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ABSTRACT

This paper combines tax, survey, and national accounts data to estimate the distribution of
national income in the United States since 1913. Our distributional national accounts capture
100% of national income, allowing us to compute growth rates for each quantile of the income
distribution consistent with macroeconomic growth. We estimate the distribution of both pre-tax
and post-tax income, making it possible to provide a comprehensive view of how government
redistribution affects inequality. Average pre-tax national income per adult has increased 60%
since 1980, but we find that it has stagnated for the bottom 50% of the distribution at about
$16,000 a year. The pre-tax income of the middle class—adults between the median and the 90th
percentile—has grown 40% since 1980, faster than what tax and survey data suggest, due in
particular to the rise of tax-exempt fringe benefits. Income has boomed at the top: in 1980, top
1% adults earned on average 27 times more than bottom 50% adults, while they earn 81 times
more today. The upsurge of top incomes was first a labor income phenomenon but has mostly
been a capital income phenomenon since 2000. The government has offset only a small fraction
of the increase in inequality. The reduction of the gender gap in earnings has mitigated the
increase in inequality among adults. The share of women, however, falls steeply as one moves up
the labor income distribution, and is only 11% in the top 0.1% today.

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1 Introduction

Income inequality has increased in many developed countries over the last several decades. This trend has attracted considerable interest among academics, policy-makers, and the general public. In recent years, following up on Kuznets' (1953) pioneering attempt, a number of authors have used administrative tax records to construct long-run series of top income shares (Alvaredo et al., 2011-2016). Yet despite this endeavor, we still face three important limitations when measuring income inequality. First and most important, there is a large gap between national accounts—which focus on macro totals and growth—and inequality studies—which focus on distributions using survey and tax data, usually without trying to be fully consistent with macro totals. This gap makes it hard to address questions such as: What fraction of economic growth accrues to the bottom 50%, the middle 40%, and the top 10% of the distribution? How much of the rise in income inequality owes to changes in the share of labor and capital in national income, and how much to changes in the dispersion of labor earnings, capital ownership, and returns to capital? Second, about a third of U.S. national income is redistributed through taxes, transfers, and public good spending. Yet we do not have a good measure of how the distribution of pre-tax income differs from the distribution of post-tax income, making it hard to assess how government redistribution affects inequality. Third, existing income inequality statistics use the tax unit or the household as unit of observation, adding up the income of men and women. As a result, we do not have a clear view of how long-run trends in income concentration are shaped by the major changes in women labor force participation—and gender inequality generally—that have occurred over the last century.

This paper attempts to compute inequality statistics for the United States that overcome the limits of existing series by creating *distributional national accounts*. We combine tax, survey, and national accounts data to build new series on the distribution of national income since 1913. In contrast to previous attempts that capture less than 60% of US national income—such as Census bureau estimates (US Census Bureau 2016) and top income shares (Piketty and Saez, 2003)—our estimates capture 100% of the national income recorded in the national accounts. This enables us to provide decompositions of growth by income groups consistent with macroeconomic growth. We compute the distribution of both pre-tax and post-tax income. Post-tax series deduct all taxes and add back all transfers and public spending, so that both pre-tax and post-tax incomes add up to national income. This allows us to provide the first comprehensive view of how government redistribution affects inequality. Our benchmark series uses the adult individual as the unit of observation and splits income equally among spouses.

We also report series in which each spouse is assigned her or his own labor income, enabling us to study how long-run changes in gender inequality shape the distribution of income.

Distributional national accounts provide information on the dynamic of income across the entire spectrum—from the bottom decile to the top 0.001%—that, we believe, is more accurate than existing inequality data. Our estimates capture employee fringe benefits, a growing source of income for the middle-class that is overlooked by both Census bureau estimates and tax data. They capture all capital income, which is large—about 30% of total national income—and concentrated, yet is very imperfectly covered by surveys—due to small sample and top coding issues—and by tax data—as a large fraction of capital income goes to pension funds and is retained in corporations. They make it possible to produce long-run inequality statistics that control for socio-demographic changes—such as the rise in the fraction of retired individuals and the decline in household size—contrary to the currently available tax-based series.

Methodologically, our contribution is to construct micro-files of pre-tax and post-tax income consistent with macro aggregates. These micro-files contain all the variables of the national accounts and synthetic individual observations that we obtain by statistically matching tax and survey data and making explicit assumptions about the distribution of income categories for which there is no directly available source of information. By construction, the totals in these micro-files add up to the national accounts totals, while the distributions are consistent with those seen in tax and survey data. These files can be used to compute a wide array of distributional statistics—labor and capital income earned, taxes paid, transfers received, wealth owned, etc.—by age groups, gender, and marital status. Our objective, in the years ahead, is to construct similar micro-files in as many countries as possible in order to better compare inequality across countries.[1] Just like we use GDP or national income to compare the macroeconomic performances of countries today, so could distributional national accounts be used to compare inequality across countries tomorrow.

We stress at the outset that there are numerous data issues involved in distributing national income, discussed in the text and the online appendix.[2] First, we take the national accounts as a given starting point, although we are well aware that the national accounts themselves are imperfect (e.g., Zucman 2013). They are, however, the most reasonable starting point, because they aggregate all the available information from surveys, tax data, corporate income state-

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[1] All updated files and results will be made available on-line on the World Wealth and Income Database (WID.world) website: `http://www.wid.world/`. All the US results and data are also posted at `http://gabriel-zucman.eu/usdina/`.

[2] The online appendix is available at `http://gabriel-zucman.eu/files/PSZ2016DataAppendix.pdf`.

ments, and balance sheets, etc., in an standardized, internationally-agreed-upon and regularly improved upon accounting framework. Second, imputing all national income, taxes, transfers, and public goods spending requires making assumptions on a number of complex issues, such as the economic incidence of taxes and who benefits from government spending. Our goal is not to provide definitive answers to these questions, but rather to be comprehensive, consistent, and explicit about what assumptions we are making and why. We view our paper as attempting to construct prototype distributional national accounts, a prototype that could be improved upon as more data become available, new knowledge emerges on who pays taxes and benefits from government spending, and refined estimation techniques are developed—just as today's national accounts are regularly improved.

The analysis of our US distributional national accounts yields a number of striking findings.

First, our data show a sharp divergence in the growth experienced by the bottom 50% versus the rest of the economy. The average pre-tax income of the bottom 50% of adults has stagnated since 1980 at about $16,000 per adult (in constant 2014 dollars, using the national income deflator), while average national income per adult has grown by 60% to $64,500 in 2014. As a result, the bottom 50% income share has collapsed from about 20% in 1980 to 12% in 2014. In the meantime, the average pre-tax income of top 1% adults rose from $420,000 to about $1.3 million, and their income share increased from about 12% in the early 1980s to 20% in 2014. The two groups have essentially switched their income shares, with 8 points of national income transferred from the bottom 50% to the top 1%. The top 1% income share is now almost twice as large as the bottom 50% share, a group that is by definition 50 times more numerous. In 1980, top 1% adults earned on average 27 times more than bottom 50% adults before tax while today they earn 81 times more.

Second, government redistribution has offset only a small fraction of the increase in pre-tax inequality. Even after taxes and transfers, there has been close to zero growth for working-age adults in the bottom 50% of the distribution since 1980. The aggregate flow of individualized government transfers has increased, but these transfers are largely targeted to the elderly and the middle-class (individuals above the median and below the 90th percentile). Transfers that go to the bottom 50% have not been large enough to lift income significantly. Given the massive changes in the pre-tax distribution of national income since 1980, there are clear limits to what redistributive policies can achieve. In light of the collapse of bottom 50% primary incomes, we feel that policy discussions should focus on how to equalize the distribution of primary assets, including human capital, financial capital, and bargaining power, rather than merely

ex-post redistribution. Policies that could raise bottom 50% pre-tax incomes include improved education and access to skills, which may require major changes in the system of education finance and admission; reforms of labor market institutions, including minimum wage, corporate governance, and worker co-determination; and steeply progressive taxation, which can affect pay determination and pre-tax distribution, particularly at the top end (see, e.g., Piketty, Saez and Stantcheva 2014, and Piketty 2014).

Third, we find that the upsurge of top incomes has mostly been a capital-driven phenomenon since the late 1990s. There is a widespread view that rising income inequality mostly owes to booming wages at the top end, i.e., a rise of the "working rich." Our results confirm that this view is correct from the 1970s to the 1990s. But in contrast to earlier decades, the increase in income concentration over the last fifteen years owes to a boom in the income from equity and bonds at the top. The working rich are either turning into or being replaced by rentiers. Top earners became younger in the 1980s and 1990s but have been growing older since then.

Fourth, the reduction in the gender gap has mitigated the increase in inequality among adults since the late 1960s, but the United States is still characterized by a spectacular glass ceiling. When we allocate labor incomes to individual earners (instead of splitting it equally within couples, as we do in our benchmark series), the rise in inequality is less dramatic, thanks to the rise of female labor market participation. Men aged 20-64 earned on average 3.7 times more labor income than women aged 20-64 in the early 1960s, while they earn 1.7 times more today. Until the early 1980s, the top 10%, top 1%, and top 0.1% of the labor income distribution were less than 10% women. Since then, this share has increased, but the increase is smaller the higher one moves up in the distribution. As of 2014, women make only about 16% of the top 1% labor income earners, and 11% of the top 0.1%.

The paper is organized as follows. Section 2 relates our work to the existing literature. Section 3 lays out our methodology. In Section 4, we present our results on the distribution of pre-tax and post-tax national income, and we provide decompositions of growth by income groups consistent with macroeconomic growth. Section 5 analyzes the role of changes in gender inequality, factor shares, and taxes and transfers for the dynamic of US income inequality. Section 6 compares and reconciles our results with previous estimates of US income concentration. We conclude in Section 7.

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2 Previous Attempts at Introducing Distributional Measures in the National Accounts

There is a long tradition of research attempting to introduce distributional measures in the national accounts. The first national accounts in history—the famous social tables of King produced in the late 17th century—were in fact distributional national accounts, showing the distribution of England's income, consumption, and saving across 26 social classes—from temporal lords and baronets down to vagrants—in the year 1688 (see Barnett, 1936). In the United States, Kuznets was interested in both national income and its distribution and made path-breaking advances on both fronts (Kuznets 1941, 1953).[3] His innovation was estimating top income shares by combining tabulations of federal income tax returns—from which he derived the income of top earners using Pareto extrapolations—and newly constructed national accounts series—that he used to compute the total income denominator. Kuznets, however, did not fully integrate the two approaches: his inequality series capture taxable income only and miss all tax-exempt capital and labor income. The top income shares later computed by Piketty (2001, 2003), Piketty and Saez (2003), Atkinson (2005) and Alvaredo et al. (2011-2016) extended Kuznets' methodology to more countries and years but did not address this shortcoming.

Introducing distributional measures in the national accounts has received renewed interest in recent years. In 2009, a report from the Commission on the Measurement of Economic Performance and Social Progress emphasized the importance of including distributional measures such as household income quintiles in the System of National Accounts (Stiglitz, Sen and Fitoussi, 2009). In response to this report, a number of countries, such as Australia, introduced distributional statistics in their national accounts (Australian Bureau of Statistic, 2013) while others are in the process of doing so. Furlong (2014), Fixler and Johnson (2014), McCully (2014), and Fixler et al. (2015) describe the ongoing U.S. effort, which focuses on scaling up income from the Current Population Survey to match personal income.[4]

There are two main methodological differences between our paper and the work currently conducted by statistical agencies. First, we start with tax data—rather than surveys—that we supplement with surveys to capture forms of income that are not visible in tax returns, such as tax-exempt transfers. The use of tax data is critical to capture the top of the distribution,

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[3]Earlier attempts include King (1915, 1927, 1930).

[4]Using tax data, Auten and Splinter (2016) have recently produced US income concentration statistics since 1962 that improve upon the Piketty and Saez (2003) fiscal income series by distributing total personal income (instead of total pre-tax and post-tax national income as we do here) from the national accounts. We view their work as complementary to ours.

which cannot be studied properly with surveys because of top-coding, insufficient over-sampling of the top, sampling errors, or non-sampling errors.[5] Second, we are primarily interested in the distribution of total national income rather than household or personal income. National income is in our view a more meaningful starting point, because it is internationally comparable, it is the aggregate used to compute macroeconomic growth, and it is comprehensive, including all forms of income that eventually accrue to individuals.[6] While we focus on national income, our micro-files can be used to study a wide range of income concepts, including the household or personal income concepts more traditionally analyzed.

Little work has contrasted the distribution of pre-tax income with that of post-tax income. Top income share studies only deal with pre-tax income, as many forms of transfers are tax-exempt. Official income statistics from the Census Bureau focus on pre-tax income and include only some government transfers (US Census Bureau 2016).[7] Congressional Budget Office estimates compute both pre-tax and post-tax inequality measures, but they include only Federal taxes and do not try to incorporate government consumption (US Congressional Budget Office 2016). By contrast, we attempt to allocate all taxes (including State and local taxes) and all forms of government spending in order to provide a comprehensive view of how government redistribution affects inequality.

