.8% in Northern Europe. In all regions, however, growth rates have been markedly higher the further one moves towards the top end of the distribution. The average pretax income of the top 1% thus rose at a rate of 1.9% in Western Europe, 3.2% in Northern Europe, 3.3% in the US, and 3.8% in Eastern Europe. Meanwhile, middle-income groups saw their average pretax incomes grow at a rate closer to the average of the full population in all regions. The bottom 20% benefited the least from real national income growth: their average income increased at a rate of 1.2% in Northern Europe and 0.7% in Western Europe, while it decreased at a rate of 1.3% in Eastern Europe and fell on average by 1.1% every year in the United States.

<sup>29</sup>See appendix figures [A.2.2.21](#) and [A.2.2.22](#) for similar results on top 1% and bottom 50% pretax income shares. Appendix figures [A.2.2.8](#) to [A.2.2.16](#) compare the evolution of pretax income inequality across countries by five-year intervals.

<sup>30</sup>The cumulated income growth rates of selected pretax income groups in Western Europe, Northern Europe, Eastern Europe, and the US are respectively represented in appendix figures [A.2.2.2](#), [A.2.2.3](#), [A.2.2.4](#), and [A.2.2.3](#).

While the long run picture reveals a clear increase in inequality, the period of stagnation that followed the 2007–2008 crisis has been less detrimental to the European middle class than to other income groups. In Western Europe and Northern Europe, average earnings increased or stagnated for middle-income groups, while they decreased significantly at both tails of the distribution. Eastern European countries were less affected by the crisis but experienced a similar evolution: the bottom 20% grew at an annual rate of 1.6% between 2007 and 2017, lower than the regional average of 2.2%. Therefore, while the financial crisis has to some extent halted the rise of top income inequality in Europe, income gaps between the middle and the bottom of the distribution have continued to widen, and low incomes have consistently lagged behind the expansion of the overall economy. The rise of inequality has been much clearer and more pronounced in the United States: between 2007 and 2017, the bottom 20% saw their average pretax income decrease by 2.9% every year, while that of the top 1% expanded at an annual rate of 1%.

### *III.C. The Distribution of Pretax Income in Europe as a Whole and the Role of Between-Country Inequalities*

Our findings show that pretax income differences are lower and have risen less in most European countries than in the US in the past decades. Does this result hold, however, once considering inequality in Europe at large, that is after accounting for the important differences in average national incomes between Western, Northern, and Eastern European countries?

Figure IIIa compares the levels and evolution of the top 1% and bottom 50% pretax income shares in the US, Europe as a whole, and Western and Northern Europe from 1980 to 2017.<sup>31</sup> Income inequality was unambiguously larger in the US than in Europe in 2017, even after accounting for differences in average incomes

<sup>31</sup>We estimate pretax income distributions for Europe as a whole and for Northern and Western Europe by aggregating country-level distributions after converting average national incomes at market exchange rates euros rather than at purchasing power parity. This approach is justified by the fact that PPP conversion factors exist for European countries but not for US states: it would be unclear why one would correct for spatial differences in the cost of living in the former case but not in the latter. Estimating the distribution of European-wide income at purchasing power parity slightly reduces European inequality levels, as well as the share of inequality explained by between-country income disparities, so it does not affect our main conclusions.

between European countries. The share of regional income received by the top percentile was almost twice as high in the United States (21%) as in Western and Northern Europe (11%) and Europe at large (11.5%). Meanwhile, the bottom 50% pretax income share reached 17% in Europe and 20% in Western and Northern Europe, compared to less than 12% in the US. This was not always the case: in 1980, the bottom 50% share was actually slightly higher in the US than in Europe as a whole (about 20% of national income) and only two percentage points lower than in Western and Northern Europe.

A more detailed picture of the distribution of growth in Europe and the US is displayed in Figure IIIb, which plots the average annual income growth rate by percentile in the two regions from 1980 to 2017, with a further decomposition of the top percentile.<sup>32</sup> Average income growth has been slightly higher in the US (1.4% per year) than in Europe (1.1%) in the past four decades, yet this average gap hides substantial differences throughout the distribution. The average pretax income of the top 0.001% grew at a rate of 3.7% in Europe as a whole and as much as 5.4% per year in the US. Meanwhile, low-income groups have benefited significantly more from macroeconomic growth in Europe than in the US: the average income of the bottom 50% grew positively in Europe, while it stagnated in the US and even declined for the bottom 30% of the population. The two growth incidence curves cross at the 67th percentile, that is, while average pretax income growth has been higher in the US than in Europe, it has been lower for the bottom 67% of the US population than for all corresponding European income groups.

To what extent are these differences driven by pretax income inequality between US states and between European countries, rather than within states and within countries? A Theil decomposition of within-group and between-group inequality in Europe and the US is shown in figure IV. The Theil index has risen much more in the US than in the Europe, and this change has been entirely due to increases in inequality within US states. In 1980, the Theil index in the US was almost perfectly equal to that of Europe at large, reaching about 0.45; by 2017, it had become higher than 1 in the US, whereas it did not exceed 0.6 in Europe. The overall Theil index and the Theil index of within-state inequality are almost indistinguishable in the

<sup>32</sup>See appendix figure A.2.2.1 for similar results on each European region.

US: within-state inequality explained 97% of overall US inequality in 1980 and 98% in 2017. The share of inequality explained by the between-group component has remained larger in Europe, but it has decreased from about 24% in 1980 to 17% in 2017, due mainly to the rise of pretax income inequality within European countries. In other words, macroeconomic convergence in Europe has become increasingly insufficient to reduce inequalities between European residents, and within-country inequality continues to matter the most.

#### IV. THE IMPACT OF TAXES AND TRANSFERS ON INEQUALITY

We now turn to discussing the impact of taxes and transfers on inequality in Europe and the United States. Section [IV.A](#) and section [IV.B](#) present results on the distribution of taxes and transfers. Section [IV.C](#) studies the net direct impact of the tax-and-transfer system on pretax income inequality. Section [IV.E](#) investigates to what extent taxes and transfers indirectly contribute to reducing pretax income inequality in Europe and the US.

##### *IV.A. The Structure and Distribution of Taxes*

Before investigating the distributional impact of taxes, it is useful to briefly compare the size and composition of government revenue in Europe and the United States.<sup>33</sup> In 2007–2017, taxes and social contributions amounted to 47% of national income in Europe, compared to 28% in the United States. The United States collected less tax revenue than any European country, from Romania (32%), the country with lowest tax revenue, to Denmark (57%), which displayed the highest tax to national income ratio. The gap between the two regions was driven by two components of revenue: social contributions, which represented 19% of national income in Europe versus 8% in the US, and indirect taxes (14% versus 7%). Meanwhile, both regions collected comparable amounts of revenue from income and wealth taxes (10-11%) and from corporate income taxes (3%). The macroeconomic tax rate was larger in Northern Europe (52%) than in Western Europe (48%) and Eastern Europe

<sup>33</sup>Appendix table A.2.7.2 presents the structure of taxes and transfers in Europe and the United States, expressed as a share of national income, over the 2007-2017 period. Appendix figures A.2.1.4, A.2.1.5, and A.2.1.6 present similar results disaggregated by country.

(41%), due mostly to the larger share of national income collected in income and corporate taxes. If one excludes contributory social contributions from the analysis (that is, contributions financing the pension and unemployment systems), then the gap between Europe and the US decreases but remains significant: 23% of national income was collected in non-contributory taxes in the US in 2007-2017, compared to 30% in Europe.

Figure Va represents the level and composition of non-contributory taxes paid by pretax income group in Eastern Europe, Western and Northern Europe, and the United States in the past decade.<sup>34</sup> Two results clearly stand out. First, while taxes paid are lower in the US than in Europe for most pretax income groups, the taxation profile is unambiguously more progressive in the United States. The top 1% face a tax rate higher than 30% in the US, which is relatively comparable to what we observe in Western and Northern Europe. Meanwhile, bottom income groups are taxed at an average rate that is nearly twice as small in the US as in Europe. Second, the difference in tax progressivity between the two regions is mainly driven by indirect taxes, which represent a significantly larger share of national income in Europe than in the US. These taxes tend to be regressive, because they are paid proportionally to consumption. Eastern Europe is the region with the least progressive tax system, due to the importance of indirect taxes and to the low progressivity of income and wealth taxes. This reflects the fact that many Eastern European countries have opted for flat (or almost flat) income taxes, whereas Western and Northern European countries and the US have a relatively long history of progressive income taxes and have so far maintained increasing marginal income tax rates.

Figure Vb ranks European countries and the United States according to a simple measure of tax progressivity: the ratio of the total tax rate faced by the top 10% to that of the bottom 50%. The composition of bars correspond to the composition of taxes paid by the top 10%. The US stands out as the country with the highest

<sup>34</sup>This way to look at tax incidence is useful for international comparisons focusing on the entire support of the adult distribution (including pensioners and the unemployed), as it allows us to better analyze the distribution of taxes independently from demographic (pensions) or economic (unemployment) factors that might artificially blow up or reduce tax progressivity. A complementary view, focusing on the distribution of all taxes as a share of factor income among the working-age population, is presented at the end of this section.

level of tax progressivity: the top decile faces a tax rate that is more than 70% higher than that of the poorest half of the population. By this measure, the European country with the most progressive tax system is the United Kingdom, followed by Norway, the Czech Republic, and France. Many European countries have values close to 1 on this indicator, corresponding to relatively flat tax systems, in which top income groups face a tax rate approximately equal to that of the bottom 50%. Several countries, in particular Serbia, Croatia, and Romania, are characterized by unambiguously regressive tax systems. As shown in the figure, the US also stands out as one of the countries where the top 10% pay the largest share of their pretax income in the form of income and wealth taxes, which points to the role of the income tax in enhancing tax progressivity at the top end of the distribution.

Looking at non-contributory taxes as a share of pretax income is useful to study tax progressivity independently from the pension and unemployment systems, whose significance may depend on demographic and economic factors that are not directly related to redistribution (such as the size of the elderly population). The downside of this approach is that it misses a share of payments that can legitimately be considered as taxes by individuals. We address this issue by reporting in the online appendix the distribution of total taxes paid as a share of factor income.<sup>35</sup> By doing so and by narrowing down the analysis to the employed and working-age (20–64) population, the analysis remains consistent and cross-country comparisons meaningful. The main conclusions are unchanged. Because social contributions fall on labor income and are generally set at fixed rates, they tend to be flat for most groups within the bottom 90% and regressive at the top. This turns the tax systems of Western and Northern European countries into approximately flat tax systems, while those of most Eastern European countries become strongly regressive at the top end of the distribution. Because social contributions are smaller in the United States than in Europe, the US tax system remains more progressive than that of all European countries (with the exception of the UK).

<sup>35</sup>See in particular appendix figures A.2.3.1 and A.2.3.7, which reproduce the results of figures Va and Vb in terms of factor income.

#### *IV.B. The Structure and Distribution of Transfers*

As for taxes, total government expenditure is significantly lower in the US (35% of national income) than in Europe (47%).<sup>36</sup> The difference between the two regions is due to cash transfers, which represent 9% of national income in the US compared to 23% in Europe. Within cash transfers, pensions are the aggregate that differs the most between the two regions (16% of national income in Europe versus 5% in the US), followed by family and social assistance transfers (5% vs. 3%) and unemployment and disability benefits (1.6% vs. 1.4%). Meanwhile, in-kind transfers in health, education, and other collective government expenditure are very similar in Europe and the US (25-26%, of which about 7% goes to health). Total government expenditure is higher in Northern Europe (51% of national income) and Western Europe (48%) than in Eastern Europe (42%), due mainly to the larger size of social assistance transfers (5% in Western and Northern Europe vs. 3.5% in Eastern Europe) and in-kind transfers (29% vs. 25% vs. 23%, respectively) in Western and Northern Europe.

Figure [VIa](#) presents the distribution of transfers across posttax income groups in Europe and the US, expressed as a share of posttax national income. Unsurprisingly, transfers are progressive in both the US and Europe: they represent over 60% of the posttax incomes of bottom deciles, compared to less than 30% of those of the top 1%. Pensions represent a smaller share of posttax income in the US than in Europe for all posttax income groups, while the distribution of other cash transfers is relatively similar between the two regions. Health payments are the most progressive type of transfers. In Europe, this is directly due to the fact that we distribute health expenditure on a lump-sum basis, assuming as a first approximation that all individuals benefit from the same in-kind transfer (see methodology). Health expenditure is also highly progressive in the United States, where public health spending is significant and targeted towards the very poor (via Medicaid). Other in-kind transfers are neither progressive nor regressive, because we assume that they are distributed proportionally to posttax disposable income (we come back to this assumption in the next section).

<sup>36</sup>See appendix table A.2.7.2.

Figure [VIb](#) provides a complementary picture of the magnitude and progressivity of government expenditure by plotting total transfers received by the bottom 50% in European countries and the United States, expressed as a share of national income. The US ranks third in terms of the smallest share of national income transferred to the bottom 50% (about 13%), due mainly to lower expenditure on pensions. In Europe, transfers received by the poorest half of the population are smallest in Serbia (11%), followed by Romania (12%), Estonia (14%), and Poland (14%). Meanwhile, Denmark, the Czech Republic, Sweden, the Netherlands, Belgium, and Finland stand out as the European countries allocating the greatest share of national income to the poorest half of the population (22-23%, corresponding to slightly less than half of all government revenue in these countries).

#### *IV.C. The Net Impact of Taxes and Transfers on Inequality*

On the one hand, taxes are lower and more progressive in the United States than in Europe. On the other hand, Europe redistributes a significantly greater fraction of national income to low-income groups than the US, although transfers are about as progressive in the two regions. What is the net impact of the tax-and-transfer system on inequality, and is it more progressive in the US or in Europe overall?

Figure [VIIa](#) directly answers this question by representing the share of national income transferred by the tax-and-transfer system between pretax income groups in Eastern Europe, Western and Northern Europe, and the United States in 2017. The bottom 50% and the middle 40% are net beneficiaries of redistribution in all three regions, but the US tax-and-transfer system appears to be unequivocally more progressive. The bottom 50% in the US received a positive net transfer of 6% of national income in 2017, compared to about 4% in Western and Northern Europe and less than 3% in Eastern Europe. Meanwhile, the top 10% saw their average income decrease by 8% of national income in the US after taxes and transfers, compared to about 4% in Western and Northern Europe and 3% in Eastern Europe. The middle 40% benefits slightly more from redistribution in the US (2%) than in Europe (less than 1%).

Figure [VIIb](#) represents the net transfer received by the bottom 50% in all European countries and the United States in 2017. Again, the US stands out as the country

that redistributes the greatest fraction of national income to the bottom 50% (6%), followed by the United Kingdom, Norway, the Netherlands, France, and Belgium (4-5%). In all countries considered in this paper, the bottom 50% end up being net beneficiaries of redistribution. Serbia, Croatia, Spain, Switzerland, Estonia, and Hungary are the European countries that redistribute the lowest share of national income to bottom income groups.

Assumptions made on the allocation of collective consumption expenditure can have a large impact on estimated posttax inequality levels across countries. As discussed in the methodology section, our benchmark series follow [Piketty, Saez, and Zucman \(2018\)](#) and allocate non-health in-kind transfers proportionally to posttax disposable income. However, we also consider alternative series in which we distribute all collective expenditure in a lump-sum way. Our main conclusions are unchanged. Under that scenario, the US is still the country redistributing the largest fraction of national income to the bottom 50% (about 11%), and the ranking of European countries on this measure also remains broadly the same (ranging from 5% to 10%). Our results on the evolution of posttax income inequality in the two regions are also maintained.<sup>37</sup> These are not surprising results, given that collective government expenditure represents approximately the same share of national income in Europe and the US and has remained relatively constant since the 1980s. As an additional robustness check, we make the polar assumption that all government consumption is distributed in a lump-sum way in Europe and proportionally to posttax income in the US. Even under this extreme and highly implausible scenario, we find that redistribution is not dramatically and unambiguously more progressive in Europe than in the US (see appendix figure A.2.5.11).

That being said, we acknowledge that the way we allocate this large component of government spending remains unsatisfactory. Ideally, one would like to distribute one by one specific types of expenditure in education, housing, infrastructure, and other areas of government intervention by combining microdata on individual use

<sup>37</sup>See appendix figure A.2.5.19, which reproduces figure [VIIIb](#) assuming that all collective expenditure is allocated on a lump-sum basis. Appendix figure A.2.5.9 compares the evolution of top 10% and bottom 50% posttax income shares in Europe and the US under these two polar scenarios. Allocating collective expenditure in a lump-sum way reduces inequality significantly in both regions, but does not affect the trends observed.

with macrodata on total spending by program. Unfortunately, while this should be done in the context of more precise country-level studies (for promising attempts, see for instance [Aaberge et al., 2010](#); [Germain et al., 2020](#); [O’Dea and Preston, 2010](#)), the data at our disposal simply does not allow us to do so for all the countries considered in this paper. We leave this for future research. For our purpose, what is important is that allocating collective expenditure in two polar ways (proportionally vs. lump sum) only marginally affects our comparison of the US and European countries, both in terms of trends and levels of inequality and redistribution.

#### *IV.D. Predistribution vs. Redistribution: Revisiting the Europe-US inequality gap*

When comparing inequality in Europe and the United States, landmark publications on inequality such as [OECD \(2008\)](#) and [OECD \(2011\)](#) reached two main conclusions: that income is less concentrated in most European countries than in the United States, and that this gap is substantially larger in terms of posttax income than in terms of pretax income.<sup>38</sup> The policy implications of these findings are relatively clear: if high income inequality countries were to increase redistribution to its level observed in less unequal countries, they would get significantly closer to the inequality levels observed in the latter. Our results challenge this claim. As documented in previous sections, pretax income inequality appears to be considerably higher in the US than in Europe, and accounting for redistribution only marginally affects the US-Europe inequality gap. If anything, taxes and transfers reduce inequality more in the US than in Europe.

Why do our conclusions contradict the standard view on redistribution in Europe and the US? We find that this is the case for three main reasons.

First, OECD estimates rely exclusively on surveys, while we systematically distribute the entire national income by combining surveys with tax data and national accounts. Because household surveys tend to underestimate top income inequality more in the US than in Europe, our estimates lead to a significant upward revision of

<sup>38</sup>In [OECD, 2011](#), redistribution as measured by the difference between market Gini and disposable income Gini is found to be 18% in the US vs. 40% in Sweden and 33% in Norway (p. 270). Similar findings are obtained in more recent OECD publications such as [Causa and Norlem Hermansen \(2017\)](#).

the gap in pretax income inequality between the two regions.

Second, standard estimates of redistribution only allocate direct taxes and transfers to individuals, thereby ignoring corporate taxes, indirect taxes, and in-kind transfers. Distributing these components of government revenue and expenditure reverts the rankings of Europe and the US in terms of redistribution. This is because indirect taxes are much higher in Europe than in the US and fall disproportionately on low-income earners.

Third, our benchmark measure of redistribution compares pretax incomes to posttax incomes, while the standard view tends to compare factor incomes (sometimes referred to as market incomes) to posttax incomes. Because many European countries have a greater share of pensioners than the United States, and because public pension systems are much more developed in Europe than in the US, including pensions in the analysis leads to increasing estimates of redistribution more in the former than in the latter. However, as we now show, our conclusions are strongly robust to using one or the other of these two income concepts.

To illustrate the role of these three factors in explaining the differences between our conclusions and the standard view, we compare in table V several estimates of the top 10% income share in Europe and the US in 2017. The table reports results obtained using three different methodologies (relying only on surveys, combining surveys and tax data, and following the DINA framework) and for three different income concepts (factor income, pretax income, and posttax income).

Survey-based estimates suggest that the top 10% factor income share is only slightly higher in the US (35.9%) than in Europe (33.3%). This gap is significantly higher in terms of posttax disposable income (4.7 percentage points) than in terms of factor income (2.6 pp.). By this measure, about 45% of the US-Europe inequality gap can be explained by redistribution, if we define redistribution as the gap between factor income and posttax income inequality. This corresponds relatively well to the standard view: by moving to European redistribution levels, the US would close a significant share of the US-Europe posttax income inequality gap.

If we combine surveys with tax data, we get a relatively different picture. The estimated top 10% factor income share increases by 7.6 percentage points in the US, compared to only 4.4 percentage points in Europe. As a result, the US-Europe gap

in factor income inequality more than doubles, from 2.6 pp. in surveys to 5.8 pp. in estimates combining surveys with tax data. While taxes and transfers do continue to reduce inequality more in Europe than in the US, redistribution now appears to only explain about 19% of the posttax income inequality gap between the two regions.

Moving to DINA estimates further modifies the distribution of income in both regions. The allocation of unreported national income components (undistributed profits and imputed rents) increases factor income inequality more in the US than in Europe, shifting the gap in the top 10% income share from 5.8 to 8.1 percentage points. By contrast, the difference between the two regions in terms of posttax income inequality actually decreases from 7.2 to 6.7 pp. This is because moving from standard estimates of posttax income to DINA series implies allocating corporate taxes, indirect taxes, and in-kind transfers, which are more progressive in the US than in Europe overall. DINA estimates reveal that taxes and transfers reduce inequality less in Europe than in the United States: the gap in the top 10% share between the two regions is 8.1 percentage points in terms of factor income, compared to 6.7 percentage points in terms of posttax income. Predistribution, not redistribution, explains why Europe is less unequal than the US.

Until now, we have compared factor income inequality to posttax income inequality for greater comparability with the existing literature. If we define redistribution as the gap between pretax income inequality and posttax income inequality, as in section IV, then the picture gets even clearer. Estimates from surveys, surveys and tax data, and DINA series all point to redistribution being higher in the United States than in Europe. This is even more the case in DINA series than in surveys. According to our DINA estimates, greater redistribution in the US thus succeeds in closing 41% ( $\frac{11.4-6.7}{11.4}$ ) of the US-Europe pretax income inequality gap. This is a radically different conclusion from the one obtained by the OECD. Redistribution does not explain why Europe is less unequal than the US: it actually contributes to *reducing* the inequality gap between the two regions.

In our view, pretax income is more comparable across countries, because it avoids artificially inflating inequality and redistribution in countries with a large elderly

population and public pension systems.<sup>39</sup> That being said, we acknowledge that pensions may contribute to reducing inequality within the elderly population, and social contributions may also have significant distributional consequences in some cases. Whether factor income or pretax income should be used as the benchmark concept remains an open question. What is important for our analysis, however, is that our results are strongly robust to adopting one or the other of these two approaches to the measurement of redistribution.

#### *IV.E. The Indirect Impact of Taxes and Transfers on Pretax Income Inequality*

While the distinction between predistribution and redistribution is widespread and useful, it should be approached with care. Indeed, redistribution policies may have an impact on the distribution of pretax incomes themselves, not only on the gap between pretax and posttax income inequality. For example, high top marginal tax rates can limit top earners' incentives to bargain for higher pay, decreasing pretax inequality. Transfers at the bottom of the distribution can also change incentives to work or acquire skills. To what extent could these considerations change our conclusion regarding the role of redistribution? This section provides an exploration of this question. We investigate two channels: changes in pretax inequality due to changes in top marginal tax rates, and changes in pretax inequality due to net redistribution at the bottom.

**Top Marginal Income Tax Rates** The idea that high top marginal tax rates reduce top incomes has been suggested before (Piketty, Saez, and Stantcheva, 2014), and supported by cross-country evidence tying top marginal rates to reduced income concentration at the top. Using our own data, we indeed observe that higher top marginal tax rates are associated with lower top 1% pretax income shares. In appendix section 1.8, we study different specifications for estimating the elasticity of the top 1% share with respect to (one minus) the top marginal tax rate across European countries. Across specifications, we find estimates ranging between

<sup>39</sup>In particular, rich pensioners may earn little factor income and therefore may appear to be lifted out of poverty by the pension system, even in a system in which pension benefits are proportional to income.

$\sigma = 0.12$  and  $\sigma = 0.45$ , somewhat more muted than the findings of [Piketty, Saez, and Stantcheva \(2014\)](#), but nonetheless significant overall.<sup>40</sup>

Let us assume that  $\sigma = 0.5$ , close to the benchmark of [Piketty, Saez, and Stantcheva \(2014\)](#) and at the high end of our own estimates. Based on this assumption of a rather strong impact of tax rates on pretax inequality, can we explain the evolution of European inequality and the difference between Europe and the United States? Figure [VIIIa](#) simulates two counterfactual evolutions of the top 1% pretax income share in Europe to answer this question: one that applies the United States' top marginal tax rate to every European country, and another that fixes top tax rates at their 1981 value in every country. The first scenario shows that the lower top marginal tax rates observed in the United States can only explain a small fraction of the Europe–US inequality differential. The second scenario shows that the decrease of top marginal tax rates generally observed in European countries can explain about 40% of the rise in within-country inequality observed since the 1980s. Therefore, the decrease of top marginal tax rates does contribute to explaining the rise of top income concentration in Europe, but it cannot account for the higher pace at which pretax inequality rose in the US. For top marginal tax rates to explain the entire difference between Europe and the United States, we would have to assume extremely high elasticities of the order  $\sigma = 2$ .

**Net Transfers at the Bottom** Now, focusing on the bottom of the distribution, it could be argued that there is a tradeoff between redistribution and predistribution, and that policymaking is about setting the equilibrium between the two. To assess this view, one can measure the correlation between the bottom 50% pretax income share and the net transfers received by the bottom 50%, as measured by the difference between their posttax and pretax income share. As shown in figure [VIIIb](#), the cross-country correlation suggests a positive link between these two variables, with a small but positive elasticity of 0.10.<sup>41</sup> In other words, we find no evidence that redistribution and predistribution are substitutes, and if anything they may be

<sup>40</sup>Differences with the results of [Piketty, Saez, and Stantcheva \(2014\)](#) arise mostly due to their inclusion of non-European countries and their longer time frame. See appendix 1.8.