Last, there is a large and growing theoretical literature jointly analyzing economic growth and income distribution. Historically, the Kuznets curve theory of how inequality evolves over the path of development (Kuznets, 1955) came out of the seminal empirical work by Kuznets (1953) on US income inequality. We hope that our estimates will similarly be fruitful to stimulate future theoretical work on the interplay between growth and inequality.[8]

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[5]Another possibility would be to use the CPS as the baseline dataset and supplement it with tax data for the top decile, where the CPS suffers from small samples, poorly measured capital income, and top-coding issues. The advantage of starting from the CPS would be that it has been the most widely known and used dataset to analyze US income and wage inequality for many decades. We leave this alternative approach to future work.

[6]Personal income is a concept that is specific to the U.S. National Income and Product Accounts (NIPA). It is an ambiguous concept (neither pre-tax, nor post-tax), as it does not deduct taxes but adds back cash government transfers. The System of National Accounts (United Nations, 2009) does not use personal income.

[7]In our view, not deducting taxes but counting (some) transfers is not conceptually meaningful, but it parallels the definition of personal income in the US national accounts.

[8]In recent decades, a lot of the work on inequality and growth has focused on the role of credit constraints and wealth inequality (see, e.g., Galor and Zeira, 1992). Our data jointly capture wealth, capital income, and labor income, making it possible to cast light on this debate and to study changes in the structure of inequality, e.g., the extent to which there has truly been a demise of the capitalists-workers class structure (Galor and Moav 2006).

3 Methodology to Distribute US National Income

In this section, we outline the main concepts and methodology we use to distribute US national income. All the data sources and computer code we use are described in Online Appendix A; here we focus on the main conceptual issues.[9]

3.1 The Income Concept We Use: National Income

We are interested in the distribution of total national income. We follow the official definition of national income codified in the latest System of National Accounts (SNA, United Nations, 2009), as we do for all other national accounts concepts used in this paper. National income is GDP minus capital depreciation plus net income received from abroad. Although macroeconomists, the press, and the general public often focus on GDP, national income is a more meaningful starting point for two reasons. First, capital depreciation is not economic income: it does not allow one to consume or accumulate wealth. Allocating depreciation to individuals would artificially inflate the economic income of capital owners. Second, including foreign income is important, because foreign dividends and interest are sizable for top earners.[10] In moving away from GDP and toward national income, we follow one of the recommendations made by the Stiglitz, Sen and Fitoussi (2009) commission and also return to the pre-World War II focus on national income (King 1930, Kuznets, 1941).

The national income of the United States is the sum of all the labor income—the flow return to human capital—and capital income—the flow return to non-human capital—that accrues to U.S. resident individuals. Some parts of national income never show up on any person's bank account, but it is not a reason to ignore them. Two prominent examples are the imputed rents of homeowners and taxes. First, there is an economic return to owning a house, whether the house is rented or not; national income therefore includes both monetary rents—for houses rented out—and imputed rents—for owner-occupiers. Second, some income is immediately paid to the government in the form of payroll or corporate taxes, so that no individual ever feels it

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[9]A discussion of the general issues involved in creating distributional national accounts is presented in Alvaredo et al. (2016). These guidelines are not specific to the United States but they are based on the lessons learned from constructing the US distributional national accounts presented here, and from similar on-going projects in other countries.

[10]National income also includes the sizable flow of undistributed profits reinvested in foreign companies that are more than 10% U.S.-owned (hence are classified as U.S. direct investments abroad). It does not, however, include undistributed profits reinvested in foreign companies in which the U.S. owns a share of less than 10% (classified as portfolio investments). Symmetrically, national income deducts all the primary income paid by the U.S. to non-residents, including the undistributed profits reinvested in U.S. companies that are more than 10% foreign-owned.

earns that fraction of national income. But these taxes are part of the flow return to capital and labor and as such accrue to the owners of the factors of production. The same is true for sales and excise taxes. Out of their sales proceeds at market prices (including sales taxes), producers pay workers labor income and owners capital income but must also pay sales and excise taxes to the government. Hence, sales and excise taxes are part of national income even if they are not explicitly part of employee compensation or profits. Who exactly earns the fraction of national income paid in the form of corporate, payroll, and sales taxes is a tax incidence question to which we return in Section 3.3 below. Although national income includes all the flow return to the factors of production, it does not include the change in the price of these factors; i.e., it excludes the capital gains caused by pure asset price changes.[11]

National income is larger and has been growing faster than the other income concepts traditionally used to study inequality. Figure 1 provides a reconciliation between national income—as recorded in the national accounts—and the fiscal income reported by individual taxpayers to the IRS, for labor and capital income separately.[12] About 70% of national income is labor income and 30% is capital income. Although most of national labor income is reported on tax returns today, the gap between taxable labor income and national labor income has been growing over the last several decades. Untaxed labor income includes tax-exempt fringe benefits, employer payroll taxes, the labor income of non filers (large before the early 1940s) and unreported labor income due to tax evasion. The fraction of labor income which is taxable has declined from 80%-85% in the post-World War II decades to just under 70% in 2014, due to the rise of employee fringe benefits. As for capital, only a third of total capital income is reported on tax returns. In addition to the imputed rents of homeowners and various taxes, untaxed capital income includes the dividends and interest paid to tax-exempt pension accounts, and corporate retained earnings. The low ratio of taxable to total capital income is not a new phenomenon—there is no trend in this ratio over time. However, when taking into account both labor and capital income, the fraction of national income that is reported in individual income tax data has declined from 70% in the late 1970s to about 60% today. This result implies that tax data under-estimate

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[11]In the long-run, a large fraction of capital gains arises from the fact that corporations retain part of their earning, which leads to share price appreciation. Since retained earnings are part of national income, these capital gains are in effect included in our series on an accrual basis. In the short run, however, most capital gains are pure asset price effects. These short-term capital gains are excluded from national income and from our series.

[12]A number of studies have tried to reconcile totals from the national accounts and totals from household surveys or tax data; see, e.g., Fesseau, Wolff and Mattonetti (2012) and Fesseau and Mattonetti (2013). Such comparisons have long been conducted at national levels (for example, Atkinson and Micklewright, 1983, for the UK) and there have been earlier cross country comparisons (for example in the OECD report by Atkinson, Rainwater, and Smeeding, 1995, Section 3.6).

both the levels and growth rates of U.S. incomes. They particularly under-estimate growth for the middle-class, as we shall see.

3.2 Pre-tax Income and and Post-tax Income

At the individual level, income differs whether it is observed before or after the operation of the pension system and government redistribution. We therefore define three income concepts that all add up to national income: pre-tax factor income, pre-tax national income, and post-tax national income. The key difference between pre-tax factor income and pre-tax national income is the treatment of pensions, which are counted on a contribution basis for pre-tax factor income and on a distribution basis for pre-tax national income. Post-tax national income deducts all taxes and adds back all public spending, including public goods consumption. By construction, average pre-tax factor income, pre-tax national income, and post-tax national income are all the same in our benchmark series (and equal to average national income), which makes comparing growth rates straightforward.

Pre-tax factor income Pre-tax factor income (or more simply factor income) is equal to the sum of all the income flows accruing to the individual owners of the factors of production, labor and capital, before taking into account the operation of pensions and the tax and transfer system. Pension benefits are not included in factor income, nor is any form of private or public transfer. Factor income is also gross of all taxes and all contributions, including contributions to private pensions and Social Security. One problem with this concept of income is that retired individuals typically have little factor income, so that the inequality of factor income tends to rise mechanically with the fraction of old-age individuals in the population, potentially biasing comparisons over time and across countries. Looking at the distribution of factor incomes can however yield certain insights, especially if we restrict the analysis to the working-age population. For instance, it allows to measure the distribution of labor costs paid by employers.

Pre-tax national income Pre-tax national income (or more simply pre-tax income) is our benchmark concept to study the distribution of income before government intervention. Pre-tax income is equal to the sum of all income flows going to labor and capital, after taking into account the operation of private and public pensions, as well as disability and unemployment insurance, but before taking into account other taxes and transfers. That is, the only difference with factor income is that we deduct the contributions to private and public pensions including Social Security—old age, survivors and disability—and unemployment insurance from incomes,

and add back the corresponding benefits.[13] Pre-tax income is broader but conceptually similar to what the IRS attempts to tax, as pensions, Social Security, and unemployment benefits are largely taxable, while contributions are largely tax deductible.[14]

Post-tax national income   Post-tax national income (or more simply post-tax income) is equal to pre-tax income after subtracting all taxes and adding all forms of government spending—cash transfers, in-kind transfers, and collective consumption expenditures.[15] It is the income that is available for saving and for the consumption of private and public goods. One advantage of allocating all forms of government spending to individuals—and not just cash transfers—is that it ensures that post-tax income adds up to national income, just like factor income and pre-tax income.[16] It can be useful, however, to focus on post-tax income including cash transfers transfers only—for instance to study the distribution of private consumption. We therefore define post-tax disposable income as pre-tax national income minus all taxes plus monetary transfers only. Post-tax disposable income does not add up to national income but is easier to measure than post-tax national income, because it does not require allocating in-kind transfers and collective consumption expenditure across the distribution.

Our objective is to construct the distribution of factor income, pre-tax income, and post-tax income. To do so, we match tax data to survey data and make explicit assumptions about the distribution of income categories for which there is no available source of information. We start by describing how we move from fiscal income to total pre-tax income, before describing how we deal with taxes and transfers to obtain post-tax income.

3.3   From Fiscal Income to Pre-Tax National Income

The starting point of our distributional national accounts is the fiscal income reported by tax-payers to the IRS on individual income tax returns. The main data source, for the post-1962

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[13]Contributions to pensions include the capital income earned and reinvested in tax-exempt pension plans and accounts. On aggregate, contributions to private pensions largely exceed distributions in the United States, while contributions to Social Security have been smaller than Social Security disbursements in recent years (see Appendix Table I-A10). To match national income, we add back the surplus or deficit to individuals, proportionally to wage income for private pensions, and proportionally to taxes paid and benefits received for Social Security (as we do for the government deficit when computing post-tax income, see below).

[14]Social Security benefits were fully tax exempt before 1984 (as well as unemployment benefits before 1979).

[15]Social Security and unemployment insurance taxes were already subtracted in pre-tax income and the corresponding benefits added in pre-tax income, so they do not need to be subtracted and added again when going from pre-tax to post-tax income.

[16]Government spending typically exceeds government revenue. In order to match national income, we add back to individuals the government deficit proportionally to taxes paid and benefits received; see Section 3.4 below.

period, is the set of annual public-use micro-files created by the Statistics of Income division of the IRS and available through the NBER that provide information for a large sample of taxpayers with detailed income categories. We supplement this dataset using the internal use Statistics of Income (SOI) Individual Tax Return Sample files from 1979 onward.[17] For the pre-1962 period, no micro-files are available so we rely instead on the Piketty and Saez (2003) series of top incomes which were constructed from annual tabulations of income and its composition by size of income (U.S. Treasury Department, Internal Revenue Service, Statistics of Income, 1916-present). Tax data contain information about most of the components of pre-tax income, including private pension distributions—the vast majority of which are taxable—, Social Security benefits (taxable since 1984), and unemployment compensation (taxable since 1979). However, they miss a growing fraction of labor income and about two-thirds of economic capital income.

Non-filers To supplement tax data, we start by adding synthetic observations representing non-filing tax units using the Current Population Survey (CPS). We identify non-filers in the CPS based on their taxable income, and weight these observations such that the total number of adults in our final dataset matches the total number of adults living in the United States, for both the working-age population (aged 20-65) and the elderly.[18]

Tax-exempt labor income To capture total pre-tax labor income in the economy, we proceed as follows. First, we compute employer payroll taxes by applying the statutory tax rate in each year. Second, we allocate non-taxable health and pension fringe benefits to individual workers using information reported in the CPS.[19] Fringe benefits have been reported to the

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[17]SOI maintains high quality individual tax sample data since 1979 and population-wide data since 1996. All the estimates using internal data presented in this paper are gathered in Saez (2016). Saez (2016) uses internal data statistics to supplement the public use files with tabulated information on age, gender, earnings split for joint filers, and non-filers characteristics which are used in this study.

[18]The IRS receives information returns that also allow to estimate the income of non-filers. Saez (2016) computes detailed statistics for non-filers using IRS data for the period 1999-2014. We have used these statistics to adjust our CPS-based non-filers. Social security benefits, the major income category for non-filers, is very similar in both CPS and IRS data and does not need adjustment. However, there are more wage earners and more wage income per wage earner in the IRS non-filers statistics (perhaps due to the facts that very small wage earners may report zero wage income in CPS). We adjust our CPS non-filers to match the IRS non-filers characteristics; see Appendix Section B.1.

[19]More precisely, we use the CPS to estimate the probability to be covered by a retirement or health plan in 40 wage bins (decile of the wage distribution × marital status × above or below 65 years old), and we impute coverage at the micro-level using these estimated probabilities. For health, we then impute fixed benefits by bin, as estimated from the CPS and adjusted to match the macroeconomic total of employer-provided health benefits. For pensions, we assume that the contributions of pension plans participants are proportional to wages winsorized at the 99th percentile.