<sup>41</sup>We stress that this elasticity is only mildly significant and not robust to the inclusion of country fixed effects (see appendix section 1.9).

complements. Since the United States redistributes a larger share of national income to the bottom 50% than European countries, a positive relationship between lower pretax inequality and higher redistribution cannot explain the differential between Europe and the United States.

The exploratory results of this section should be interpreted with care and not in a strictly causal way. That being said, they do suggest the existence of some indirect effects of redistribution on predistribution, but not in a way that would overturn our key conclusions.

## V. CONCLUSION

This article developed a new methodology to estimate the distribution of national income in 26 European countries between 1980 and 2017 by combining all available surveys, tax data, and national accounts in a systematic manner. The resulting dataset was then used to study the joint evolution of growth, inequality, and redistribution in Europe and the United States in the past decades.

Our results revealed that pretax income inequality has risen in almost all European countries since 1980. This rise has been concentrated at the top end of the distribution and has been most pronounced in Eastern Europe. However, income concentration has grown much less in Europe than in the United States. This is true of each European country taken separately but also of Europe as a whole. While inequalities between European countries remain significant, they only explain a small and decreasing fraction of European-wide income disparities.

Against a widespread view, we documented that the structure of taxes and transfers cannot explain why Europe is less unequal than the United States today. On the contrary, redistribution appears to reduce inequality more in the US than in Europe, despite the lower aggregate levels of taxes and transfers observed in the US. The novelty of this conclusion mainly arises from accounting for the underrepresentation of top incomes in surveys, which is more acute in the US than in Europe; from distributing the totality of national income, which leads to revising inequality estimates upwards more in the US than in Europe; and from allocating indirect taxes and in-kind transfers, which are more progressive in the US than in

Europe. Given that the two regions have been exposed in a relatively similar way to technological change and globalization in the past decades, our results thus shed light on the importance of predistribution policies, such as access to education and healthcare or labor market regulations, in explaining international differences in the distribution of pretax income growth.

We see at least two avenues for future research. First, there is a need to better understand to what extent collective government expenditure in education, health, and other spheres of public intervention reduces inequality in the long run. While we have shown that our main conclusions are robust to polar assumptions on the distributional incidence of this form of redistribution, much remains to be done when it comes to precisely estimating it. Doing so would require combining distributional national accounts with more disaggregated data on who benefits from specific policies and programs.

Our dataset could also be used to better assess the distributional impact of taxes and transfers on inequality. Drawing on simple correlations and estimates from the existing literature, we have shown that changes in top marginal income tax rates or in net redistribution cannot entirely rationalize the diverging trajectories of Europe and the United States observed in the past decades. In the same spirit, further analyses could more systematically simulate, for instance, the effect of adopting specific tax-and-transfer systems of the distribution of pretax and posttax incomes. Such an enterprise would be particularly useful to better understand the sources of rising pretax income inequalities and to identify which policies affect them in the long run.

WORLD INEQUALITY LAB, PARIS SCHOOL OF ECONOMICS

WORLD INEQUALITY LAB, PARIS SCHOOL OF ECONOMICS AND SCIENCESPO

WORLD INEQUALITY LAB, PARIS SCHOOL OF ECONOMICS

#### REFERENCES

Aaberge, Rolf, Manudeep Bhuller, Audun Langørgen, and Magne Mogstad (2010). “The distributional impact of public services when needs differ”. In: *Journal of Public Economics* 94.9-10, pp. 549–562.

- Alstadsæter, Annette, Martin Jacob, Wojciech Kopczuk, and Kjetil Telle (2017). “Accounting for Business Income in Measuring Top Income Shares: Integrated Accrual Approach Using Individual and Firm Data from Norway”.
- Alvaredo, Facundo, Anthony B. Atkinson, Thomas Blanchet, and et al. (2020). “Distributional National Accounts Guidelines: Concepts and Methods used in the World Inequality Database”. In: *World Inequality Lab Working Paper*.
- Atkinson, Anthony B. (1996). “Income distribution in Europe and the United States”. In: *Oxford Review of Economic Policy* 12.1.
- Atria, Jorge, Ignacio Flores, Ricardo Mayer, and Claudia Sanhueza (2018). “Top incomes in Chile: A Historical Perspective of Income Inequality (1964-2015)”.
- Australian Bureau of Statistics (2019). “Australian National Accounts: Distribution of Household Income, Consumption and Wealth, 2003-04 to 2017-18”. In:
- Beblo, Miriam and Thomas Knaus (2001). “Measuring income inequality in Euro-land”. In: *Review of Income and Wealth* 47.3.
- Blanchet, Thomas and Lucas Chancel (2016). “National Accounts Series Methodology”.
- Blanchet, Thomas, Juliette Fournier, and Thomas Piketty (2017). “Generalized Pareto Curves: Theory and Applications”.
- Bozio, Antoine, Bertrand Garbinti, Jonathan Goupille-Lebret, Malka Guillot, and Thomas Piketty (2018). “Inequality and Redistribution in France, 1990-2018: Evidence from Post-Tax Distributional National Accounts (DINA)”. In: *WID.world Working Paper 2018/10*.
- Brandolini, Andrea (2006). “Measurement of income distribution in supranational entities: The case of the European Union”. In: *LIS Working Paper Series, No. 452*.
- Causa, Orsetta and Mikkel Norlem Hermansen (2017). *Income redistribution through taxes and transfers across OECD countries*. Tech. rep. OECD Economics Department Working Papers, No. 1453.
- Chen, Tianqi and Carlos Guestrin (2016). “XGBoost: A Scalable Tree Boosting System”.
- Dauderstädt, Michael and Cem Keltik (2011). “Immeasurable Inequality in the European Union”. In: *Intereconomics* 46.1, pp. 44–51.

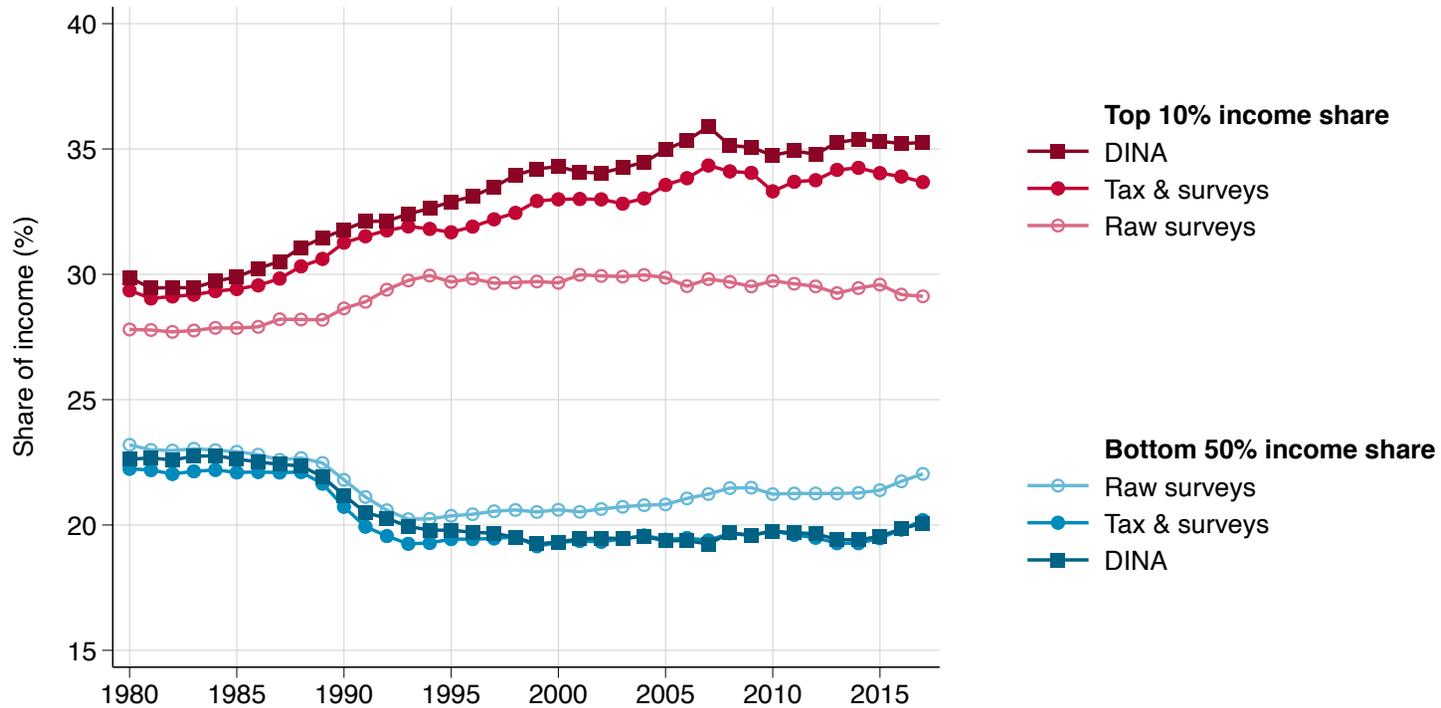
- Eurostat (2018). “Income comparison: social surveys and national accounts”. In: Fairfield, Tasha and Michel Jorratt De Luis (2016). “Top Income Shares, Business Profits, and Effective Tax Rates in Contemporary Chile”. In: *Review of Income and Wealth* 62.August, S120–S144.
- Fesseau, Maryse and Maria Liviana Mattonetti (2013). “Distributional Measures Across Household Groups in a National Accounts Framework: Results from an Experimental Cross-country Exercise on Household Income, Consumption and Saving”. In: *OECD Statistics Working Papers 2013/4*.
- Filauro, Stefano and Zachary Parolin (2018). “Unequal unions? A comparative decomposition of income inequality in the European Union and United States”. In: *Journal of European Social Policy*.
- Garbinti, B., J. Goupille-Lebret, and T. Piketty (2018). “Income inequality in France, 1900-2014: Evidence from Distributional National Accounts (DINA)”. In: *Journal of Public Economics* 162.1, pp. 63–77.
- Germain et al. (2020). “Rapport sur les comptes nationaux distributionnels”. In: *INSEE Rapport*.
- Guillaud, Elvire, Matthew Olckers, and Michaël Zemmour (2019). “Four Levers of Redistribution: The Impact of Tax and Transfer Systems on Inequality Reduction”. In: *Review of Income and Wealth*.
- Hacker, Jacob S. and Paul Pierson (2010). “Winner-Take-All Politics: Public Policy, Political Organization, and the Precipitous Rise of Top Incomes in the United States”. In: *Politics & Society* 38.2, pp. 152–204.
- Immervoll, Herwig and Linda Richardson (2011). “Redistribution Policy and Inequality Reduction in OECD Countries: What has changed in two decades?” In: *OECD Social, Employment and Migration Working Papers No. 122*.
- Jesuit, David K. and Vincent A. Mahler (2010). “Comparing Government Redistribution Across Countries: The Problem of Second-Order Effects”. In: *Social Science Quarterly* 91.5, pp. 1390–1404.
- Kleven, Henrik, Camille Landais, Mathilde Muñoz, and Stefanie Stantcheva (2020). “Taxation and Migration: Evidence and Policy Implications”. In: *Journal of Economic Perspectives* 34.2, pp. 119–42.

- Lakner, Christoph and Branko Milanovic (2016). “Global Income Distribution: From the Fall of the Berlin Wall to the Great Recession”. In: *The World Bank Economic Review* 30.2, pp. 203–232.
- Milanovic, Branko (1998). *Income, Inequality, and Poverty during the Transition from Planned to Market Economy*. World Bank Regional and Sectoral Studies.
- O’Dea, Cormac and Ian Preston (2010). “The distributional impact of public spending in the UK”. In: *IFS working paper W12/06*.
- OECD (2008). *Growing unequal: Income Distribution and Poverty in OECD countries*. OECD Publishing.
- (2011). *Divided we stand: Why inequality keeps rising?* OECD Publishing.
- Piketty, Thomas and Emmanuel Saez (2003). “Income inequality in the United States, 1913-1998”. In: *Quarterly Journal of Economics* 118.1, pp. 1–39.
- Piketty, Thomas, Emmanuel Saez, and Stefanie Stantcheva (Feb. 2014). “Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities”. en. In: *American Economic Journal: Economic Policy* 6.1, pp. 230–271.
- Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman (2018). “Distributional National Accounts: Methods and Estimates for the United States”. In: *Quarterly Journal of Economics* 133.2, pp. 553–609.
- (2019). “Simplified Distributional National Accounts”. In: *AEA Papers and Proceedings* 109, pp. 289–295.
- Saez, Emmanuel and Gabriel Zucman (2019). *The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay*. W. W. Norton & Company.
- Salverda, Wiemer (2017). “The European Union’s income inequalities”.
- Statistics Canada (2019). “Distributions of Household Economic Accounts, estimates of asset, liability and net worth distributions, 2010 to 2018, technical methodology and quality report”. In:
- Statistics Netherlands (2014). “Measuring Inequalities in the Dutch Household Sector”.
- United Nations Statistics Commission (2008). *System of National Accounts 2008*. United Nations.

- Wolfson, Michael, Mike Veall, and Neil Brooks (2016). “Piercing the Veil – Private Corporations and the Income of the Affluent”. In: *Canadian Tax Journal* 64.1, pp. 1–25.
- Zwijnenburg, Jorrit, Sophie Bournot, and Federico Giovannelli (2019). “OECD Expert Group on Disparities in a National Accounts Framework: Results from the 2015 Exercise.” In: *OECD Statistics Working Papers 2019/76*.

Figure I  
 Measuring Inequality: From Surveys to Distributional National Accounts

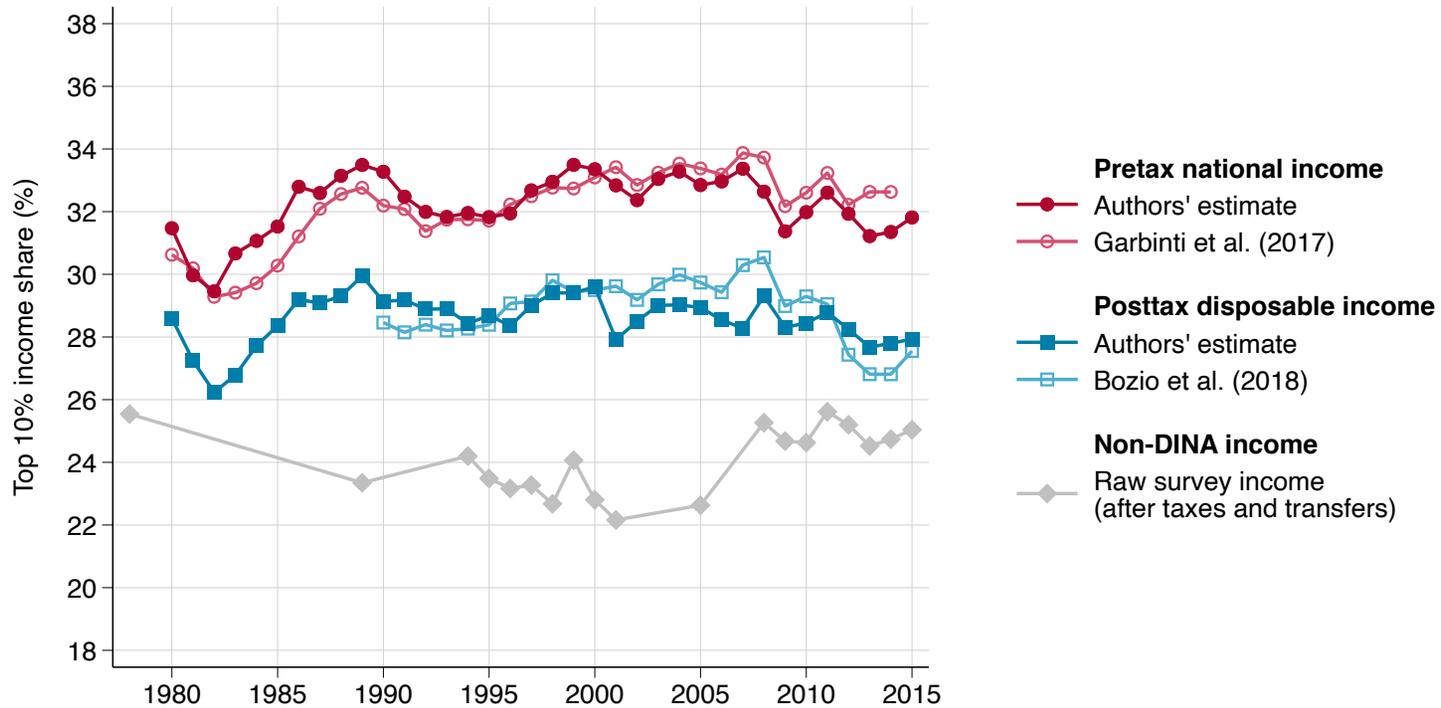
(a) Pretax Income Inequality in All 26 European Countries, 1980–2017



Source: Authors' computations combining surveys, tax data and national accounts. Note: Incomes measured at purchasing power parity. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses, except for the "raw survey income" series in panel (b), for which income is split equally among all adult household members. Posttax DINA series distribute taxes on products proportionally to income for consistency with [Bozio et al. \(2018\)](#), see appendix 3 for other approaches that follow the latest DINA guidelines.

Figure I  
 Measuring Inequality: From Surveys to Distributional National Accounts

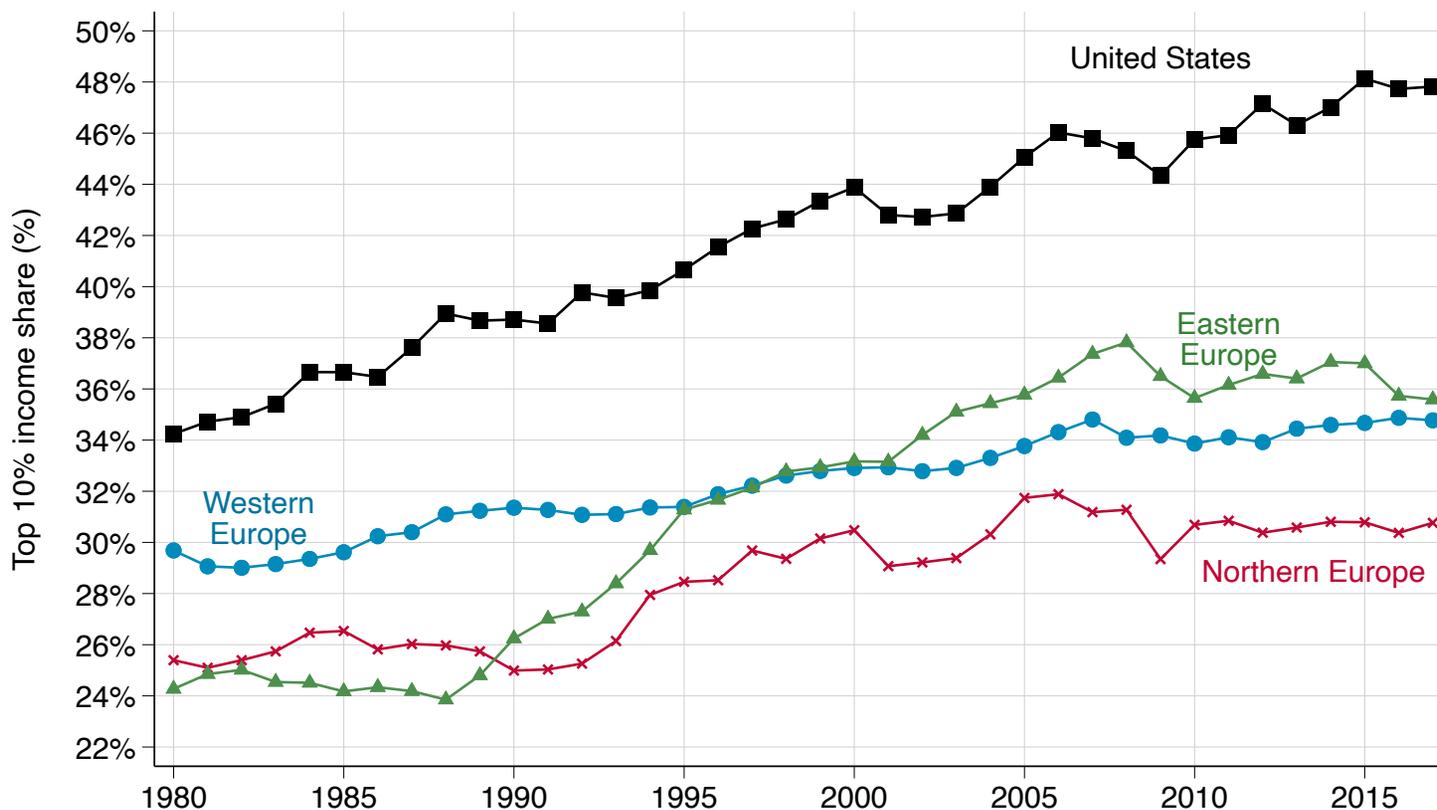
(b) Top 10% Income Share in France, 1978-2015



Source: Authors' computations combining surveys, tax data and national accounts. Note: Incomes measured at purchasing power parity. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses, except for the "raw survey income" series in panel (b), for which income is split equally among all adult household members. Posttax series distribute taxes on products proportionally to income for consistency with Bozio et al. (2018), see appendix 3 for other approaches that follow the latest DINA guidelines.

Figure II  
The Rise of Top Incomes in Europe and the United States, 1980-2017

(a) Top 10% Pretax Income Share, 1980-2017

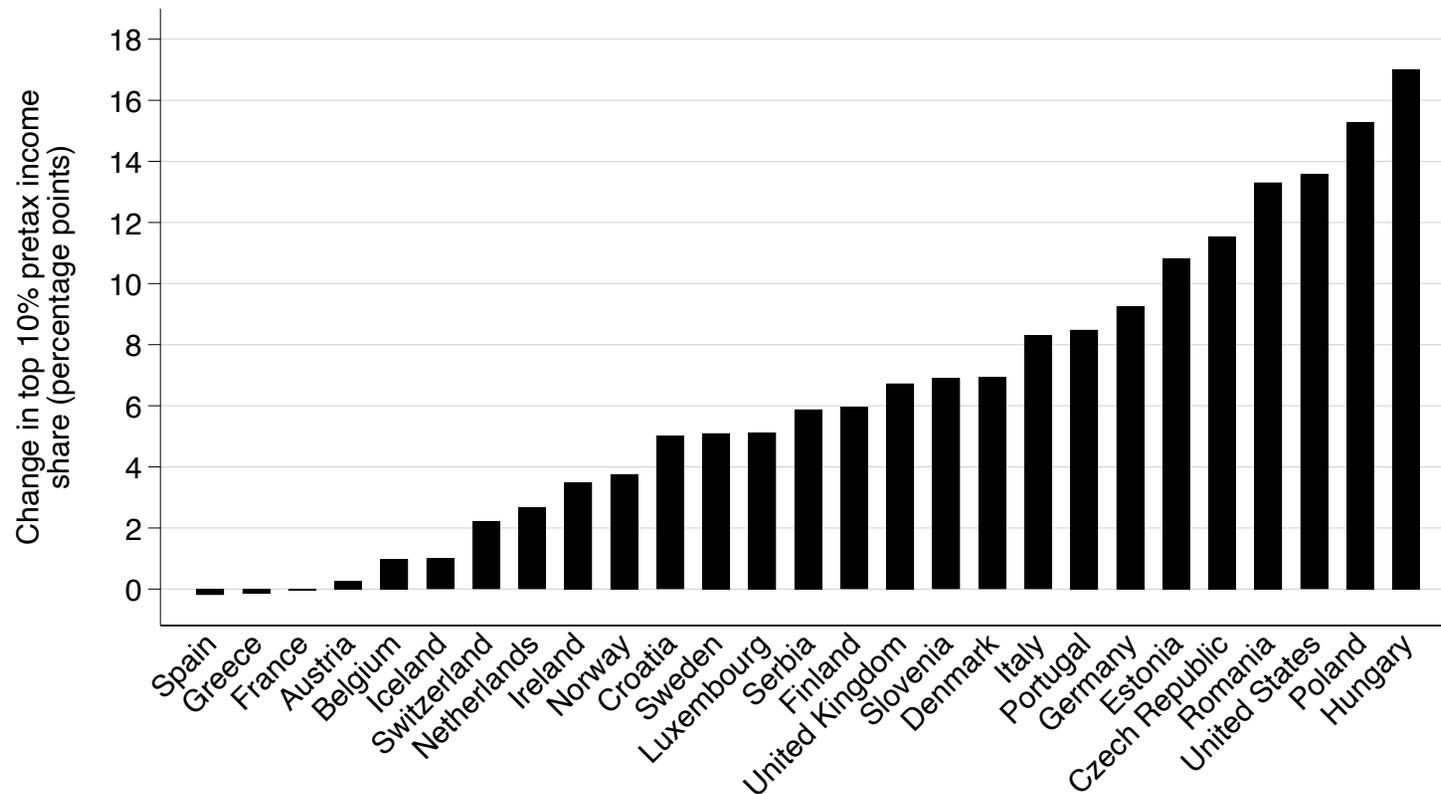


43

Source: Authors' computations combining surveys, tax data and national accounts. Notes: Panel (a) represents the evolution of the share of pretax income received by the top 10% in Western Europe, Northern Europe, Eastern Europe, and the United States. Panel (b) plots the percentage point change in the top 10% pretax income share by country between 1980 and 2017. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