IRS on W2 forms in recent years—employee contributions to defined contribution plans since 1999, and health insurance since 2013. We have checked that our imputed pension benefits are consistent with the high quality information reported on W2s.[20] They are also consistent with the results of Pierce (2001), who studies non-wage compensation using a different dataset, the employment cost index micro-data. Like Pierce (2001), we find that the changing distribution of non-wage benefits has slightly reinforced the rise of wage inequality.[21]

Tax-exempt capital income   To capture total pre-tax capital income in the economy, we first distribute the total amount of household wealth recorded in the Financial Accounts following the methodology of Saez and Zucman (2016). That is, we capitalize the interest, dividends and realized capital gains, rents, and business profits reported to the IRS to capture fixed-income claims, equities, tenant-occupied housing, and business assets. For itemizers, we impute main homes and mortgage debt by capitalizing property taxes and mortgage interest paid. We impute all forms of wealth that do not generate reportable income or deductions—currency, non-mortgage debt, pensions, municipal bonds before 1986, and homes and mortgages for non-itemizers—using the Survey of Consumer Finances.[22] Next, for each asset class we compute a macroeconomic yield by dividing the total flow of capital income by the total value of the corresponding asset. For instance, the yield on corporate equities is the flow of corporate profits—distributed and retained—accruing to U.S. residents divided by the market value of U.S.-owned equities. Last, we multiply individual wealth components by the corresponding yield. By construction, this procedure ensures that individual capital income adds up to total capital income in the economy. In effect, it blows up dividends and capital gains observed in tax data in order to match the macro flow of corporate profits including retained earnings—and similarly for other asset classes.

Is it reasonable to assume that retained earnings are distributed like dividends and realized capital gains? The wealthy might invest in companies that do not distribute dividends to avoid the dividend tax, and they might never sell their shares to avoid the capital gains tax, in which case retained earnings would be more concentrated than dividends and capital gains. Income tax avoidance might also have changed over time as top dividend tax rates rose and

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[20]The Statistics of Income division of the IRS produces valuable statistics on pension contributions reported on W2 wage income forms. In the future, our imputations could be refined using individual level information on pensions (and now health insurance as well) available on W2 wage income tax forms.

[21]In our estimates, the share of total non-wage compensation earned by bottom 50% income earners has declined from about 25% in 1970 to about 16% today, while the share of taxable wages earned by bottom 50% income earners has fallen from 25% to 17%, see Appendix Table II-B15.

[22]For complete methodological details, see Saez and Zucman (2016).

fell, biasing the trends in our inequality series. We have investigated this issue carefully and found no evidence that such avoidance behavior is quantitatively significant—even in periods when top dividend tax rates were very high. Since 1995, there is comprehensive evidence from matched estates-income tax returns that taxable rates of return on equity are similar across the wealth distribution, suggesting that equities (hence retained earnings) are distributed similarly to dividends and capital gains (Saez and Zucman 2016, Figure V). This also was true in the 1970s when top dividend tax rates were much higher. Exploiting a publicly available sample of matched estates-income tax returns for people who died in 1976, Saez and Zucman (2016) find that despite facing a 70% top marginal income tax rate, individuals in the top 0.1% and top 0.01% of the wealth distribution had a high dividend yield (4.7%), almost as large as the average dividend yield of 5.1%. Even then, wealthy people were unable or unwilling to disproportionally invest in non-dividend paying equities. These results suggest that allocating retained earnings proportionally to equity wealth is a reasonable benchmark.

Tax incidence assumptions Computing pre-tax income requires making tax incidence assumptions. Should the corporate tax, for instance, be fully added to corporate profits, hence allocated to shareholders? As is well known, the burden of a tax is not necessarily borne by whoever nominally pays it. Behavioral responses to taxes can affect the relative price of factors of production, thereby shifting the tax burden from one factor to the other; taxes also generate deadweight losses (see Fullerton and Metcalf, 2002 for a survey). In this paper, we do not attempt to measure the complete effects of taxes on economic behavior and the money-metric welfare of each individual. Rather, and perhaps as a reasonable first approximation, we make the following simple assumptions regarding tax incidence.[23]

First, we assume that taxes neither affect the overall level of national income nor its distribution across labor and capital. Of course this is unlikely to be true. An alternative strategy would be to make explicit assumptions about the elasticities of supply and demand for labor and capital, so as to estimate what would be the counterfactual level of output and income if the tax system did not exist (one would also need to model how public infrastructures are paid for, and how they contribute to the production function). This is beyond the scope of the present paper and is left for future work. We prefer to adopt a more modest objective: we simply assume that pre-tax and post-tax income both add up to the same national income total, and that taxes on capital are borne by capital only, while taxes on labor are borne by

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[23]For a detailed discussion of our tax incidence assumptions, see the Online Appendix Section B.4.

labor only. In a standard tax incidence model, this is indeed the case whenever the elasticity e_L of labor supply with respect to the net-of-tax wage rate and the elasticity e_K of capital supply with respect to the net-of-tax rate of return are small relative to the elasticity of substitution σ between capital and labor.[24] This implies, for instance, that payroll taxes are entirely paid by workers, irrespective of whether they are nominally paid by employers or employees.

Second, within the capital sector, and consistent with the seminal analysis of Harberger (1962), we allow for the corporate tax to be shifted to forms of capital other than equities.[25] We differ from Harberger's analysis only in that we treat residential real estate separately. Because the residential real estate market does not seem perfectly integrated with financial markets, it seems more reasonable to assume that corporate taxes are borne by all capital except residential real estate. We symmetrically assume that residential property taxes only fall on residential real estate. Last, we assume that sales and excise taxes are paid proportionally to factor income minus saving.[26] We have also tested a number of alternative tax incidence assumptions, and found only second-order effects on the level and time pattern of our pre-tax income series.[27] Our incidence assumptions are broadly similar to the assumptions made by the US Congressional Budget Office (2016) which produces distributional statistics for Federal taxes only.[28] Our micro-files are constructed in such a way that users can make alternative tax incidence assumptions. These assumptions might be improved as we learn more about the economic incidence of taxes. It is also worth noting that our tax incidence assumptions only matter for the distribution of pre-tax income—they do not matter for post-tax series, which by definition subtract all taxes.

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[24]However whenever supply effects cannot be neglected, the aggregate level of domestic output and national income will be affected by the tax system, and all taxes will be partly shifted to both labor and capital.

[25]Harberger (1962) shows that under reasonable assumptions, capital bears exactly 100 percent of the corporate tax but that the tax is shifted to all forms of capital.

[26]In effect, this assumes that sales taxes are shifted to prices rather than to the factors of production so that they are borne by consumers. In practice, assumptions about the incidence of sales taxes make very little difference to the level and trend of our income shares, as sales taxes are not very important in the United States and have been constant to 5%-6% of national income since the 1930s; see Appendix Table I-S.A12b.

[27]For instance, we tried allocating the corporate tax to all capital assets including housing; allocating residential property taxes to all capital assets; allocating consumption taxes proportionally to income (instead of income minus savings). None of this made any significant difference.

[28]CBO assumes that corporate taxes fall 75% on all forms of capital and 25% on labor income. Because U.S. multinational firms can fairly easily avoid US taxes by shifting profits to offshore tax havens without having to change their actual production decisions (e.g., through the manipulation of transfer prices), it does not seem plausible to us that a significant share of the US corporate tax is borne by labor (see Zucman, 2014). By contrast, in small countries—where firms' location decisions may be more elastic—or in countries that tax capital at the source but do not allow firms to easily avoid taxes by artificially shifting profits offshore, it is likely that a more sizable fraction of corporate taxes fall on labor.

3.4   From Pre-Tax Income to Post-Tax Income

To move from pre-tax to post-tax income, we deduct all taxes and add back all government spending. We incorporate all levels of government (federal, state, and local) in our analysis of taxes and government spending, which we decompose into monetary transfers, in-kind transfers, and collective consumption expenditure. Using our micro-files, it is possible to separate federal from state and local taxes and spending.

Monetary social transfers.   We impute all monetary social transfers directly to recipients. The main monetary transfers are the earned income tax credit, the aid for families with dependent children (which became the temporary aid to needy families in 1996), food stamps,[29] and supplementary security income. Together, they make about 2.5% of national income, see Appendix Table I-S.A11. (Remember that Social security pensions, unemployment insurance, and disability benefits, which together make about 6% of national income, are already included in pre–tax income). We impute monetary transfers to their beneficiaries based on rules and CPS data.

In-kind social transfers.   In-kind social transfers are all transfers that are not monetary (or quasi-monetary) but are individualized, that is, go to specific beneficiaries. In-kind transfers amount to about 8% of national income today. Almost all in-kind transfers in the United States correspond to health benefits, primarily Medicare and Medicaid. Beneficiaries are again imputed based on rules (such as all persons aged 65 and above or persons receiving disability insurance for Medicare) or based on CPS data (for Medicaid). Medicare and Medicaid benefits are imputed as a fixed amount per beneficiary at cost value.

Collective expenditure (public goods consumption).   We allocate collective consumption expenditure proportionally to post-tax disposable income. Given that we know relatively little about who benefits from spending on defense, police, the justice system, infrastructure, and the like, this seems like the most reasonable benchmark to start with. It has the advantage of being neutral: our post-tax income shares are not affected by the allocation of public goods consumption. There are of course other possible ways of allocating public goods. The two polar cases would be distributing public goods equally (fixed amount per adult), and proportionally

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[29]Food stamps (renamed supplementary nutrition assistance programs as of 2008) is not a monetary transfer strictly speaking as it must be used to buy food but it is almost equivalent to cash in practice as food expenditures exceed benefits for most families (see Currie, 2003 for a survey).

to wealth (which might be justifiable for some types of public goods, such as police and defense spending). An equal allocation would increase the level of income at the bottom, but would not increase its growth, because public goods spending has been constant around 18% of national income since the end of World War II. Our treatment of public goods could easily be improved as we learn more about who benefits from them.

In our benchmark series, we also allocate public education consumption expenditure proportionally to post-tax disposable income.[30] This can be justified from a lifetime perspective where everybody benefits from education and where higher earners attended better schools and for longer. In the Online Appendix Section B.5.2, we propose a polar alternative where we consider the current parents' perspective and attribute education spending as a fix lump sum per child.[31] This slightly increases the level of bottom 50% post-tax incomes but without affecting the trend.[32]

Government deficit   Government revenue usually does not add up to total government expenditure. To match national income, we impute the primary government deficit to individuals. We allocate 50% of the deficit proportionally to taxes paid, and 50% proportionally to benefits received. This effectively assumes that any government deficit will translate into increased taxes and reduced government spending 50/50. The imputation of the deficit does not affect the distribution of income much, as taxes and government spending are both progressive, so that increasing taxes and reducing government spending by the same amount has little net distributional effect. However, imputing the deficit affects real growth, especially when the deficit is large. In 2009-2011, the government deficit was around 10% of national income, about 7 points higher than usual. The growth of post-tax incomes would have been much stronger in the aftermath of the Great Recession had we not allocated the deficit back to individuals.[33]

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[30]That is, we treat government spending on education as government spending on other public goods such as defense and police. Note that in the System of National Accounts, public education consumption expenditure are included in individual consumption expenditure (together with public health spending) rather than in collective consumption expenditure.

[31]For married couples, we attribute each child 50/50 to each parent. Note that children going to college and supported by parents are typically claimed as dependents so that our lump-sum measure gives more income to families supporting children through college.

[32]See Appendix Figure S.23.

[33]Interest income paid on government debt is included in individual pre-tax income but is not part of national income (as it is a transfer from government to debt holders). Hence we also deduct interest income paid by the government to US residents in proportion to taxes paid and benefits received (50/50).

4 The Distribution of National Income

We start the analysis with a description of the levels and trends in pre-tax income and post-tax income across the distribution. The unit of observation is the adult, i.e., the U.S. resident aged 20 and over.[34] We use 20 years old as the age cut-off—instead of the official majority age, 18—as many young adults still depend on their parents. Throughout this section, the income of married couples is split equally between spouses. We will analyze how assigning each spouse her or his own labor income affects the results in Section 5.1.

4.1 The Distribution of Pre-Tax and Post-Tax Income in 2014

To get a sense of the distribution of pre-tax and post-tax national income in 2014, consider first in Table 1. Average income per adult in the United States is equal to $64,600—by definition, for the full adult population, pre-tax and post-tax average national incomes are the same. But this average masks a great deal of heterogeneity. The bottom 50% adults (more than 117 million individuals) earn on average $16,200 a year before taxes and transfers, i.e., about a fourth of the average income economy wide. Accordingly, the bottom 50% receives 12.5% (a fourth of 50%) of total national pre-tax income. The "middle 40%"—the group of adults with income between the median and the 90th percentile that can be described as the middle class—has roughly the same average pre-tax income as the economy-wide average. That is, the pre-tax income share of the middle 40% is close to 40%. The top 10% earns 47% of total pre-tax income, i.e., 4.7 times the average income. There is thus a ratio of 1 to 20 between average pre-tax income in the top 10% and in the bottom 50%. For context, this is much more than the ratio of 1 to 8 between average income in the United States and average income in China—about $7,750 per adult in 2013 using market exchange rates to convert yuans into dollars.[35] Moving further up the income distribution, the top 1% earns about a fifth of total national income (20 times the

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[34]We include the institutionalized population in our base population. This includes prison inmates (about 1% of adult population in the US), population living in old age institutions and mental institutions (about 0.6% of adult population), and the homeless. The institutionalized population is generally not covered by surveys. Furlong (2014) and Fixler et al. (2015) remove the income of institutionalized households from the national account aggregates to construct their distributional series. We prefer to take everybody into account and allocate zero incomes to institutionalized adults when they have no income. Such adults file tax returns when they earn income.