Figure II  
The Rise of Top Incomes in Europe and the United States, 1980-2017

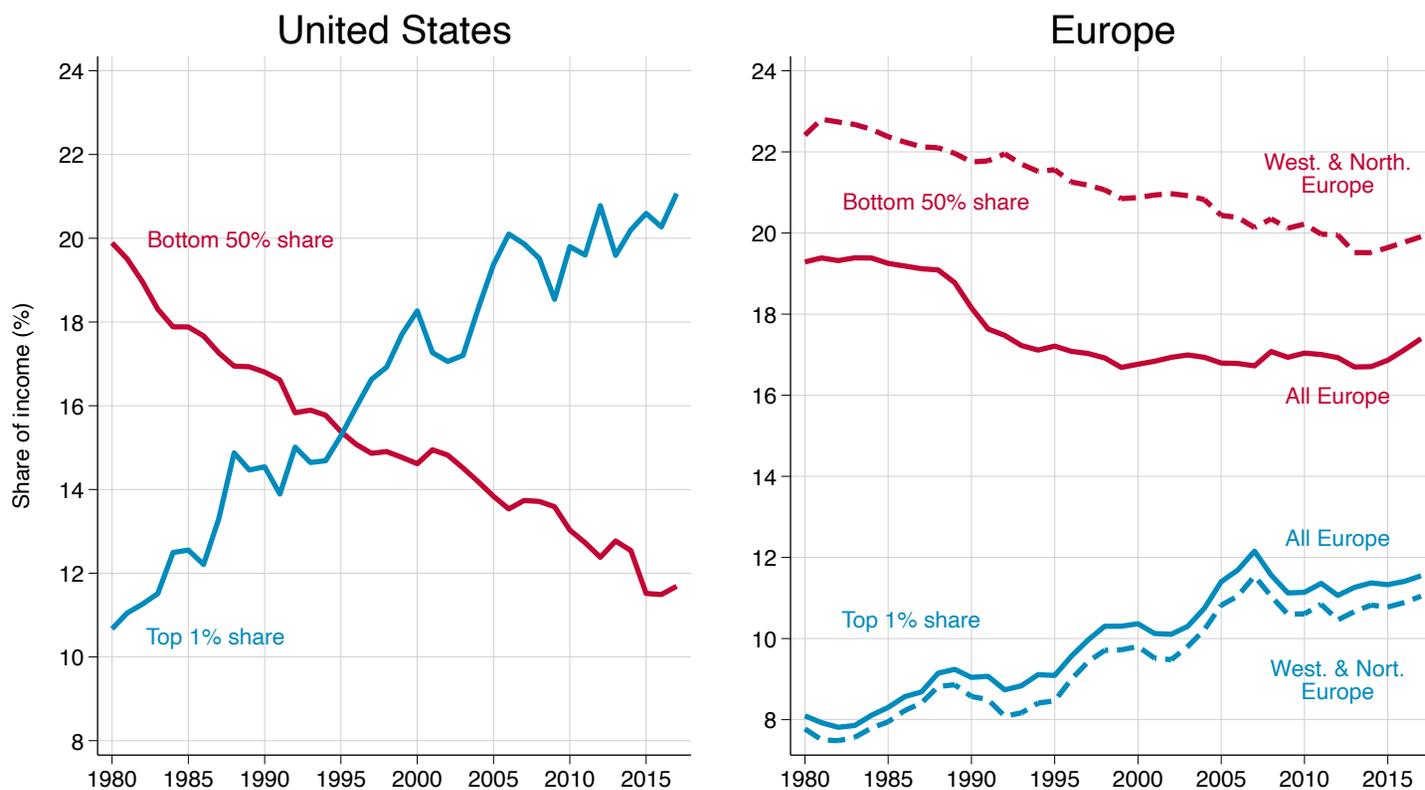
(b) Percentage Point Change in Top 10% Pretax Income Share by Country, 1980-2017



*Source:* Authors' computations combining surveys, tax data and national accounts. *Notes:* Panel (a) represents the evolution of the share of pretax income received by the top 10% in Western Europe, Northern Europe, Eastern Europe, and the United States. Panel (b) plots the percentage point change in the top 10% pretax income share by country between 1980 and 2017. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

Figure III  
The Distribution of Pretax Income Growth in Europe and the United States, 1980-2017

(a) Top 1% versus Bottom 50% Pretax Income Shares

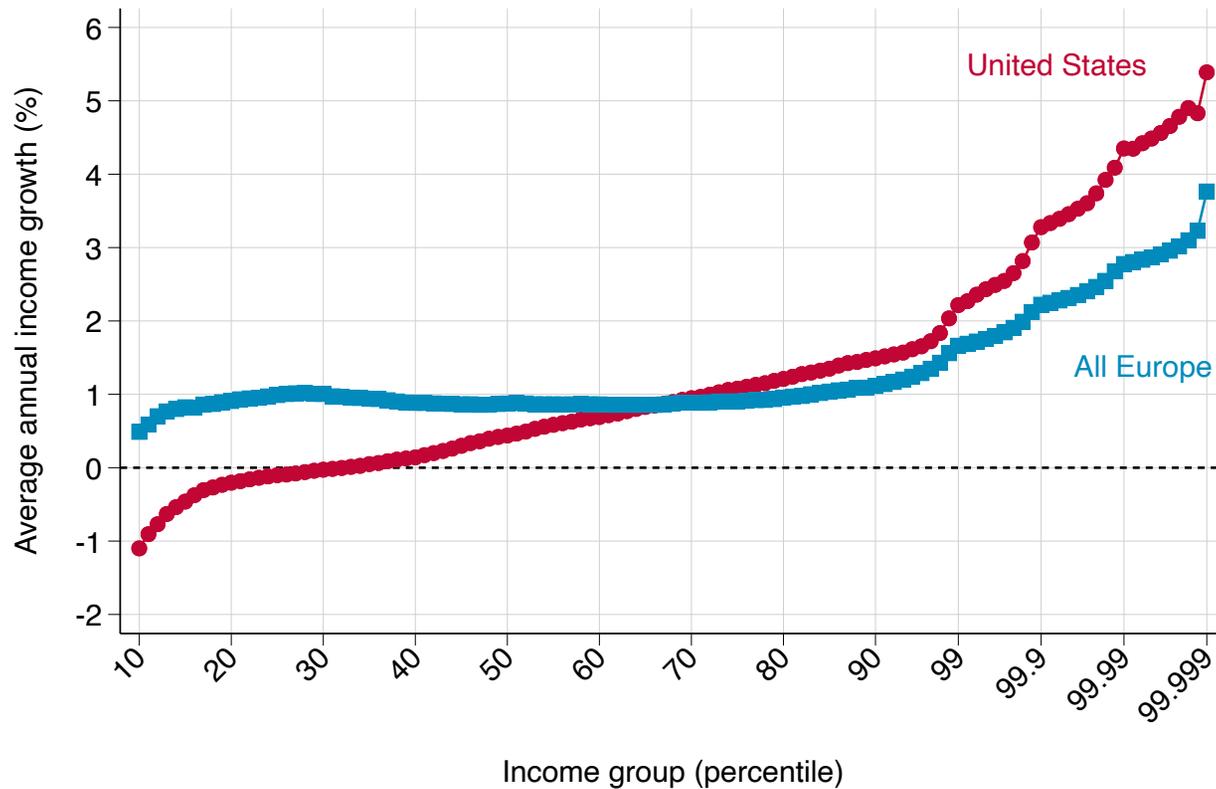


45

Source: Authors' computations combining surveys, tax data and national accounts. Notes: Panel (a) compares the share of pretax income received by the bottom 50% to that received by the top 1% of the regional population in Europe and the United States. Panel (b) plots the average annual pretax income growth rate by percentile in Europe and the US, with a further decomposition of the top percentile. Figures for the US come from Piketty, Saez, and Zucman (2018). Figures for Europe correspond to Europe at large, that is, after accounting for differences in average national incomes between European countries, measured at market exchange rates. The same holds for Western and Northern Europe. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

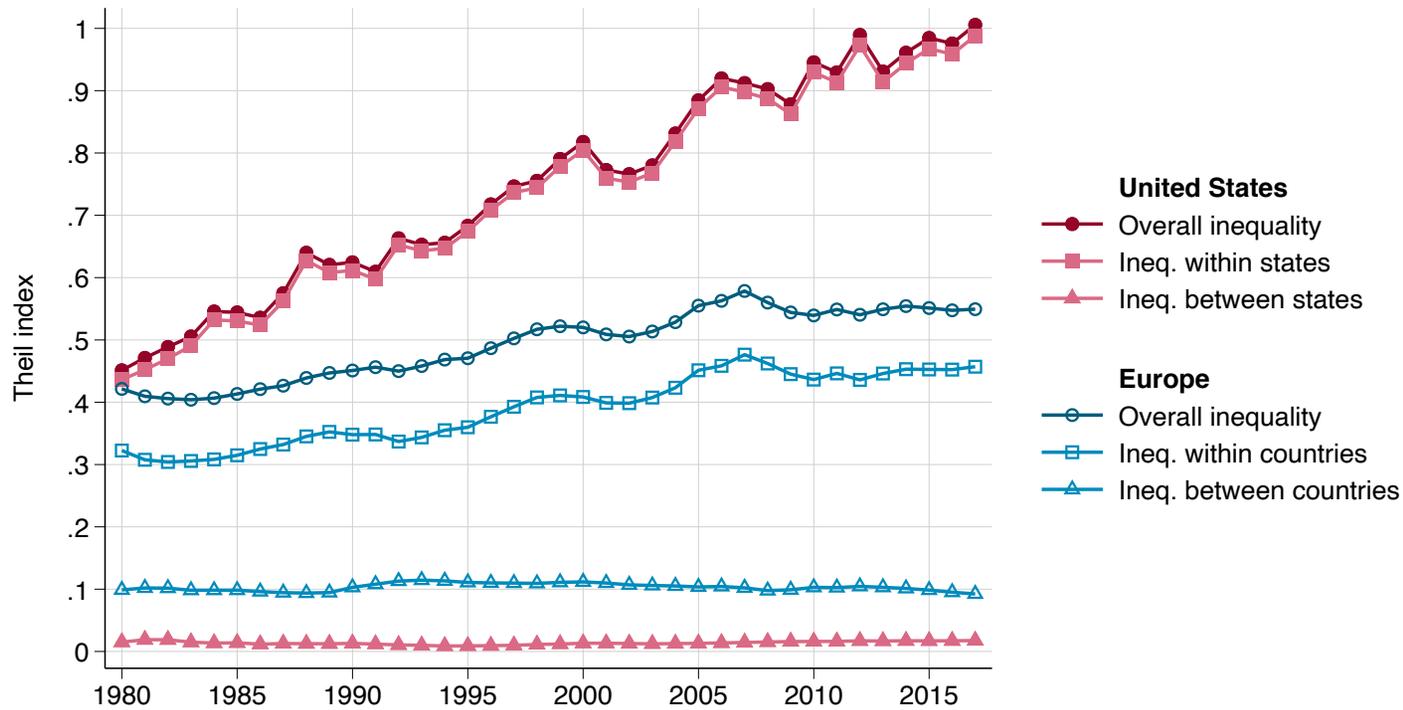
Figure III  
The Distribution of Pretax Income Growth in Europe and the United States, 1980-2017

(b) Average Annual Pretax Income Growth by Percentile



*Source:* Authors' computations combining surveys, tax data and national accounts. *Notes:* Panel (a) compares the share of pretax income received by the bottom 50% to that received by the top 1% of the regional population in Europe and the United States. Panel (b) plots the average annual pretax income growth rate by percentile in Europe and the US, with a further decomposition of the top percentile. Figures for the US come from [Piketty, Saez, and Zucman \(2018\)](#). Figures for Europe correspond to Europe at large, that is, after accounting for differences in average national incomes between European countries, measured at market exchange rates. The same holds for Western and Northern Europe. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

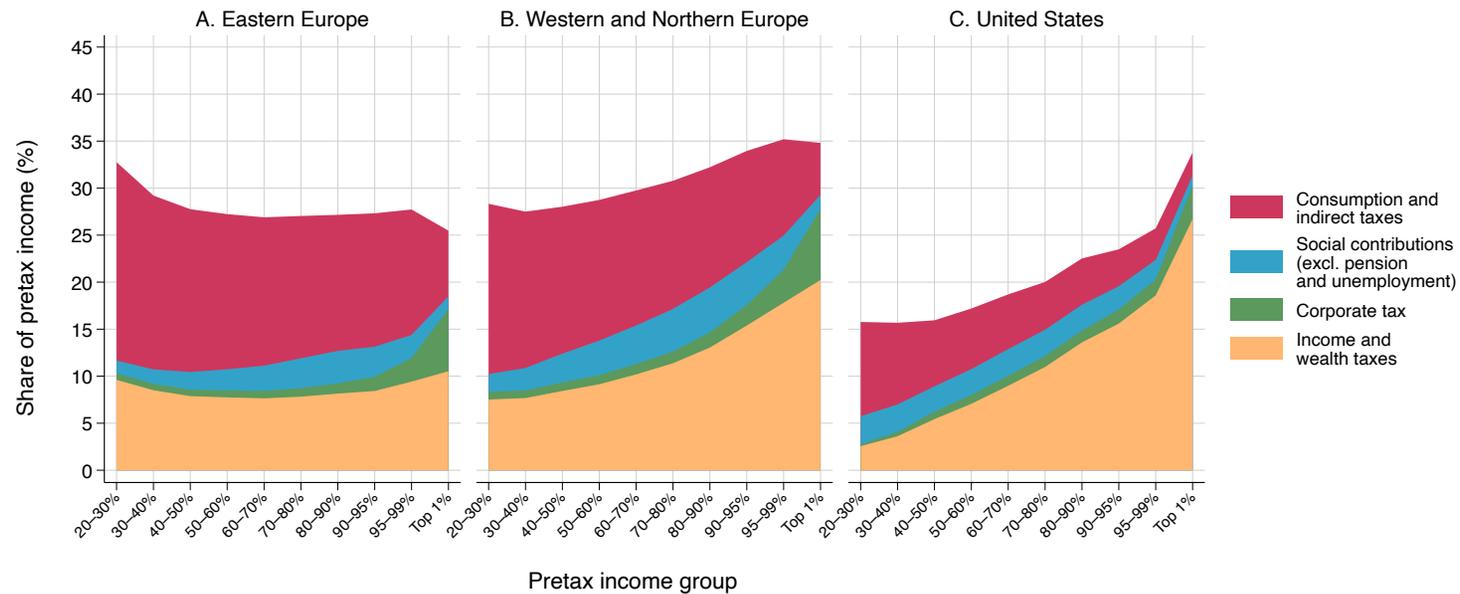
Figure IV  
 Pretax Income Inequality in Europe and the United States, 1980-2017: Theil Decomposition



*Source:* Authors' computations combining surveys, tax data and national accounts for European countries. Figures for the US come from [Piketty, Saez, and Zucman \(2018\)](#) for the overall Theil index, and from state GDP estimates of the Bureau of Economic Analysis for the US between-group component. *Notes:* Figures for Europe correspond to Europe at large, that is, after accounting for differences in average national incomes between European countries, measured at market exchange rates. The income concept is pretax income. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses.