[35]All our results in this paper use the same national income price index across the US income distribution to compute real income, disregarding any potential differences in prices across groups. Using our micro-files, it would be straightforward to use different price indexes for different groups. This might be desirable to study the inequality of consumption or standards of living, which is not the focus of the current paper. Should one deflate income differently across the distribution, then one should also use PPP-adjusted exchange rates to compare average US and Chinese income, reducing the gap between the two countries to a ratio of approximately 1 to 5 (instead of 1 to 8 using market price exchange rates).

average income) and the top 0.1% close to 10% (100 times the average income, or 400 times the average bottom 50% income). The top 0.1% income share is close to the bottom 50% share.

Post-tax national income is more equally distributed than pre-tax income: the tax and transfer system is progressive overall. Transfers play a key role for the bottom 50%, where post-tax national income ($25,000) is over 50% higher than pre-tax national income. This is, however, entirely due to in-kind transfers and collective expenditures: post-tax disposable income—including cash transfers but excluding in-kind transfers or public goods—is only slightly larger than pre-tax national income for the bottom 50%. That is, the bottom 50% pays roughly as much in taxes as what it receives in cash transfers; it does not benefit on net from cash redistribution. While the bottom 50% earns about 40% of the average post-tax income, the top 10% earns close to 4 times the average post-tax income (i.e., the top 10% post-tax share is 39%). After taxes and transfers, there is thus a ratio of 1 to 10 between the average income of the top 10% and of bottom 50%—still a larger difference than the ratio of 1 to 8 between average national income in the United States and in China. Taxes and government spending reduce top 10% incomes by about 17%, top 1% incomes by 23%, and top 0.1%, top 0.01%, and top 0.001% incomes by about 27%. Taken together, government taxes and transfers are overall slightly progressive at the top.

In Appendix Table S.7, we also report the distribution of factor income, that is, income before any tax, transfer, and *before* the operation of the pension system. Unsurprisingly, since most retirees have close to zero factor income, the bottom 50% factor income share is lower than the bottom 50% pre-tax income share, by about two points. The average factor income of bottom 50% earners is $13,300 in 2014, significantly less than their average post-tax disposable income. That is, if one uses factor income as the benchmark series for the distribution of income before government intervention, then the bottom 50% appears as a net beneficiary of cash redistribution. For the top 10% and above, factor income and pre-tax income are almost identical as social security and pensions are a very small fraction of income at the top.

4.2 Long-Run Trends in the Distribution of Income and Growth

There have been considerable long-run changes in income inequality in the United States over a century. Figure 2 displays the share of pre-tax and post-tax income going to the top 10% and top 1% adults. Top pre-tax income shares fell in the first half of the twentieth century and have been rising rapidly since the early 1980s. Pre-tax top income shares are almost at the same level today as they were at their peak in the late 1920s just before the Great Depression.

The U-shaped evolution over the last century is similar to the one seen in fiscal income series (Piketty and Saez, 2003), although there are differences, as we explain in Section 6 where we reconcile our findings with other estimates of US income inequality.

Top post-tax income shares have also followed a U-shaped evolution over time, but exhibit a less marked upward swing in recent decades. In particular, they have not returned to their level of a century ago. Early in the twentieth century, when the government was small and taxes low, post-tax and pre-tax top incomes were similar. Pre-tax and post-tax shares started diverging during the New Deal for the top 1% and World War II for the top 10%—when federal income taxes increased significantly for that group as a whole. And although post-tax inequality has increased significantly since 1980, it has risen less than pre-tax inequality. Between 1980 and 2014, the top 10% income share rose by about 10 points post-tax and 13 points pre-tax. As a result of the significant 2013 tax increases at the top, post-tax top income shares have increased less than pre-tax income shares in very recent years. Overall, redistributive policies have prevented post-tax inequality from returning all the way to pre-New Deal levels.

Table 2 decomposes growth by income groups since World War II in two 34 year long sub-periods. From 1946 to 1980, real macroeconomic growth per adult was strong (+95%) and equally distributed—in fact, it was slightly equalizing, as bottom 90% grew faster than top 10% incomes.[36] In the next 34 years period, from 1980 to 2014, aggregate growth slowed down (+61%) and became extremely uneven. Looking first at income before taxes and transfers, income stagnated for bottom 50% earners: for this group, average pre-tax income was $16,000 in 1980—expressed in 2014 dollars, using the national income deflator—and still is $16,200 in 2014. Growth for the middle 40% was weak, with a pre-tax increase of 42% since 1980 (0.8% a year). At the top, by contrast, average income more than doubled for the top 10%; it tripled for the top 1%. The further one moves up the ladder, the higher the growth rates, culminating in an increase of 636% for the top 0.001%—ten times the macroeconomic growth rate. Such sharply divergent growth experiences over decades highlight the need for growth statistics disaggregated by income groups.

Government redistribution made growth more equitable, but only slightly so. After taxes and transfers, the bottom 50% only grew +21% since 1980 (0.6% a year). That is, transfers erased about a third of the gap between macroeconomic growth (+60%) and growth at the bottom (0% before government intervention). Taxes did not hamper the upsurge of income at the top: after taxes and transfers the top 1% nearly doubled, the top 0.1% nearly tripled, the

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[36]Very top incomes, however, grew more in post-tax terms then in pre-tax terms between 1946 and 1980, because the tax system was more progressive at the very top in 1946.

top 0.001% grew 617%, almost as much as pre-tax.

4.3 The Stagnation of Bottom 50% Average Income

Perhaps the most striking development in the U.S. economy over the last decades is the stagnation of income in the bottom 50%. This evolution therefore deserves a careful analysis.[37] The top panel of Figure 3 shows how the pre-tax and post-tax income shares of the bottom 50% have evolved since the 1960s. The pre-tax share increased in the 1960s as the wage distribution became more equal—the real federal minimum wage rose significantly in the 1960s and reached its historical maximum in 1969. The pre-tax share then declined from about 21% in the 1969 down to 12.5% in 2014. The post-tax share initially increased more then the pre-tax share following President Johnson's "war on poverty"—the Food Stamp Act was passed in 1965; aid to families with dependent children increased in the second half of the 1960s, Medicaid was created in 1965. It then fell along with the pre-tax income share. The gap between the pre- and post-tax share of income earned by the bottom 50% increased over time. This is not due to the growth of Social Security benefits—because pre-tax income includes pension and social security benefits—but owes to the rise of transfers other than Social Security, chiefly Medicaid and Medicare. In fact, as shown by the bottom panel of Figure 3, almost all of the meager growth in real bottom 50% post-tax income since the 1970s comes from Medicare and Medicaid. Excluding those two transfers, average bottom 50% post-tax income would have stagnated around $20,000 since the late 1970s. The bottom half of the adult population has thus been shut off from economic growth for over 40 years, and the paltry increase in their disposable income has been absorbed by increased health spending.

The growth in Medicare and Medicaid transfers reflects an increase in the generosity of the benefits, but also the rise in the price of health services provided by Medicare and Medicaid—possibly above what people would be willing to pay on a private market (see, e.g., Finkelstein, Hendren, and Luttmer 2016)—and perhaps an increase in the economic surplus of health providers in the medical and pharmaceutical sectors. To put in perspective the average annual health transfer of about $5,000 received by bottom 50% individuals, note that it represents the equivalent of less than a week of the average pre-tax income of top 10% individuals (about $300,000) and a bit more than a day of the average pre-tax income of top 1% individuals ($1.3

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[37]There is a large literature documenting the stagnation of low-skill wage earnings (see, e.g., Katz and Autor, 1999). The US Census bureau (2016) official statistics also show very little growth of median family income in recent decades. Our value added is to include all national income accruing to the bottom 50% adults, to contrast pre-tax and post-tax incomes, and to be able to compare the bottom to the top of the distribution in a single dataset representative of the US population.

million). Concretely, the in-kind health redistribution received by bottom 50% individuals is equivalent to about one week of attention provided by an average top-decile health provider, or one day of attention provided by an average top-percentile health provider.

Figure 3 also displays the average post-tax disposable income of bottom bottom 50% earners—including cash transfers but excluding in-kind transfers and collective consumption expenditures. For the bottom half of the distribution, post-tax disposable income has stagnated at about $15,000–$17,000 since 1980. This is about the same level as average bottom 50% pre-tax income. In other words, it is solely through in-kind health transfers and collective expenditure that the bottom half of the distribution sees its income rise above its pre-tax level and becomes a net beneficiary of redistribution. In fact, until 2008 the bottom 50% paid more in taxes than it received in cash transfers. The post-tax disposable income of bottom 50% adults was lifted by the large government deficits run during the Great Recession: Post-tax disposable income fell much less than post-tax income—which imputes the deficit back to individuals as negative income—in 2007-2010.

From a purely logical standpoint, the stagnation of bottom 50% income might reflect demographic changes rather than deeper evolutions in the distribution of lifetime incomes. People's incomes tend to first rise with age—as workers build human capital and acquire experience—and then fall during retirement, so population aging may have pushed the bottom 50% income share down. It would be interesting to estimate how the bottom 50% lifetime income has changed for different cohorts.[38] Existing estimates suggest that mobility in earnings did not increase in the long-run (see Kopczuk, Saez, and Song, 2010 for an analysis using Social Security wage income data), so it seems unlikely that the increase in cross-sectional income inequality—and the collapse in the bottom 50% income share—could be offset by rising lifetime mobility out of the bottom 50%.

To shed more light on this issue, we have computed the evolution of bottom 50% incomes within different age groups separately.[39] For the working-age population, as shown by the top panel of Figure 4, the average bottom 50% income rises with age, from $13,000 for adults aged 20-44 to $23,000 for adults aged 45-65 in 2014—still a very low level. But the most striking finding is that among working-age adults, average bottom 50% pre-tax income has collapsed since 1980: -20% for adults aged 20-45 and -8% for those between 45 and 65 years old. It is only

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[38] In our view, both the annual and lifetime perspective are valuable. This paper focuses on the annual perspective. It captures cross-sectional inequality, which is particularly relevant for lower income groups that have limited ability to smooth fluctuations in income through saving. Constructing life-time inequality series is left for future research.

[39] We can do this decomposition by age starting in 1979 when age data become available in internal tax data.

for the elderly that pre-tax income has been rising, because of the increase in Social Security benefits and private pensions distributions. Americans aged above 65 and in the bottom 50% of that age group now have the same average income as all bottom 50% adults—about $16,000 in 2014—while they earned much less in 1980.[40] After taxes and transfers, as shown by the bottom panel of Figure 4, the average income of bottom 50% seniors now exceeds the average bottom 50% income in the full population and has grown 70% since 1980. In fact, all the growth in post-tax bottom 50% income owes to the increase in income for the elderly.[41] For the working-age population, post-tax bottom 50% income has hardly increased at all since 1980. We reach the same conclusion when we look at the average post-tax disposable income of the bottom 50% adults aged 20 to 45: it has stagnated at very low levels—around 15,000$.

There are three main lessons. First, since income has collapsed for the bottom 50% of all working-age groups—including experienced workers above 45 years old—it is unlikely that the bottom 50% of lifetime income has grown much since the 1980s. Second, the stagnation of the bottom 50% is not due to population aging—quite the contrary: it is only the income of the elderly which is rising at the bottom. For the bottom half of the working-age population, average income before government intervention has fallen since 1980—this is true whether one looks at pre-tax income (including Social Security benefits) or factor income (excluding Social Security benefits).[42] Third, despite the rise in means-tested benefits—including Medicaid and the Earned Income Tax Credit, created in 1975 and expanded in 1986 and the early 1990s—government redistribution has not enhanced income growth for low- and moderate income working-age Americans over the last three decades. There are clear limits to what taxes and transfers can achieve in the face of such massive changes in the pre-tax distribution of income like those that have occurred since 1980. In our view, the main conclusion is that the policy discussion should focus on how to equalize the distribution of primary assets, including human capital, financial capital, and bargaining power, rather than merely ex-post redistribution.

The stagnation of income for the bottom 50% contrasts sharply with the upsurge of the top

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[40]The vast majority—about 80% today—of the pre-tax income for bottom 50% elderly Americans is pension benefits. However, the income from salaried work has been growing over time and now accounts for about 12% of the pre-tax income of poor elderly Americans (close to $2,000 on average out of $16,000); the rest is accounted for by a small capital income residual. See Appendix Table II-B7c.

[41]In turn, most of the growth of the post-tax income of bottom 50% elderly Americans has been due to the rise of health benefits. Without Medicare and Medicaid (which covers nursing home costs for poor elderly Americans), average post-tax income for the bottom 50% seniors would have stagnated at $20,000 since the early 2000s, and would have increased only modestly since the early 1980s when it was around $15,000; see Appendix Table II-C7c and Appendix Figure S.5.

[42]More broadly, for the working-age population, growth is nearly identical whether one looks at factor income or pre-tax income. For detailed series on the distribution of factor income, see Appendix Tables II-A1 to II-A14.

1%. As shown by the top panel of Figure 5, both groups have basically switched their income share. The top 1% used to earn 11% of national income in the late 1960s and now earns slightly over 20% while the bottom 50% used to get slightly over 20% and now gets 12%. Eight points of national income have been transferred from the bottom 50% to the top 1%. The top 1% income share has made gains large enough to more than compensate the fall in the bottom 50% share, a group demographically 50 times larger.[43] While average pre-tax income has stagnated since 1980 at around $16,000 for the bottom 50%, it has been multiplied by three for the top 1% to about $1,300,000 in 2014 (bottom panel of Figure 5). As a result, while top 1% adults earned 27 times more income than bottom 50% adults on average in 1980, they earn 81 times more today. Income is booming at the top for all groups, not only for the elderly. As shown by Appendix Figure S.11, the top 0.1% income share rises as much for adults aged 45 to 64 as for the entire population. Population aging plays no role in the upsurge in US income concentration.

5 Decomposing Inequality: The Role of Gender, Capital, and Government Redistribution

In this section, we use our distributional national accounts to provide a number of new decompositions that shed light on some of the key forces shaping the distribution of US incomes. We start by studying the effect of changes in gender inequality, before moving to changes in capital vs. labor factor shares, and government taxes and transfers.

5.1 Gender Inequality and the Glass Ceiling

So far we have split income equally between spouses. In this section we present individualized series where each spouse is assigned his or her own labor income.[44] By construction, individualized series assign zero labor income to a non-working spouse; comparing individualized and equal-split series thus makes it possible to assess the effect of changes in women labor force participation—and gender inequality generally—on the evolution of income inequality. To split earnings, we use information from W2 forms on the labor income earned by each spouse from

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[43]The next 40% "middle class" has also lost about 5.5 points of national income since 1980 while the upper middle class, the top 10% excluding the top 1% has gained about 3 points since 1980 (see Appendix Table II-B1).

[44]Equal splitting implicitly assumes that all income earned by married couples is shared equally. Individualized series by contrast assume that labor income is not shared at all. There is obviously a lot of variations across couples in the actual sharing of resources and division of monetary power. Empirical studies find that actual sharing practices are in between full and no sharing (see Chiappori and Meghir, 2015, for a recent survey). Because of the lack of comprehensive data (and especially historical data), we restrict ourselves to the two polar cases of full and no-sharing. Attempting to split incomes using empirical sharing rules is left for future research.

1999 onward. Prior to 1999, we rely on IRS tabulations of how wage income is split among couples in the top 5% that are available for some years, and on similar tabulations that we computed annually in the CPS for the bottom 95%.[45] We always split the capital income of married couples equally, due to the lack of information on property regimes.[46]

The long-run U-shaped evolution of pre-tax inequality is still present when assigning each spouse her or his own labor income, but it is less marked. Unsurprisingly, there is always more inequality when labor income is assigned to each spouse individually rather than equally split. But as shown by the top panel of Figure 6, the difference has varied a lot over time. When women labor force participation was low in the 1950s and 1960s, the top 10% income share with individualized labor income was substantially higher than the top 10% share with incomes equally split (+5 points). The gap has declined with the reduction in gender inequality, to about 2 points today. Individualized series therefore show a smaller rise in income concentration. Income concentration in the late 1920s was worse than today on an individual basis because there was much more inequality within couples than today. The reduction in the gender gap has played an important role in mitigating the rise of inequality.

The bottom panel of Figure 6 quantifies the extent to which the gender gap in earnings has shrunk since the 1960s. We take the total average pre-tax labor income of working-age (20-64) men and divide it by the total average pre-tax labor income of working-age women. This measure of the gender gap is larger than the one traditionally used—the ratio between men and women's wage conditional on full-time work; see, e.g., Blau and Kahn (2016)—as it includes not only wage differences conditional on working, but also differences in labor force participation, hours of work, fringe benefits, and self-employment income. This is the relevant measure to study overall inequality among adults.[47] We find that men earned 3.7 times more labor income than women in the early 1960s and now earn about 1.75 times more. The gender gap in labor income has halved but has not disappeared—far from it. Additional breakdowns by age show that the gender gaps increase with age. In recent years, among adults aged 20-34, men earn 1.3 times more than women; the ratio reaches about 2 for adults aged 55 to 64; see Appendix Figure S.7.

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[45]See Online Appendix Section B.2 for details. Since 1979, internal IRS data also provide the exact breakdown for self-employment income across spouses (see Saez, 2016).

[46]Wealth acquired during marriage is generally jointly owned. Joint ownership means wealth is equally split in case of divorce in community property states, like Texas and California. In other states, joint ownership means wealth is "equitably distributed" in case of divorce, which might take into account relative contributions and also give more to the spouse with less earning potential. Bequests received and pre-marriage assets are generally not equally split.

[47]There is a wide literature on the US gender gap. See e.g. Blau, Ferber, and Winkler (2014) for a classical textbook treatment.

In the working-age population (including non-workers), at the median, pre-tax labor income differences between men and women have diminished. As shown by the top panel of Figure 7, two forces are at play. For working-age women, the median pre-tax income has been multiplied by more than five from 1962 to 2014—largely the result of an increase in formal market labor supply—to about $20,000 today. For working-age men, median pre-tax labor income has stagnated: it is the same in 2014 as in 1964, about $35,000. There has been no growth for the median male worker over half a century. The median labor income of men grew relatively quickly from 1962 to 1973 and during the 1990s boom, but fell during recessions, effectively erasing all the gains. It collapsed, in particular, during the Great Recession, from $40,000 in 2007 to $33,000 in 2010. The median labor income of women has stopped growing since the late 1990s, halting the convergence across genders. For all working-age individuals, as a result, median pre-tax labor income is only 10% higher in 2014 ($27,500) than 25 years earlier in 1989 ($25,000).

Considerable gender inequalities persist at the top of the distribution. As the bottom panel of Figure 7 shows, women are almost as likely to work as men today. The share of women among the population earning positive labor income—from salaried work or self-employment—was 37% in the 1960s and converged to close to 50% during the 1970s and 1980s—women have closed the participation gap. But women are much less represented in top labor income groups. In the 1960s, women accounted for less than 5% of the top 10%, top 1%, and top 0.1% labor income earners. Nowadays they account for close to 27% of top 10% labor income earners (+22 points), but the increase is smaller the higher one moves up the distribution, so that the proportion of women in top groups falls steeply with income. Women make only about 16% of the top 1% labor income earners (+13 points since the 1960s), and 11% of the top 0.1% (+9 points). The representativity of women at the very top has only modestly increased since 1999. The glass ceiling is not yet close to being shattered.[48]

5.2 Decomposing Inequality at the Top: Labor vs. Capital

Pre-tax income Y can be decomposed into a labor income component Y_L and a capital income component Y_K. By definition, $Y = Y_L + Y_K$. The share of national income accruing to capital

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[48]A number of studies have analyzed the share of women in top earnings groups. Kopczuk, Saez, and Song (2010), Figure X, use Social Security data from 1937 to 2004. Because of data limitations, they focus only on commerce and industry employees leaving out all government workers (where women are over-represented particularly in the education sector) and the self-employed. Guvenen et al. (2014) also use Social Security wage earnings and obtain similar results. Atkinson et al. (2016) study the share of women in top income groups in a sample of 8 countries with individual taxation, but do not consider labor income and capital income separately.

is $\alpha = Y_K/Y$ and the labor share is $1 - \alpha = Y_L/Y$. Our distributional national accounts make it possible to compute factor shares for each quantile of the distribution consistent with macroeconomic factor shares.[49] This comprehensive definition of capital income is much broader than capital income reported on tax returns. In particular, it includes the imputed rents of homeowners, property taxes, the returns on pension funds, corporate retained earnings, and corporate taxes.

For the United States as a whole, the capital share of national income fluctuates around 20% to 30% and has been rising in recent decades, a phenomenon also observed in other countries (Piketty and Zucman 2014; Karabarbounis and Neiman 2014). In 2000, 23% of national income was derived from capital; this share increased to 30% in 2014. In fact, as shown by Appendix Table S.2, almost all the 2000-2014 growth of average income per adult in the United States (0.6% a year on average over this period of time) owes to the rise of capital income: labor income per adult has grown by 0.1% per year, while capital income per adult has grown by 2.2% per year.

The capital share varies widely across the income distribution. The vast majority of Americans earn little capital income. As shown by the top panel of Figure 8, for the bottom 90%, the capital share is always less than 20%. It has significantly increased over time, from around 10% from the 1970s to close to 20% today—in large part because of the rise of pension funds, which account for a growing share of household wealth (36% in 2014). The capital share then rises steeply as one moves up the income distribution. In 2014, the top 1% derives over half of their incomes from capital, the top 0.1% more than two thirds. At the very top, the fluctuations in the capital share are spectacular. Early in the twentieth century, the top 0.1% derived 70%-80% of its income from capital; this share collapsed during the Great Depression when corporate profits slumped, before rebounding in the 1950s and 1960s to up to 90%. In other words, in the post-World War II decades, the top of the distribution was dominated by "rentiers". The working rich then replaced the rentiers from the 1970s to the late 1990s; this process culminated in 2000 when the capital share in the top 0.1% reached a low water-mark of 48.5%. Since then, it has bounced back. As the 21st century progresses, the working rich of

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[49]To decompose the mixed income of non-corporate businesses into a labor and a capital component, we assume fixed factor shares for simplicity (namely 0.7 for labor income and 0.3 for capital income). This assumption is irrelevant for our results on trends in income levels, income shares, and growth decompositions. It has very little impact on the level and time patterns of capital shares. We experimented with other methods to decompose mixed income. For instance, one can assume the same factor shares in the non-corporate sector as in the corporate sector; or one can attribute to the human capital—education and experience—of self-employed workers the same return as the one observed for wage earners; or one can attribute to the non-human assets used by non-corporate businesses the same rate of return as the one observed on other assets. This makes very little difference on the total capital share, see Appendix Table I-S.A3.

the late twentieth century may increasingly live off their capital income, or be in the process of being replaced by their offsprings living off their inheritance.

One potential concern with the computation of factor shares is that the frontier between labor and capital can be fuzzy. In closely held businesses, owner-managers can choose to pay themselves in salaries or in dividends. There are tax incentives to reclassify labor income into more lightly taxed capital income, particularly capital gains. Is the rise of the capital share—especially at the top—a real phenomenon or an illusion caused by changes in tax avoidance? To shed light on this issue, the bottom panel of Figure 8 depicts the average age of top earners. The adult population is steadily growing older since the late 1970s. By contrast, average age declined at the top from 1979 to 2000, consistent with the rise of the labor share of top earners and the notion that the working rich were replacing rentiers. Since 2000, this trend has reverted: top earners are growing older. The trend break in 2000 exactly mirrors the reversal of the capital share—lending support to the view that the "working rich" are indeed playing a smaller role than they used to at the top of the pyramid.[50]

Over the last fifteen years, capital income has been the key driver of the rise of the top 1% income share. Figure 9 decomposes the top 1% income share into labor and capital. The labor income of top 1% earners boomed in the 1980s and 1990s, but since the late 1990s it has declined as a fraction of national income. Instead, all the increase in the top 1% income share in recent years owes to an upsurge in capital income, in particular profits from corporate equities. These results confirm the earlier finding from Piketty and Saez (2003) that the rise in income concentration up to the late 1990s was primarily a labor income phenomenon; they are also consistent with the more recent finding by Saez and Zucman (2016) that wealth concentration has increased sharply since 2000. The rise in wealth inequality leads to an increase in capital income concentration, which itself reinforces wealth inequality to the extent that top capital incomes are saved at a high rate.

5.3 The Role of Taxes and Transfers

About a third of U.S. national income is redistributed through taxes, transfers, and public good spending. How have changes in taxes and transfers affected the dynamic of post-tax income?

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[50]In Appendix Figure S.10, we present another indication that the rise in the capital share of income is a real economic phenomenon. We compute capital income by assuming a fixed rate of return to capital across the distribution. This procedure neutralizes potential changes in how labor income is reclassified into capital income. The results also show a clear rising share of capital income at the top, although the increase starts earlier—in the late 1980s rather than in the early 2000s.

Taxes.   The progressivity of the U.S. tax system has declined significantly over the last decades. The top panel of Figure 10 shows how effective tax rates vary across the income distribution.[51] The tax rates we compute take into account all taxes—on individual incomes, payroll, estates, corporate profits, properties, and sales—whether levied by federal, state, or local governments. Tax rates are computed as a percentage of pre-tax income. For the United States as a whole, the macroeconomic tax rate increased from 8% in 1913 to 30% in the late 1960s. Since then, it has remained at that level. However, effective tax rates have become more compressed across the income distribution. In the 1950s, top 1% income earners paid 40%-45% of their pre-tax income in taxes, while bottom 50% earners paid 15-20%. The gap is much smaller today: top earners pay about 30%-35% of their income in taxes, while bottom 50% earners pay around 25%. The effective rate paid by the top 1% exhibits cyclical variations. During stock market booms, top 1% income earners realize capital gains; the taxes paid on those gains are included in the numerator of the effective tax rate but the capital gains themselves are excluded from the denominator, because pre-tax income (just like national income) excludes capital gains. There is, however, a downward trend over time. The bulk of the decline owes to the fall of corporate and estate taxes. In the 1960s, as shown by Appendix Table II-G2, the top 1% paid close to 20% of its pre-tax income in corporate and estate taxes while it pays only about 10% today.

The 2013 tax reform has partly reverted the long-run decline in top tax rates. The 2013 tax reform involved a sizable increase in top marginal income tax rates—plus 9.5 points for capital income and 6.5 points for labor income, see Saez (2017)—as a result of surtaxes introduced by the Affordable Care Act and the expiration of the 2001 Bush tax cuts for top earners. These increases are the largest hikes in top tax rates since the 1950s, exceeding the 1993 increases of the Clinton administration. The effective tax rate paid by top 1% earners has risen about 4 points between 2011 (32%) and 2013 (36%) and is now back to its level of the early 1980s.[52] Although a significant development, it is worth noting that inequality was much lower in the 1980s than today, and that the long-run decline in corporate and estate tax revenue continues to exert a downward pressure on effective tax rates at the top.