Figure V  
The Distribution of Taxes in Europe and the United States

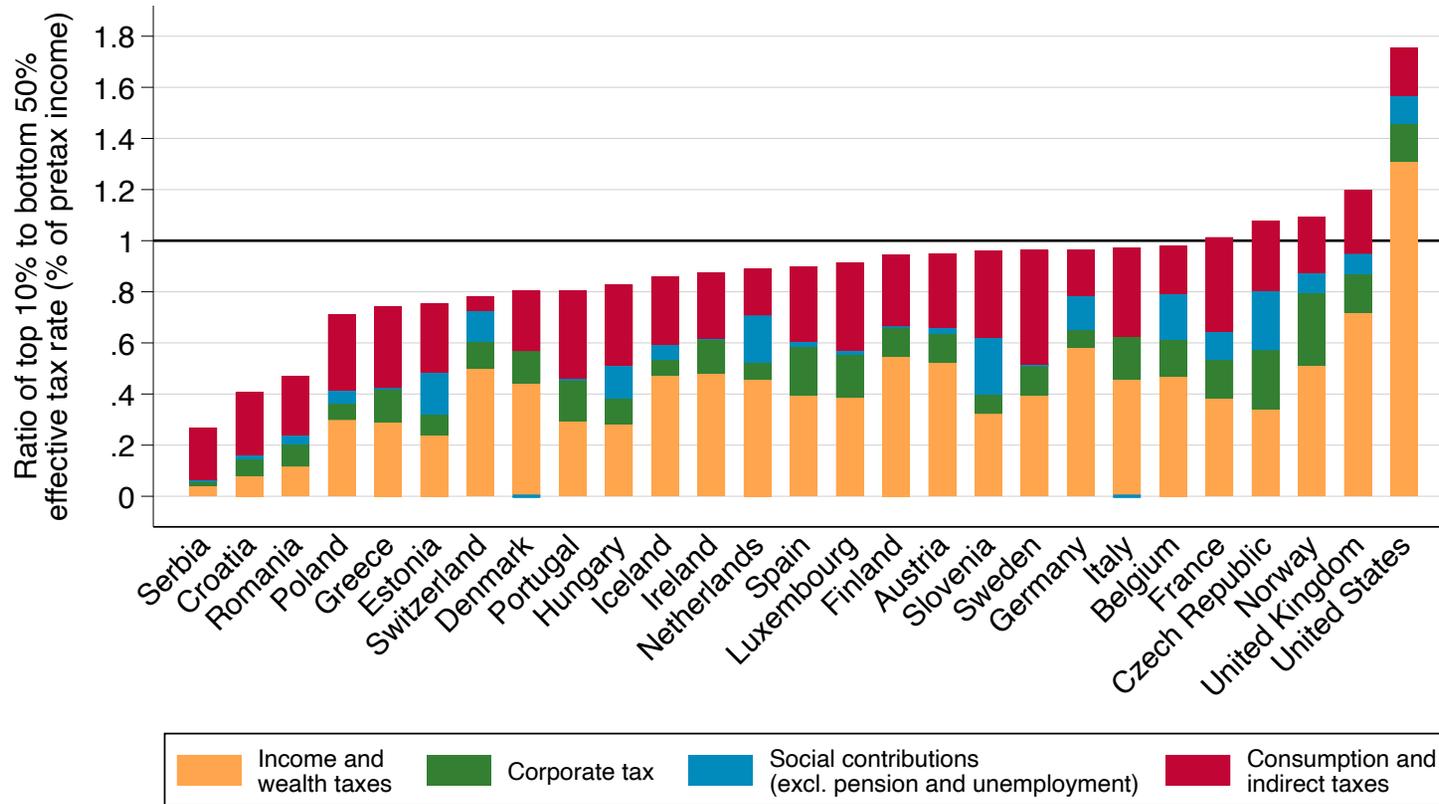
(a) Non-contributory Taxes Paid as a Share of Pretax Income



*Source:* Authors' computations combining surveys, tax data and national accounts for European countries; [Piketty, Saez, and Zucman \(2018\)](#) for the United States. *Notes:* Figures correspond to averages over the 2007–2017 period for European countries (population-weighted average of country-specific estimates in the case of European regions), and to 2017–2018 for the US. In panel (b), the composition of bars corresponds to the composition of taxes paid by the top 10%. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

Figure V  
The Distribution of Taxes in Europe and the United States

(b) Level and Composition of Taxes Paid by the Top 10% Relative to the Bottom 50% by Country

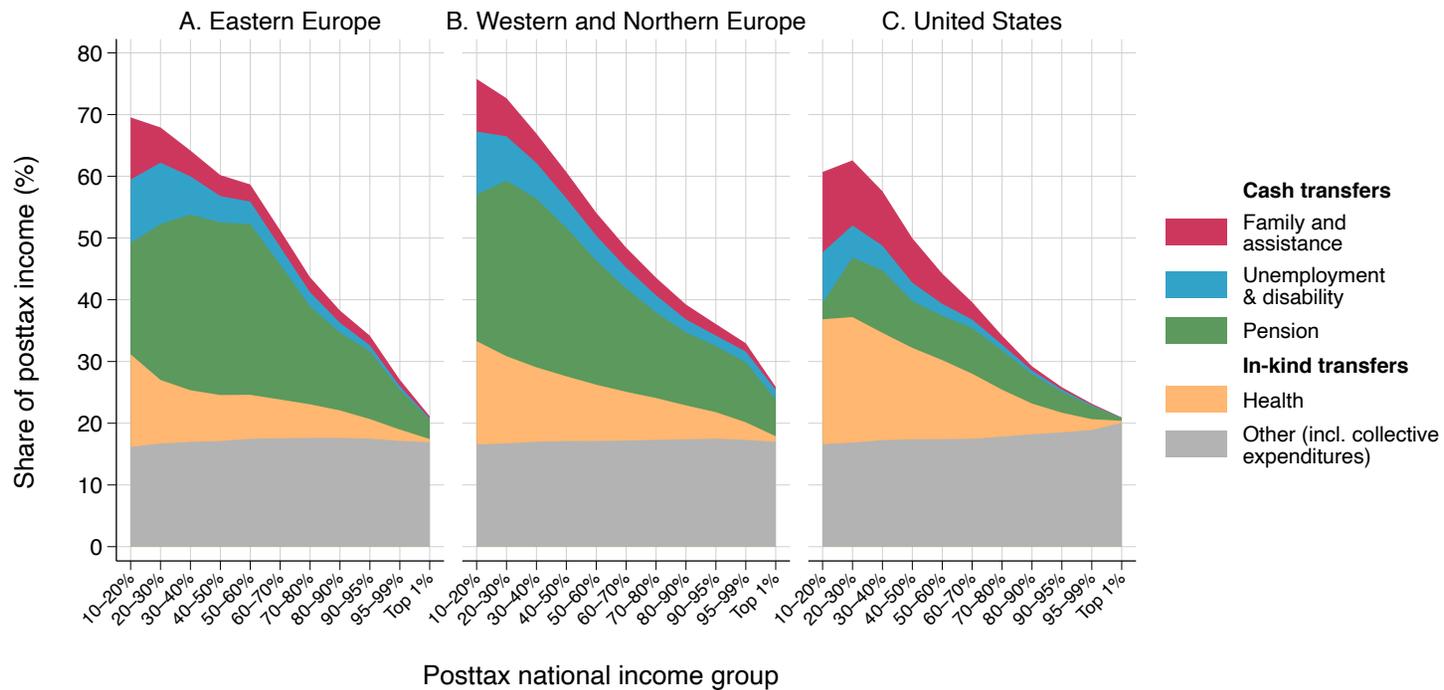


Source: Authors' computations combining surveys, tax data and national accounts for European countries; [Piketty, Saez, and Zucman \(2018\)](#) for the United States. Notes: Figures correspond to averages over the 2007–2017 period for European countries (population-weighted average of country-specific estimates in the case of European regions), and to 2017–2018 for the US. In panel (b), the composition of bars corresponds to the composition of taxes paid by the top 10%. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

Figure VI  
The Distribution of Transfers in Europe and the United States

(a) Total Transfers Received by Posttax Income Group (% of posttax income)

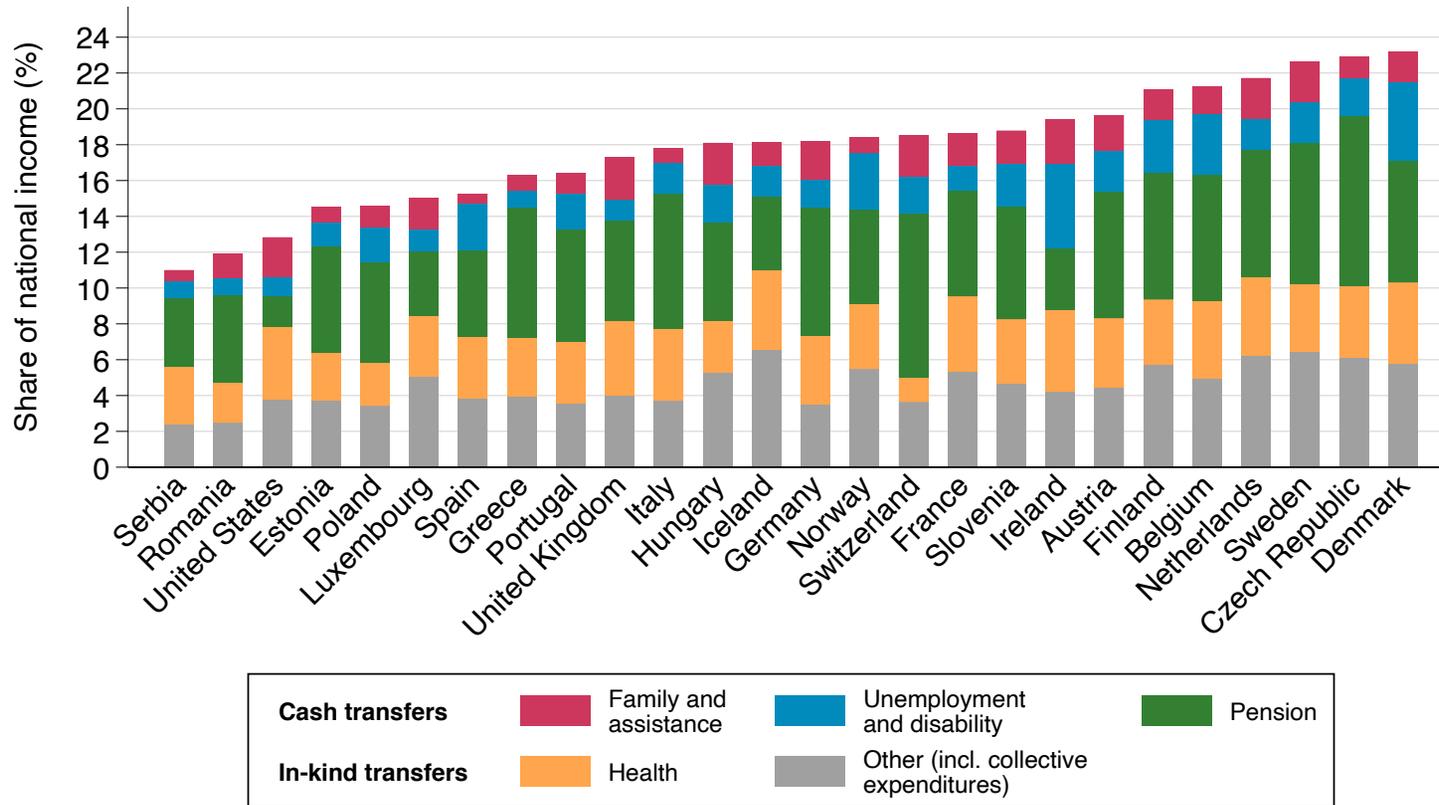
50



Source: Authors' computations combining surveys, tax data and national accounts for European countries; Saez and Zucman (2019) for the US. Notes: Figures correspond to averages over the period 2007–2017 for European countries (population-weighted average of country-specific estimates in the case of European regions), and to 2017–2018 for the US. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