While tax rates have tended to fall for top earners since the 1960s, they have risen for the bottom 50%. As shown by the bottom panel of Figure 10, this increase essentially owes to

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[51]Comprehensive tax rates including all levels of government have not been computed before. Estimates of Federal (but not State and local) taxes have been produced by the US Congressional Budget Office (2016) starting in 1979 and by Piketty and Saez (2007) starting in 1962; no estimates of Federal tax rates existed for the pre-1962 period.

[52]The US Congressional Budget Office (2016) also finds an increase by about 4-5 points in the federal tax rate of the top 1% from 2011 to 2013.

the rise of payroll taxes. In the 1960s, payroll taxes amounted to 5% of the pre-tax income of bottom 50% earners; today they exceed 10%. In fact, payroll taxes are now much more important than any other taxes—federal and state—borne by the bottom 50%. In 2014, payroll taxes amount to 11.3% of pre-tax income, significantly above the next largest items—federal and state income taxes, 6.6% of pre-tax income, and sales taxes, 4.7%.[53] Although payroll taxes finance transfers—Social Security and Medicare—that go in part to the bottom 50%, their increase contributes to the stagnation of the post-tax income of working-age bottom 50% Americans.

Transfers. One major evolution in the U.S. economy over the last fifty years is the rise of individualized transfers—monetary, and more importantly in-kind transfers. While public good spending has remained constant around 18% of national income, transfers—other than Social Security, disability, and unemployment insurance already included in pre-tax income—have increased from about 2% of national income in 1960 to 11% today, see Appendix Figure S.12 and Appendix Table I-S.A11. The two largest transfers are Medicaid (4% of national income in 2014) and Medicare (3.2% of national income in 2014); other important transfers include refundable tax credits (0.8% of national income, rising to 1.3% during the Great Recession), veterans' benefits (0.6% of national income, twice the level of the 1990s and early 2000s) and Food Stamps (0.5% of national income).

Individualized transfers tend overall to be targeted to the middle class. The top panel of Figure 11 shows the average transfers received by post-tax income groups, expressed as a percent of the average national income in the full adult population.[54] Despite Medicaid and other means-tested programs which entirely go the bottom 50%, the middle 40% receives larger transfers than the bottom 50% Americans. In 2014, the bottom 50% receives the equivalent of 10% of per-adult national income—less than the macro average of 11%—, the middle-class receives more—close to 16%—and the top 10% receives less—about 8%. As shown by Appendix Figure S.13, there is a similar inverted U-shaped relationship between post-tax income and transfers received when including Social Security benefits in transfers: the average transfer then amounts to 16.6% of average national income, and close to 25% of average national income for middle-class adults.

Transfers have played a key role in enabling middle-class income to grow. As shown by the

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[53]In keeping with the national accounts conventions, we treat the non-refundable portion of tax credits and tax deductions as negative taxes, but the refundable portion of tax credits as a transfer. As a result, nobody can have negative income taxes.

[54]We choose this representation for transfers because individualized transfers are fairly close to a fixed amount per individual, in contrast to taxes which are fairly close to being proportional to pre-tax income.

bottom panel of Figure 11, without transfers average income for the middle 40% would not have grown at all from 1999 to 2014. In actual fact it grew 10%, thanks to an increase of 37% in transfers received excluding Social Security. Tax credits played a particularly important role during the Great Recession. Without transfers the average income of the middle-class would have fallen by 10% between 2007 and 2009; thanks to transfers the decline was limited to 4%. By contrast, given the collapse in their pre-tax income, transfers have not been sufficient to enable bottom 50% incomes to grow significantly.

6   Comparison with Previous Estimates

6.1   Comparison with top fiscal income shares

Our new distributional national accounts confirm the rise of income concentration seen in tax data. Figure 12 compares our top 10% pre-tax income share to the one estimated by Piketty and Saez (2003, series updated to 2015) based on fiscal income. There is a similar U-shaped evolution of income concentration over the last century. Rising inequality is not an illusion of tax data: when taking a comprehensive and consistent view of income over the long run, the upsurge of income at the top appears to be a real economic phenomenon. There are, however, differences between our top pre-tax income shares and Piketty and Saez's (2003) top fiscal income shares.

First, the inequality of pre-tax income is less volatile than that of fiscal income. In fiscal income statistics, corporate taxes are excluded and the retained earnings of corporations are implicitly proxied by realized capital gains, which are volatile due to large short-run swings in equity values. By contrast, pre-tax income statistics fully allocate corporate profits (the sum of retained earnings, dividend payouts, and corporate taxes) each year to the persons to which they accrue. As a result, while top fiscal income shares are erratic around the Tax Reform Act of 1986—in large part due to the realization of capital gains in 1986 before the increase in capital gains tax rates in 1987—as well as during stock market booms, our new pre-tax national income shares do not exhibit large year-to-year variation.

Second, and more importantly, the similarity between the share of pre-tax national income going to the top 10% adults and Piketty and Saez's (2003) share of fiscal income going to the top 10% tax units masks two discrepancies that go in opposite direction. There is generally more inequality in pre-tax income than in fiscal income, but less inequality among (equal-split) adults than among tax units. These two effects offset each other in 1980. But the "national

income vs. fiscal income" effect dominated before, while the "equal-split adults vs. tax unit" effect has dominated since then.

Pre-tax income is generally more concentrated than fiscal income because most pre-tax capital income is not taxable—and capital income tends to be concentrated at the top. As the bottom panel of Figure 12 shows, the un-equalizing effect of tax-exempt capital income was particularly large in the 1950s and 1960s, when undistributed corporate profits were high. In those years, top 10% tax units earned about 33% of fiscal income but as much as 38% of all pre-tax income. The gap between pre-tax and fiscal top income shares has fallen since the 1960s, for two reasons. First, the type of capital income that is tax-exempt has changed over time. Since the 1970s, a large and growing fraction of tax-exempt capital income has been the flow of interest and dividends paid to pension funds. This form of capital income is more equally distributed than corporate retained earnings, so accounting for it does not increase inequality as much. Second, a growing fraction of labor income—employee fringe benefits—goes untaxed, and this income is more equally distributed than taxable income. As a result, the top 10% tax units earn about 50% of both fiscal and pre-tax income today.

The second difference with the Piketty and Saez (2003) series is the unit of observation. In our benchmark series, we compute income inequality across adults with income equally split between married spouses, in contrast to Piketty and Saez (2003) who compute inequality across tax units. A tax unit is either a single person aged 20 or above or a married couple, in both cases with children dependents if any. As shown by Appendix Figure S.15b, there is always less inequality across equal-split adults than across tax units, because the equalizing effect of splitting income 50/50 among married couples dominates the often un-equalizing effect of moving from tax units to individuals.[55]

In our view, statistics based on equal-split adults, tax units, or individualized adults all have their merits and shed valuable light on income concentration and its evolution. There is a long tradition of computing inequality across households, which are conceptually close to tax units.[56] However, because the size of households changes over time, inequality between households can rise or fall for purely demographic reasons. In the United States, the number of households has been growing faster than the number of adults over the last decades, because of the decline of marriage and the rise of single-headed households. Computing inequality

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[55]A related difference is that Piketty and Saez (2003) series use the total number of families based on CPS data which exclude the institutionalized population while our estimates are based on the full adult population.

[56]A household can include several tax units like two adult roommates sharing meals, or a grandparent living with her kid and grandkids (see US Census Bureau, 2016 for the exact definition of households).

across equal-split adults neutralizes this demographic trend and, as Appendix Figure S.15b shows, leads to a smaller increase in inequality than computing inequality across tax units. To compare inequality over time, using the equal-split adult as unit of observation is therefore a meaningful benchmark, as it abstracts from confounding trends in household size and gender inequality. There is no silver bullet, however. To measure the inequality of living standard in the cross-section, one might want to use the household unit, maybe with adjustments to capture economies of scale within the household as done for example in the US Congressional Budget Office (2016) official statistics.[57] To measure the inequality of monetary power, one might favor fully individualized series—where each spouse is assigned her own income—such as those discussed in Section 5.1. None of these approaches alone offers a comprehensive view; all provide valuable vantage points on the current evolutions of income inequality and can be studied using our distributional national accounts.

6.2   Growth for the bottom 90%

The Piketty and Saez (2003) fiscal income data have sometimes been used to study the distribution of economic growth (see e.g., Saez, 2008). As we have seen, however, the top 10% income share has increased less than estimated by Piketty and Saez (2003). The consequence is that there has been more growth for the bottom 90% since 1980 than what fiscal data suggest—although still not much. The top panel of Figure 13 shows the growth performance of the bottom 90%. It has been meager since 1980: while average income in the United States has grown 1.4% a year from 1980 to 2014, bottom 90% pre-tax income has grown 0.8%. This stands in contrast to the period from 1946 to 1980, when bottom 90% income grew at the same rate as average income, about 2.0% a year.[58] Modest as it is, bottom 90% pre-tax income growth is significantly greater than that estimated using the Piketty and Saez (2003) data, according to which average bottom 90% incomes has declined since 1980, by 0.1% a year. The real income figures from Piketty and Saez (2003) under-estimate the growth of bottom 90% incomes and exaggerate the share of growth going to top groups. We hope our new series will put the

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[57]Equal-split series under-estimate economies of scale within the household. John who earns $10,000 gets the same income as Felix and Maria who as a couple earn $20,000 in total, while in reality John probably has a lower living standards due to economies of scale—it may be harder for him, for instance, to pay his rent. Household (or tax-unit)-based series, in contrast, over-estimate economies of scale, as Felix and Maria count as one unit, just as Felix. The right equivalence scale probably lies in between the tax unit and the equal-split adult.

[58]The bottom 90% has grown slightly faster post-tax, at 1.0% per year since 1980—which is still substantially less than the 1.4% growth rate for the full population; see Appendix Figure S.16. Redistribution toward the bottom 90% has increased over time: in the post-World War II decades, bottom 90% incomes were only about 3% higher post-tax than pre-tax, while they are 13% higher today. But this redistribution has only offset about one third of the growth gap between the bottom 90% and the average since 1980.

discussion of the distribution of income growth on a stronger footing.

There are three reasons why middle-class growth has been stronger than in the Piketty and Saez (2003) series. First, the inequality literature—including Piketty and Saez (2003)—deflates incomes by the consumer price index (CPI), while we use the more comprehensive and accurate national income price index. It is well known that the CPI tends to over-state inflation, in particular because it is not chained—contrary to the national income price index—hence does not properly account for the substitution bias (Boskin, 1996).[59] The CPI has been growing 0.2% a year faster than the national income deflator since 1980. Second, as we have seen, the number of tax units has been growing faster than the number of adults; this divergence has accelerated since 1980 (+0.3% a year). To compute growth statistics, it makes little sense to use households as the unit of observation: one does not want growth to be affected by changes in marriage and divorce rates, in particular because it would make cross-country comparisons more difficult.

Last, and most importantly, the tax-exempt income of bottom 90% earners has grown significantly since 1980. The bottom panel of Figure 13 decomposes the average income of bottom 90% adults earners into taxable labor income, tax-exempt labor income—fringe benefits and employer payroll taxes—and capital income. Tax-exempt labor income accounted for 13% of bottom 90% income in 1962; it now accounts for 23%. Capital income has also been on the rise, from 11% to 15% of average bottom 90% income—all of this increase owes to the rise of imputed capital income earned on tax-exempt pension plans. In fact, since 1980, only tax-exempt labor income and capital income have been growing for the bottom 90%. The taxable labor income of bottom 90% earners—which is the only form of income that can be used for the consumption of goods and non-health services—has not grown at all.

7   Conclusion

In this paper, we have combined tax, survey, and national accounts data to build distributional national accounts for the United States since 1913. Our series capture 100% of national income. They can be used to provide decompositions of growth by income groups consistent with macroeconomic growth; to contrast pre-tax and post-tax income; to compare inequality between equal-split adults, individuals, and tax units; to jointly study income and wealth; and to simulate the growth and distributional impacts of tax and transfer reforms, among other

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[59]Piketty and Saez (2003) and official Census Bureau statistics (US Census Bureau, 2016) use the CPI-U-RS series which incorporate some of the better current methods to estimate the CPI and apply them retrospectively back to 1978. However the CPI-U-RS is not chained.

things. As inequality has become a key issue in the public debate in the United States, we feel that such distributional national accounts are a needed tool to better monitor economic growth and its distribution. We see three main avenues for future research.

First, our dataset should be seen as a prototype to be further developed and improved upon—just like the national accounts themselves, including the computation of GDP, are regularly improved. Looking forward, our assumptions and imputations could be bettered by drawing on new knowledge on the incidence of taxes and transfers and by leveraging new and better data. For example, tax data after 2013 provide direct information at the micro-level on the value of employee health insurance benefits. Like the national accounts, we see our distributional national accounts as work in constant evolution. Our hope is that our prototype distributional national accounts will ultimately be taken over, refined, published, and regularly improved upon by government statistical agencies.

Second, distributional national accounts can be used to compare income across countries on a consistent basis. The same methodology as the one pioneered in this paper is currently being applied to other countries. Our long-term goal is to create distributional national accounts for as many countries as possible and to produce global distributions of income and wealth consistent with global income and wealth accounts.[60] As an illustration, Figure 14 compares the average bottom 50 percent pre-tax national income in the United States to the average bottom 50 percent pre-tax income in France estimated by Garbinti, Goupille, and Piketty (2016) using similar methods. In sharp contrast with the United States, in France the average pre-tax income of the bottom 50 percent grew by 32 percent from 1980 to 2014 (after adjusting for inflation), at approximately the same rate as national income per adult. While average income for the bottom half of the distribution was 11 percent lower in France than in the United States in 1980, is is now 16 percent higher. The bottom half makes more in France than in the United States even though average income per adult is 35 percent lower in France (partly due to differences in standard working hours in the two countries).[61] The diverging trends in the growth of bottom 50 percent incomes across France and the United States—two advanced economies subject to the same forces of technological progress and globalization—suggests that domestic policies play an important role for the dynamic of income inequality. In the United States, the stagnation of bottom 50 percent incomes and the upsurge in the top 1 percent coincided with reduced

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[60]All the results will be made available online on the World Wealth and Income Database (WID.world), see http://www.wid.world/.

[61]Since the welfare state is more generous in France, the gap between the bottom 50 percent of income earners in France and the United States would probably be even greater after taxes and transfers. Garbinti, Goupille, and Piketty (2016) have not estimated post-tax income series yet.

progressive taxation, widespread deregulation—particularly in the financial sector—, weakened unions, and an erosion of the federal minimum wage.

Third, it would be valuable to produce State and local distributional accounts within the United States. This would be particularly valuable at a time where discrepancies across States in terms of economic growth and opportunity have come to the forefront of the political debate. Since 1979, the internal tax data have precise geographical indicators and are large enough to study outcomes at the state or regional level. Our approach naturally lends itself to the definition of national income across geographical units by simply considering the individual national income of residents in each geographical unit.[62] Starting in 1996, the population-wide tax data could be leveraged to construct measures of national income at an even finer geographical level, such as the county or the metropolitan statistical area.

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[62]US National accounts provide measures of GDP, personal consumption expenditure, and personal income (but not national income) at the state level (see US Department of Commerce, Bureau of Economic Analysis, 2016).

References

Alvaredo, Facundo, Anthony Atkinson, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman. 2011-present. *The World Wealth and Income Database.* online at `http://www.wid.world`.

Alvaredo, Facundo, Anthony Atkinson, Lucas Chancel, Thomas Piketty, and Emmanuel Saez, and Gabriel Zucman. 2016. "Distributional National Accounts (DINA) Guidelines: Concepts and Methods used in the World Wealth and Income Database." World Wealth and Income Database document online at `http://www.wid.world`.

Atkinson, Anthony B. 2005. "Top Incomes in the UK over the 20th Century." *Journal of the Royal Statistical Society: Series A (Statistics in Society),* 168(2): 325–343.

Atkinson, Anthony B., Alessandra Cesarico and Sarah Voitchovsky. 2016. "Top Incomes and the Gender Divide." LSE International Inequality Institute Working Paper 5.

Atkinson, Anthony B. and John Micklewright. 1983. "On the Reliability of Income Data in the Family Expenditure Survey," *Journal of the Royal Statistical Society*, Series A. 146 (1) 33-61.

Atkinson, Anthony B., Lee Rainwater, and Timothy M. Smeeding. 1995. "Income Distribution in OECD Countries," OECD Social Policy Studies, No. 18, Paris.

Atkinson, Anthony, Thomas Piketty, and Emmanuel Saez. 2011. "Top Incomes in the Long-Run of History", *Journal of Economic Literature*, 49(1), 3-71.

Auten, Gerald and David Splinter. 2016. "Using Tax Data to Measure Income Inequality: Effects of Base Broadening Tax Reform," U.S. Department of the Treasury, Office of Tax Analysis, unpublished mimeo.

Barnett, G.E. 1936. *Two Tracts by Gregory King.* (Baltimore: The Johns Hopkins Press).

Blau, Francinne, Marianne A. Ferber, and Anne E. Winkler. 2014. *The Economics of Women, Men, and Work,* Upper Saddle River, NJ: Prentice-Hall, 7th ed.

Blau, Francinne, Lawrence M. Kahn. 2016. *The Gender Wage Gap: Extent, Trends, and Explanations,* NBER Working paper No. 21913.

Boskin, Michael. 1996. "Toward A More Accurate Measure Of The Cost Of Living", Report to the Senate Finance Committee from the Advisory Commission To Study The Consumer Price Index.

Chiappori, Pierre-André and Costas Meghir. 2015. "Intrahousehold Inequality," Chapter 16, In: Anthony B. Atkinson and François Bourguignon, (Eds.), *Handbook of Income Distribution,* Elsevier: Amsterdam, 1369-1418.

Currie, Janet. 2003. "US Food and Nutrition Programs." In *Means-Tested Transfer Programs in the United States*, ed. Robert Moffitt. (Chicago: University of Chicago Press).

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," OECD Statistics Working Papers.

Fesseau, Maryse, Florence Wolff, and Maria Liviana Mattonetti. 2013. "A cross country comparison of household income, consumption and wealth between micro sources and national accounts aggregates," Working Paper No. 52, Paris: OECD.

Finkelstein, Amy, Nathaniel Hendren, and Erzo F.P. Luttmer. 2016. "The Value of Medicaid: Interpreting Results from the Oregon Health Insurance Experiment", NBER working paper No. 21308.

Fixler, Dennis, and David S. Johnson. 2014. "Accounting for the Distribution of Income in the US National Accounts," in *Measuring Economic Stability and Progress,* D. Jorgenson, J. S. Landefeld, and P. Schreyer, eds., (University of Chicago Press: Chicago).

Fixler, Dennis, David Johnson, Andrew Craig, Kevin Furlong. 2015. "A Consistent Data Series to Evaluate Growth and Inequality in the National Accounts," BEA Working Paper.

Fullerton, Don and Gilbert E. Metcalf. 2002. "Tax incidence," in: A. J. Auerbach and M. Feldstein (eds.), *Handbook of Public Economics,* Volume 4, chapter 26, 1787-1872 (North-Holland: Amsterdam).

Furlong, Kevin. 2014. "Distributional Estimates in the US National Accounts: Integrating Micro and Macro Data", Bureau of Economic Analysis slides online at `ftp://ftp.census.gov/adrm/fesac/2014-06-13_furlong.pdf`

Galor, Oded and Joseph Zeira. 1993. "Income Distribution and Macroeconomics," *Review of Economics Studies,* 60(1), 35-52.

Galor, Oded and Omer Moav. 2006. "Das Human Kapital: A Theory of the Demise of the Class Structure," *Review of Economic Studies* 73, 85–117.

Garbinti, Bertrand, Jonathan Goupille, and Thomas Piketty. 2016. "Inequality Dynamics in France, 1900-2014: Evidence from Distributional National Accounts (DINA)", PSE Working paper.

Guvenen, Fatih, Greg Kaplan, and Jae Song. 2014. "The Glass Ceiling and The Paper Floor: Gender Differences among Top Earners, 1981-2012," NBER Working Paper No. 20560.

Harberger, Arnold C. 1962. "The Incidence of the Corporation Income Tax," *Journal of Political Economy,* 70(3), 215–240.

Karabarbounis, Loukas and Brent Neiman. 2014. "The Global Decline of the Labor Share." *Quarterly Journal of Economics* 129(1), 61-103.

Katz, Lawrence, and David Autor. 1999. "Changes in the Wage Structure and Earnings Inequality," in *Handbook of Labor Economics,* O. Ashenfelter and D. Card, eds. (Amsterdam: North-Holland), Volume 3A.

King, Willford I. 1915. *The Wealth and Income of the People of the United States*, (New York: Macmillian).

King, Willford I. 1927. "Wealth Distribution in the Continental United States at the Close of 1921", *Journal of the American Statistical Association*, 22, 135–153.

King, Willford I. 1930. *The National Income and Its Purchasing Power*, (New York: National Bureau of Economic Research).

Kopczuk, Wojciech, Emmanuel Saez, and Jae Song. 2010, "Earnings Inequality and Mobility in the United States: Evidence from Social Security Data since 1937," *Quarterly Journal of Economics* 125(1), 91–128.

Kuznets, Simon. 1941. *National Income and Its Composition, 1919–1938* (New York: National Bureau of Economic Research).

Kuznets, Simon. 1953. *Shares of Upper Income Groups in Income and Savings* (New York: National Bureau of Economic Research).

Kuznets, Simon. 1955. "Economic Growth and Income Inequality." *American Economic Review*, 45(1), 1–28.

McCully, Clinton. 2014. "Integration of Micro and Macro data on Consumer Income and Expenditure," in *Measuring Economic Stability and Progress,* D. Jorgenson, J. S.Landefeld, and P. Schreyer, editors, University of Chicago Press, 2014.

Pierce, Brooks. 2001. "Compensation Inequality, 1913-1998," *Quarterly Journal of Economics* 116(4), 1493–1525.

Piketty, Thomas. 2001. *Les hauts revenus en France au XXe siècle: Inegalités et redistributions 1901–1998.* (Paris: Grasset).

Piketty, Thomas. 2003. "Income Inequality in France, 1901–1998." *Journal of Political Economy,* 111(5): 1004–1042.

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

Piketty, Thomas, and Emmanuel Saez. 2003. "Income Inequality in the United States, 1913-1998," *Quarterly Journal of Economics* 118(1), 1-39.

Piketty, Thomas and Emmanuel Saez. 2007. "How Progressive is the US Federal Tax System? A Historical and International Perspective," *Journal of Economic Perspectives* 21(1), 3-24.

Piketty, Thomas, Emmanuel Saez, and Stefanie Stantcheva. 2014. "Optimal Taxation of Top Labor Incomes: A Tale of Three Elasticities," *American Economic Journal: Economic Policy* 6(1), 230–271.

Piketty, Thomas, and Gabriel Zucman. 2014. "Capital is Back: Wealth-Income Ratios in Rich Countries, 1700-2010," *Quarterly Journal of Economics* 129(3), 1255-1310.

Saez, Emmanuel. 2008. "Striking It Richer: The Evolution of Top Incomes in the United States," *Pathways Magazine*, Stanford Center for the Study of Poverty and Inequality, 6-7.

Saez, Emmanuel. 2016. "Statistics of Income Tabulations: High Incomes, Gender, Age, Earnings Split, and Non-filers." SOI Working Paper.

Saez, Emmanuel. 2017. "Taxing the Rich More: Preliminary Evidence from the 2013 Tax Increase," *Tax Policy and the Economy,* ed. Robert Moffitt, (Cambridge: MIT Press), Volume 31.

Saez, Emmanuel and Gabriel Zucman. 2016. "Wealth Inequality in the United States since 1913: Evidence from Capitalized Income Tax Data," *Quarterly Journal of Economics* 131(2), 519-578.

Stiglitz Joseph, Amartya Sen, and Jean-Paul Fitoussi. 2009. *Report by the Commission on the Measurement of Economic Performance and Social Progress*, INSEE France, online at `www.stiglitz-sen-fitoussi.fr`.

United Nations. 2009. "System of National Accounts 2008," European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank. online at `http://unstats.un.org/unsd/nationalaccount/docs/SNA2008.pdf`

US Board of Governors of the Federal Reserve System. 2014. "Z.1 Financial Accounts of the United States , Fourth Quarter 2013." downloaded, March 6, 2014.

US Census Bureau. 2016. "Income and Poverty in the United States: 2015 Current Population Reports", Publication P60-252, US Census Bureau, Washington DC.

US Congressional Budget Office. 2016. "The Distribution of Household Income and Federal Taxes, 2013", US Congressional Budget Office report, Washington DC.

US Department of Commerce, Bureau of Economic Analysis. 2016. *National Income and Product Accounts of the United States, 1929-2015*, (Washington, DC).

US Treasury Department, Internal Revenue Service. 1916-present. *Statistics of Income: Individual Income Tax Returns,* annual since 1916, Washington, D.C.

Zucman, Gabriel. 2013. "The Missing Wealth of Nations: Are Europe and the US net Debtors or net Creditors?" *Quarterly Journal of Economics*, 128(3), 1321-1364.

Zucman, Gabriel. 2014. "Tax Evasion on Offshore Profits and Wealth", *Journal of Economic Perspectives*, 28(4), 121-148.