Figure VI  
The Distribution of Transfers in Europe and the United States

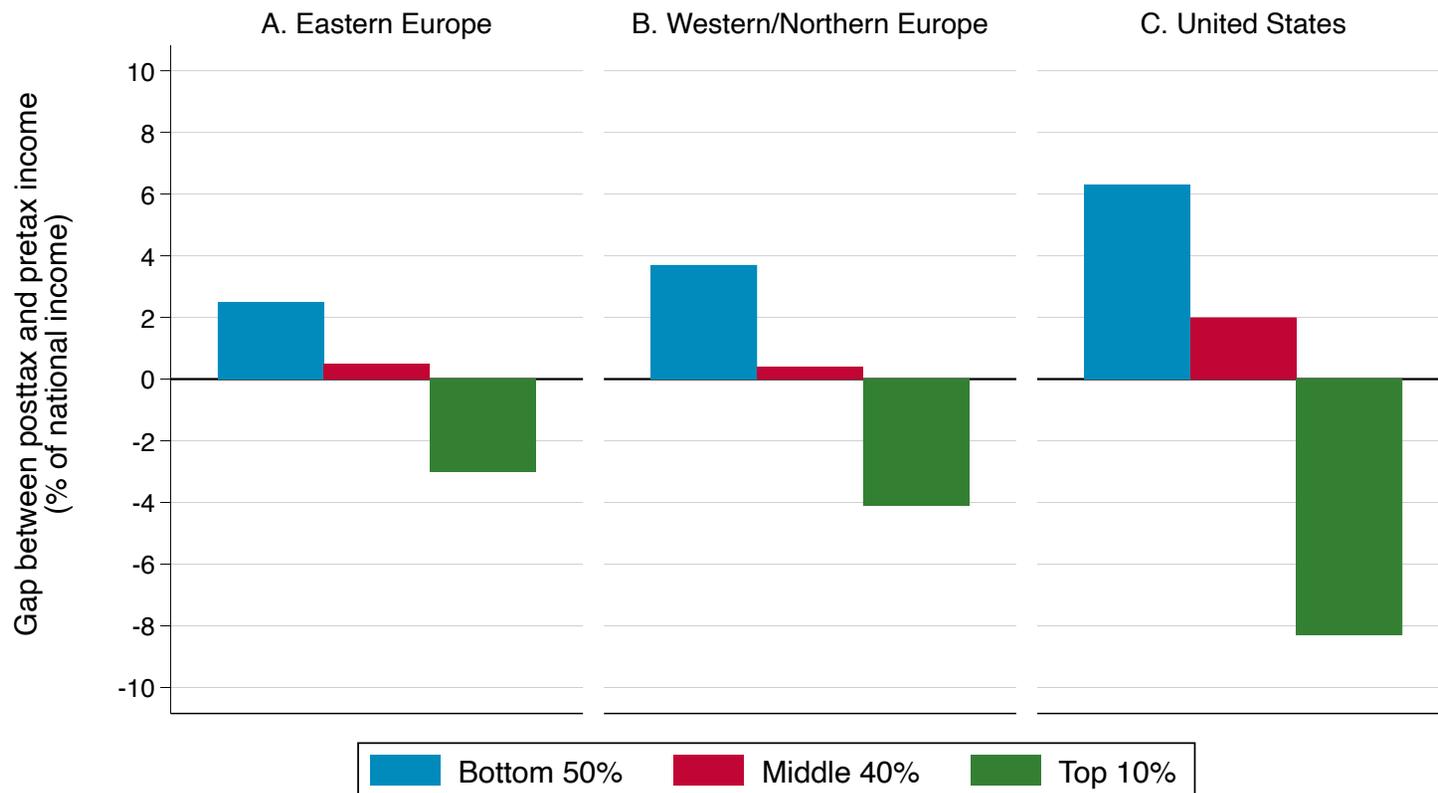
(b) Total Transfers Received by the Bottom 50% by Country (% of national income)



Source: Authors' computations combining surveys, tax data and national accounts for European countries; Piketty, Saez, and Zucman (2018) for the US. Notes: Figures correspond to averages over the period 2007–2017 for European countries (population-weighted average of country-specific estimates in the case of European regions), and to 2017–2018 for the US. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

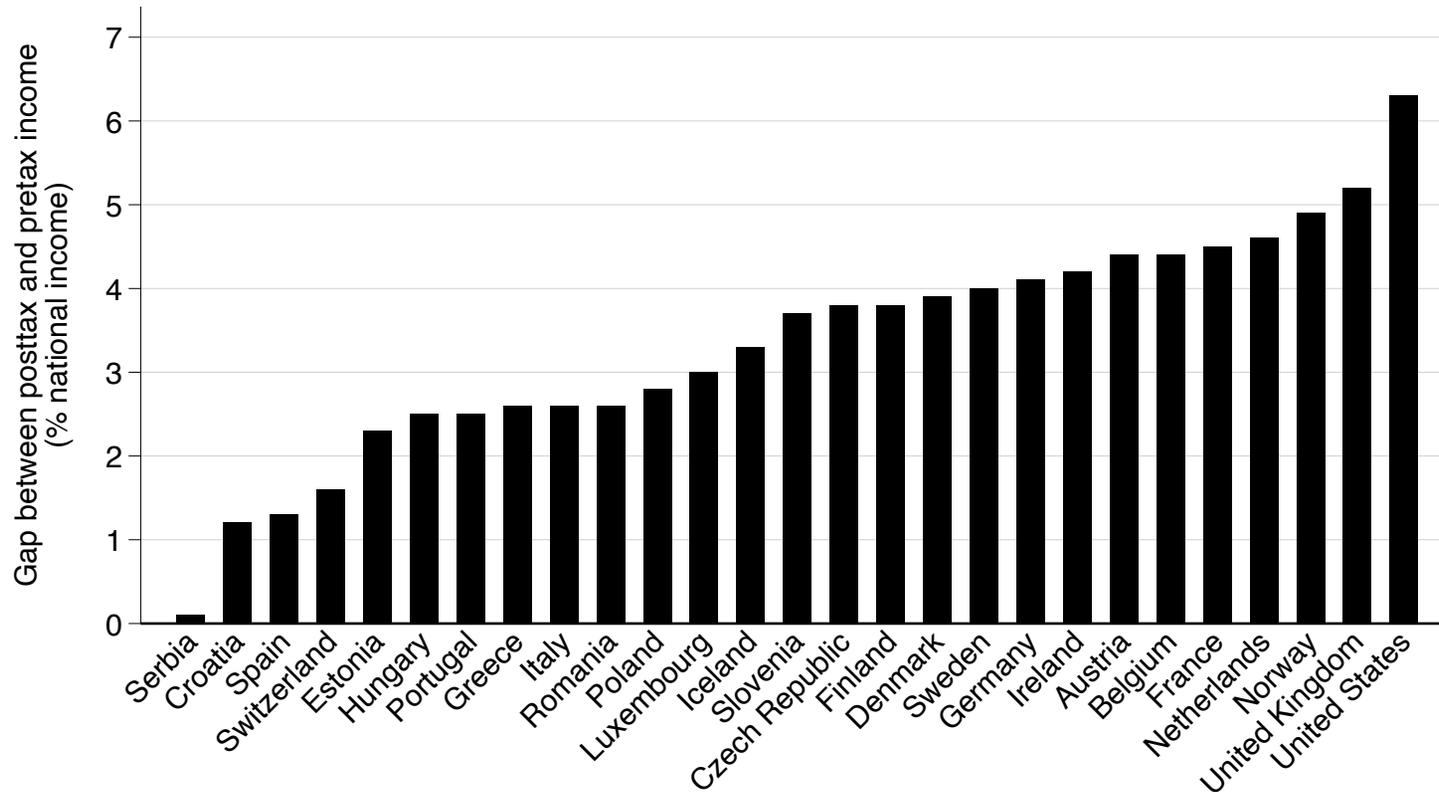
## Figure VII Net Redistribution in Europe and the United States

(a) Net Transfers Operated by the Tax-and-Transfer System  
Between Pretax Income Groups (% of National Income)



*Source:* Authors' computations combining surveys, tax data and national accounts for European countries; [Piketty, Saez, and Zucman, 2018](#) for the US. *Notes:* Panel (a) represents the net transfer received or paid by pretax income group in Eastern Europe, Western and Northern Europe, and the United States in 2017. Panel (b) represents the net transfer received by the bottom 50% by country, expressed as a share of national income, in 2017. The unit of observation is the adult individual aged 20. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

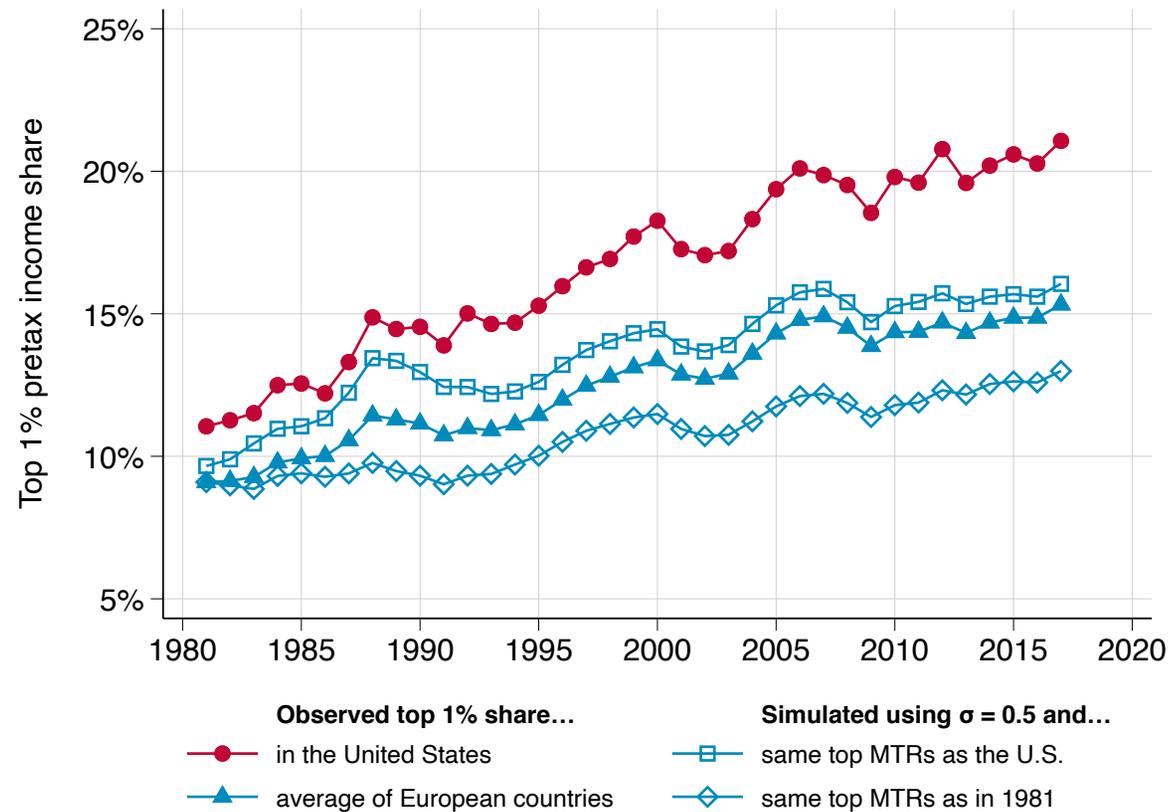
Figure VII  
 Net Redistribution in Europe and the United States  
 (b) Net Transfer Received by the Bottom 50% by Country



Source: Authors' computations combining surveys, tax data and national accounts for European countries; [Piketty, Saez, and Zucman, 2018](#) for the US. Notes: Panel (a) represents the net transfer received or paid by pretax income group in Eastern Europe, Western and Northern Europe, and the United States in 2017. Panel (b) represents the net transfer received by the bottom 50% by country, expressed as a share of national income, in 2017. The unit of observation is the adult individual aged 20. Income is split equally among spouses. See online appendix table A.2.7.1 for the composition of European regions.

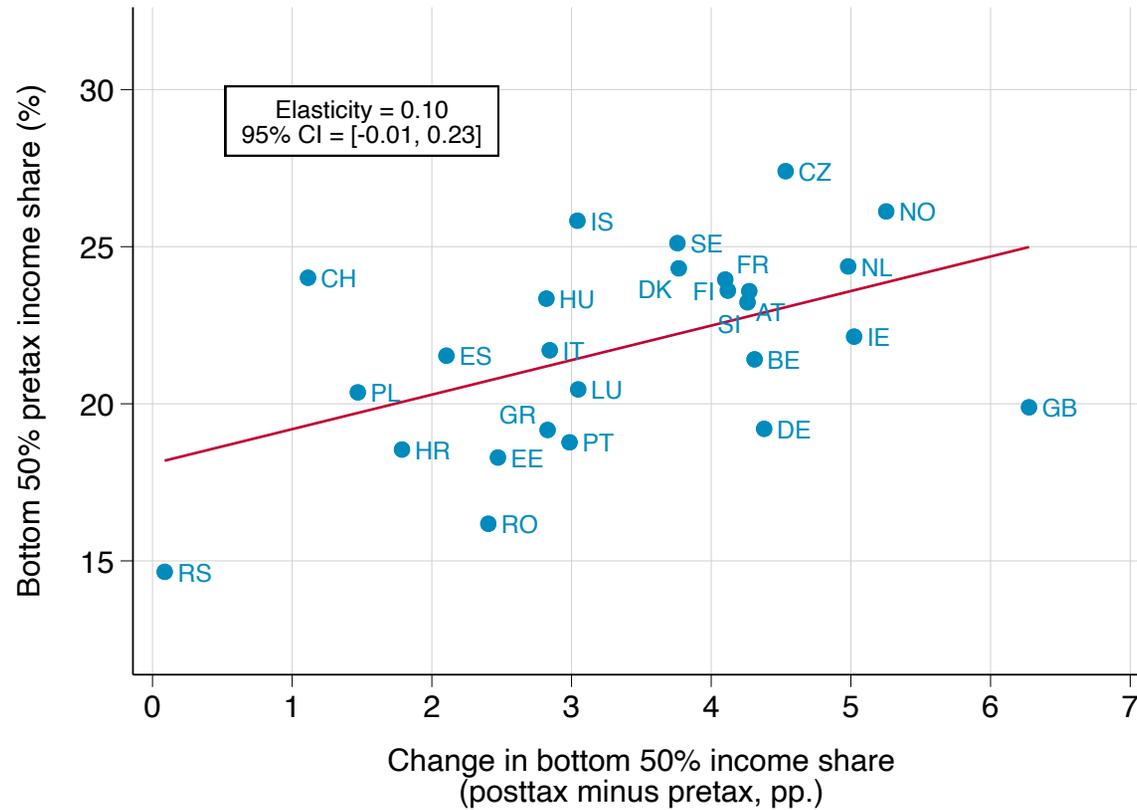
Figure VIII  
The Indirect Impact of Redistribution on Predistribution

(a) Evolution of Top 1% Share Under Different Top Marginal tax Rates



Source: Authors' computations combining surveys, tax data and national accounts for Europe; [Piketty, Saez, and Zucman, 2018](#) for the US. Top marginal tax rates data extended from [Kleven et al. \(2020\)](#) using OECD data (see appendix 1.6.2). Notes: European estimates refer to a population-weighted average of European countries with data available since 1981 (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and United Kingdom). Counterfactual top 1% share estimated using the model  $\Delta(\text{top 1\% share}) = (\Delta(1 - MTR))^\sigma$ .

Figure VIII  
 The Indirect Impact of Redistribution on Predistribution  
 (b) Redistribution to the Bottom 50% and Pretax Income Inequality



55

Source: Authors' computations combining surveys, tax data and national accounts. Notes: Averages over the 2007-2017 period. Elasticity refers to specification (2) in table A.1.9.5, appendix 1.9.

Table I  
Methodology Used to Distribute Factor Income, Pretax Income, and Posttax Income in Europe

Income concept	Source	Method	Share of income
<b>Factor national income</b>			100%
(+) Household primary income			79.2%
<i>Compensation of employees,     mixed and property income</i>	Survey + tax data	Observed	76.9%
<i>Net imputed housing rents</i>	Survey + tax data	Observed	2.3%
(+) Corporate primary income	National accounts	Proportional to equity ownership / wages and pension for equity held through pension funds	8.3%
(+) Government primary income	National accounts	Proportional to pretax income	12.4%
<b>Pretax national income</b>			100%
(+) Factor national income			100%
(-) Contributory social contributions	Survey + tax data	Observed/simulated	18.2%
(+) Pension benefits	Survey + tax data	Observed	16.6%
(+) Unemployment benefits	Survey + tax data	Observed	1.7%
<b>Posttax national income</b>			100%
(+) Pretax national income			100%
(-) Taxes			29.3%
<i>Non-contributory social contributions</i>	Survey + tax data	Observed/simulated	1.3%
<i>Direct taxes on income and wealth</i>	Survey + tax data	Observed	11.1%
<i>Taxes on products</i>	National accounts	Proportional to consumption	14%
<i>Corporate income tax</i>	National accounts	Proportional to equity ownership / wages and pension for equity held through pension funds	3%
(+) Transfers			30%
<i>Cash transfers</i>	Survey + tax data	Observed	5.1%
<i>Public health expenditures</i>	National accounts	Lump sum	7.7%
<i>Other public expenditures</i>	National accounts	Proportional to posttax income	17.3%
(+) Budget balance	National accounts	Proportional to posttax income	-0.7%

*Notes:* The table reports the methodology used to distribute the various components of factor national income, pretax national income, and posttax national income in European countries, together with the share of net national income each component typically represents (population-weighted average over all European countries over the 2010-2017 period).

**Table II**  
**Methodology Used to Combine Survey, Tax, and National Accounts Data in Europe**

Methodological Step	Detailed Steps	Sources and Coverage	Discussion / Impact
<b>Step 1:</b> Direct Measurement of Income Concepts in Survey Microdata.	Construction of pretax and posttax income variables.	EU-SILC (2004–2017); LIS (1980–2017); ECHP (1994–2001)	
	Imputation of social contributions.	Employee contributions (OECD, 2004–2017); Employer contributions (OECD, 2004–2005, EU-SILC, 2006–2017)	<i>Negligible impact</i> • Top 10% pretax income share decreases on average by 0.1 pp. after deduction of contributory social contributions.
<b>Step 2:</b> Harmonization of Survey Tabulations.	Collection and interpolation of survey tabulations, and harmonization using a machine learning algorithm.	World Income Inequality Database, PovcalNet, other survey data sources (1980–2017).	<i>Small impact</i> • 28% of cases: pretax income estimated from posttax income. • 1.5% of cases: income estimated from consumption.
<b>Step 3:</b> Combination of Surveys and Tax Data.	Calibration of survey microdata using top income shares series estimated from tax data.	World Inequality Database, various research articles, authors (1980–2017).	• Matching of income concepts and statistical units in surveys and tax data. • Calibration of surveys on tax data.
	Application of the correction to all survey distributions.		<i>Large impact</i> • Correction increases top 10% pretax income share by 2.3 pp. on average.
<b>Step 4:</b> Distribution of Unreported National Income Components.	Estimation and calibration of consumption, imputed rents, and stock ownership.	HFCS/WAS surveys for stock ownership; HBS for consumption; EU-SILC for imputed rents.	Top 10% pretax income earners account on average for: • 36% of stock. • 19% of consumption. • 16% of imputed rents.
	Missing incomes matched statistically to calibrated survey distributions.		<i>Moderate impact</i> • Retained earnings increase top 10% pretax income share by 1.0 pp. • Corporate tax increases top 10% pretax income share by 0.7 pp. • Imputed rents decrease top 10% pretax income share by 0.4 pp. • Taxes on products increase top 10% posttax income share by 1.5 pp. • Health spending decreases top 10% posttax income share by 1.5 pp.

*Notes:* The table reports the methodology used to combine survey, tax, and national accounts data to create European distributional national accounts, together with the impact of each methodological step on estimates of pretax and posttax income distributions. Numbers in the table refer to population-weighted averages across all countries and all years included in the database.

**Table III**  
**The distribution of pretax income in Europe and the United States, 2017**

	Eastern Europe		Northern Europe		Western Europe		United States	
	Average income	Income share	Average income	Income share	Average income	Income share		
Full population	€21,700	100%	€44,900	100%	€35,300	100%	€52,700	100%
Bottom 50%	€8,700	20.1%	€21,600	24.1%	€14,600	20.8%	€12,300	11.7%
Bottom 20%	€3,100	2.8%	€11,600	5.2%	€6,800	3.8%	€3,800	1.4%
Next 30%	€12,500	17.3%	€28,300	18.9%	€19,900	16.9%	€18,000	10.2%
Middle 40%	€24,100	44.3%	€50,600	45.1%	€39,200	44.5%	€53,300	40.5%
Top 10%	€77,300	35.6%	€138,000	30.8%	€123,000	34.8%	€252,000	47.8%
Top 1%	€261,000	12.0%	€395,000	8.8%	€384,000	10.9%	€1,110,000	21.1%
Top 0.1%	€892,000	4.1%	€1,140,000	2.5%	€1,230,000	3.5%	€5,190,000	9.8%
Top 0.01%	€3,060,000	1.4%	€3,290,000	0.7%	€3,970,000	1.1%	€23,830,000	4.5%
Top 0.001%	€10,490,000	0.5%	€9,490,000	0.2%	€12,840,000	0.4%	€92,020,000	1.7%

*Source:* Authors' computations combining surveys, tax data and national accounts for Europe; [Piketty, Saez, and Zucman \(2018\)](#) for the United States. *Notes:* The table shows the average annual real pretax income of various groups of the population in Western and Northern Europe, Eastern Europe and the United States in 2017. Incomes measured at purchasing power parity, €1 = \$1.3. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses.

Table IV  
Average annual pretax income growth in Europe and the United States, 1980-2017

	Eastern Europe		Northern Europe		Western Europe		United States	
	1980-2017	2007-2017	1980-2017	2007-2017	1980-2017	2007-2017	1980-2017	2007-2017
Full population	1.2%	2.2%	1.8%	0.7%	1.0%	0.0%	1.4%	0.4%
Bottom 50%	0.3%	2.8%	1.5%	0.3%	0.7%	0.0%	-0.1%	-1.2%
Bottom 20%	-1.3%	1.6%	1.2%	-0.5%	0.7%	-0.6%	-1.1%	-2.9%
Next 30%	0.6%	3.0%	1.5%	0.5%	0.7%	0.1%	0.1%	-0.9%
Middle 40%	1.1%	2.3%	1.7%	1.0%	0.8%	0.0%	1.0%	0.5%
Top 10%	2.2%	1.7%	2.4%	0.6%	1.4%	0.0%	2.3%	0.9%
Top 1%	3.8%	1.1%	3.2%	-0.6%	1.9%	-0.3%	3.3%	1.0%
Top 0.1%	5.7%	0.1%	4.3%	-1.9%	2.3%	-1.0%	4.2%	1.3%
Top 0.01%	7.7%	-1.0%	5.4%	-3.3%	2.6%	-1.7%	4.9%	1.4%
Top 0.001%	9.8%	-2.1%	6.6%	-4.6%	2.9%	-2.5%	5.4%	0.5%

*Source:* Authors' computations combining surveys, tax data and national accounts for Europe; [Piketty, Saez, and Zucman \(2018\)](#) for the United States.

*Notes:* The table shows the average annual real pretax income growth of various groups of the population in Western and Northern Europe, Eastern Europe and the United States over the 1980-2017 and 2007-2018 periods. Incomes measured at purchasing power parity. The unit of observation is the adult individual aged 20 or above. Income is split equally among spouses.

Table V  
 Predistribution versus redistribution in Europe and the United States:  
 estimates of the top 10% share using different concepts and data sources

	United States	Europe	Difference
<b>Surveys</b>			
Factor income	35.9%	33.3%	+2.6 pp.
Pretax income	33.1%	26.9%	+6.2 pp.
Posttax income	28.9%	24.3%	+4.7 pp.
<b>Surveys + Tax data</b>			
Factor income	43.5%	37.7%	+5.8 pp.
Pretax income	41.7%	32.1%	+9.6 pp.
Posttax income	35.9%	28.8%	+7.2 pp.
<b>DINA</b>			
Factor income	46.0%	37.9%	+8.1 pp.
Pretax income	45.7%	34.3%	+11.4 pp.
Posttax income	37.1%	30.4%	+6.7 pp.

*Source:* Authors' computations combining surveys, tax data and national accounts for Europe (population-weighted average). Survey-based estimates for the United States come from the Luxembourg Income Study. Surveys + Tax data and DINA estimates for the United States come from [Piketty, Saez, and Zucman \(2018\)](#). *Notes:* The table shows how estimates of top 10% factor income, pretax income, and posttax income shares in Europe and the United States in 2017 vary depending on whether they are observed in household surveys, computed by combining surveys and tax data, or estimated using the distributional national accounts methodology.