Table 1: The Distribution of National Income in the United States in 2014

Income group	Number of adults	Pre-tax national income		Post-tax disposable income		Post-tax national income	
		Average income	Income share	Average income	Income share	Average income	Income share
Full Population	234,400,000	$64,600	100%	$48,900	100%	$64,600	100%
Bottom 50%	117,200,000	$16,200	12.5%	$17,700	18.1%	$25,000	19.4%
Middle 40%	93,760,000	$65,400	40.5%	$50,300	41.1%	$67,200	41.6%
Top 10%	23,440,000	$304,000	47.0%	$200,000	40.9%	$252,000	39.0%
Top 1%	2,344,000	$1,300,000	20.2%	$830,000	17.0%	$1,010,000	15.6%
Top 0.1%	234,400	$6,000,000	9.3%	$3,800,000	7.8%	$4,400,000	6.8%
Top 0.01%	23,440	$28,100,000	4.4%	$17,200,000	3.5%	$20,300,000	3.1%
Top 0.001%	2,344	$122,000,000	1.9%	$75,000,000	1.5%	$88,700,000	1.4%

Notes: This table reports statistics on the income distribution in the United States in 2014 for three income concepts: (1) pre-tax national income, (2) post-tax disposable income, and (3) post-tax national income. Pre-tax and post-tax national income match national income. Post-tax disposable income excludes in-kind government transfers (medicare, medicaid, etc.), public goods consumption (defense, education, etc.), and the government deficit. The unit is the adult individual (aged 20 or above). Income is split equally among spouses. Fractiles are defined relative to the total number of adults in the population. Pre-tax national income fractiles are ranked by pre-tax national income, post-tax disposable income fractiles are ranked by post-tax disposable income, and post-tax national income fractiles are ranked by post-tax national income. Hence, the three sets of fractiles do not represent exactly the same groups of individuals due to re-ranking when switching from one income definition to another.

Table 2: The Growth of National Income in the United States since World War II

Income group	Pre-tax income growth		Post-tax income growth	
	1980-2014	**1946-1980**	**1980-2014**	**1946-1980**
Full Population	61%	95%	61%	95%
Bottom 50%	1%	102%	21%	130%
Middle 40%	42%	105%	49%	98%
Top 10%	121%	79%	113%	69%
Top 1%	205%	47%	194%	58%
Top 0.1%	321%	54%	299%	104%
Top 0.01%	454%	75%	424%	201%
Top 0.001%	636%	57%	617%	163%

Notes: The table displays the cumulative real growth rates of pre-tax and post-tax national income per adult over two 34 years period: 1980 to 2014 and 1946 to 1980. Pre-tax and post-tax national income match national income. The unit is the adult individual (aged 20 or above). Fractiles are defined relative to the total number of adults in the population. Income is split equally among spouses. Pre-tax national income fractiles are ranked by pre-tax national income while post-tax national income fractiles are ranked by post-tax national income.

Figure 1: From Taxable Income to National Income

From taxable to total labor income

Source: Appendix Table I-S.A8b.

From taxable to total capital income
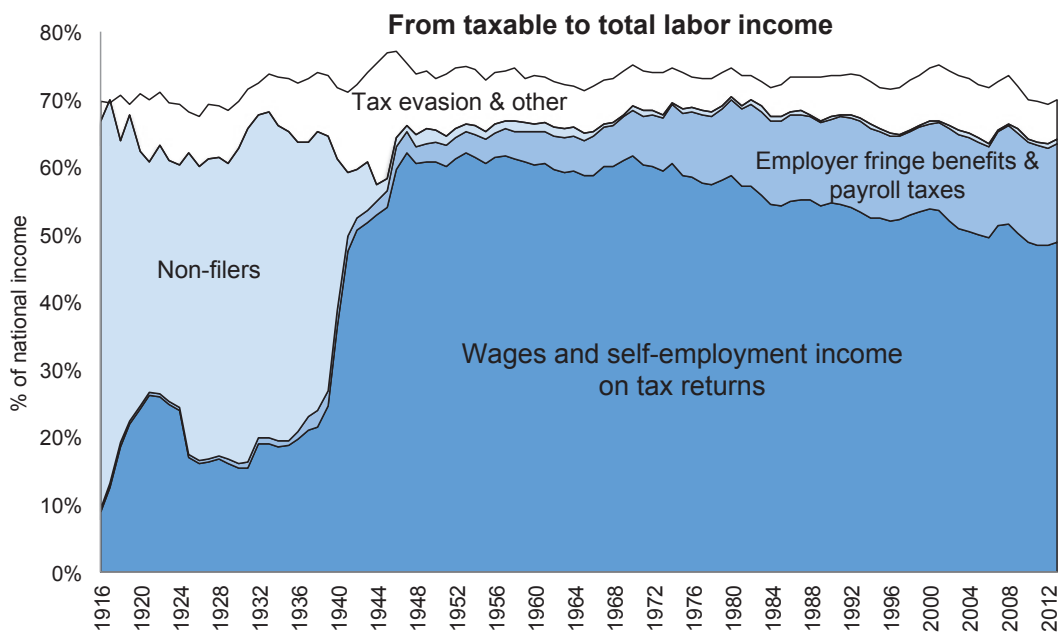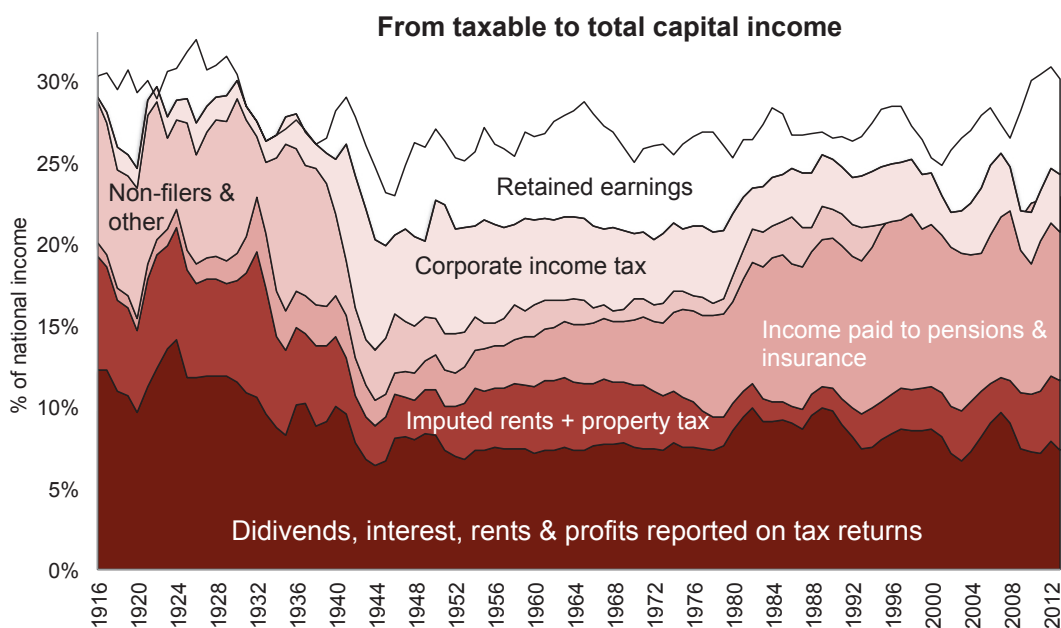
Source: Appendix Table I-S.A8.

Notes: The top panel decomposes total labor income into (i) taxable labor income reported on individual income tax returns (taxable wages and the labor share—assumed to be 70%—of reported non-corporate business income); (ii) tax-exempt employee fringe benefits (health and pension contributions) and the employer share of payroll taxes; (iii) wages and labor share of non-corporate business income earned by non-filers; (iv) tax evasion (the labor share of non-corporate business incomes that evade taxes) and other discrepancies. The bottom panel decomposes total capital income into (i) capital income reported on tax returns (dividends, interest, rents, royalties, and the capital share of reported non-corporate business income); (ii) imputed rents net of mortgage interest payments plus residential property taxes; (iii) capital income paid to pensions and insurance funds; (iv) corporate income tax; (v) corporate retained earnings; (vi) tax evasion, non-filers, non-mortgage interest and other discrepancies. Business taxes are allocated proportionally to each category of capital income. In both panels, sales taxes are allocated proportionally to each category of income, and the denominator is personal factor income as defined in Appendix Table I-A4, which is very close to national income.

Figure 2: Top Income Shares

Top 10% national income share: pre-tax vs. post-tax

Source: Appendix Tables II-B1 and II-C1
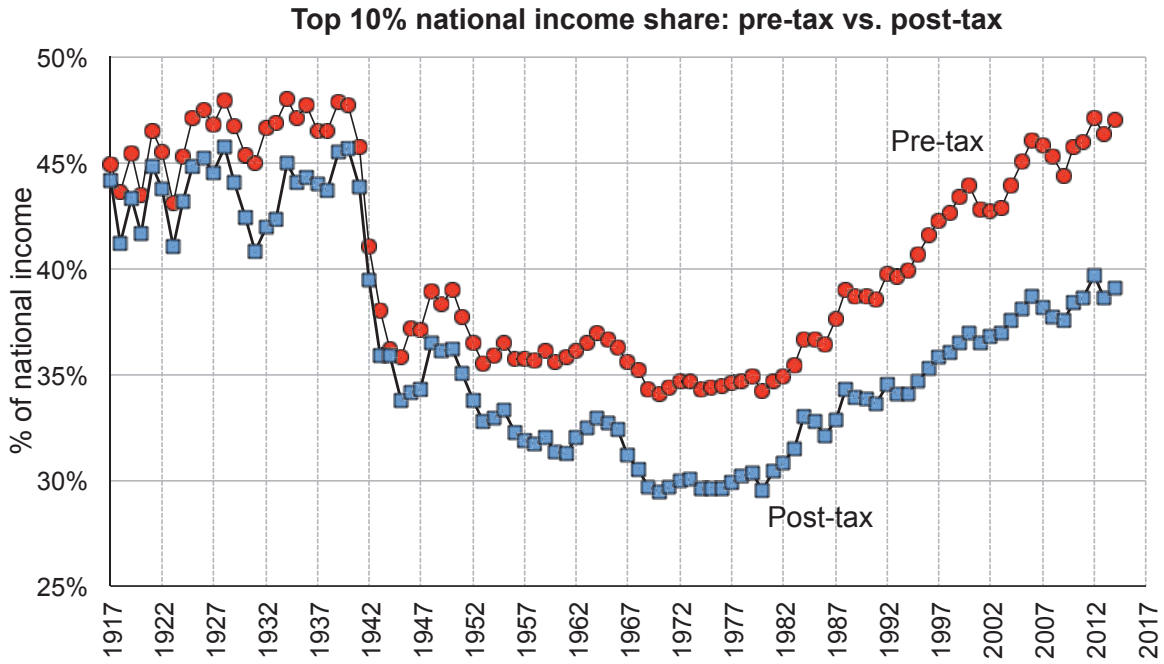
**Top 1% national income share: pre-tax vs. post-tax**
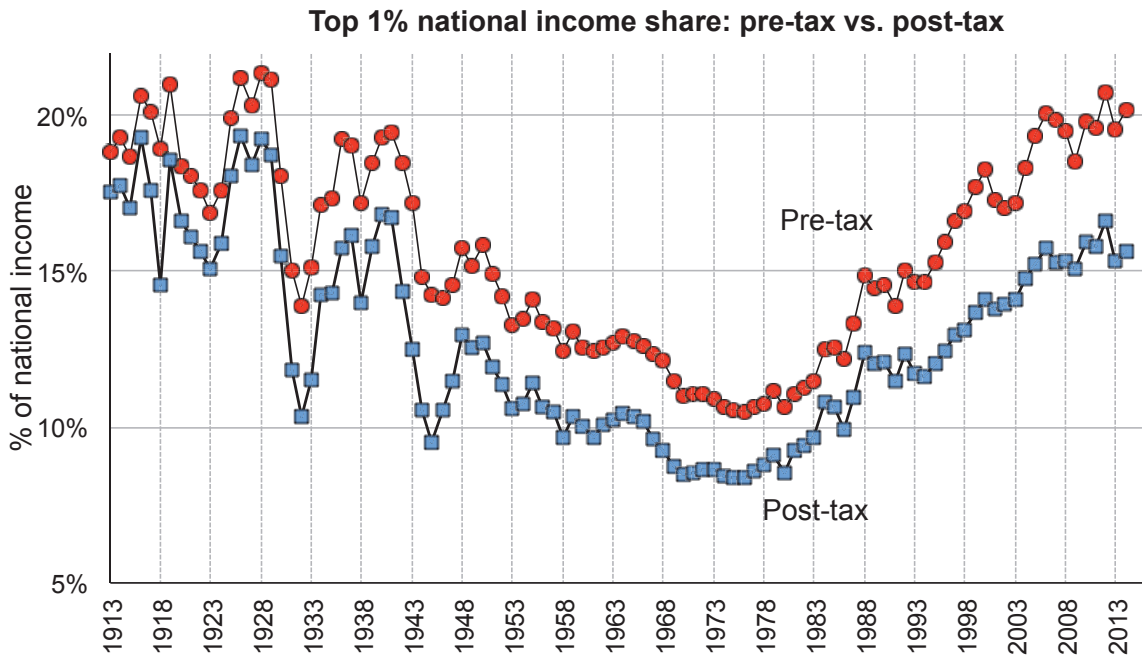
Source: Appendix Tables II-B1 and II-C1

Notes: The figure displays the share of national income pre-tax and post-tax going to the top 10% adults from 1917 to 2014 (top panel) and to the top 1% adults from 1913 to 2014 (bottom panel). Adults are all US residents aged 20 and above. Incomes within married couples are equally split. Pre-tax national income is factor income after the operation of the public and private pension systems and unemployment insurance system. Post-tax national income is defined as pre-tax income minus all taxes plus all government transfers and spending (federal, state, and local). Both pre-tax and post-tax national income aggregate to national income.

Figure 3: Pre-tax vs. Post-tax Bottom 50% Incomes and Shares

Bottom 50% national income share: pre-tax vs. post-tax

Source: Appendix Tables II-B1 and II-C1

Real income of bottom 50%:
pre-tax vs. post-tax
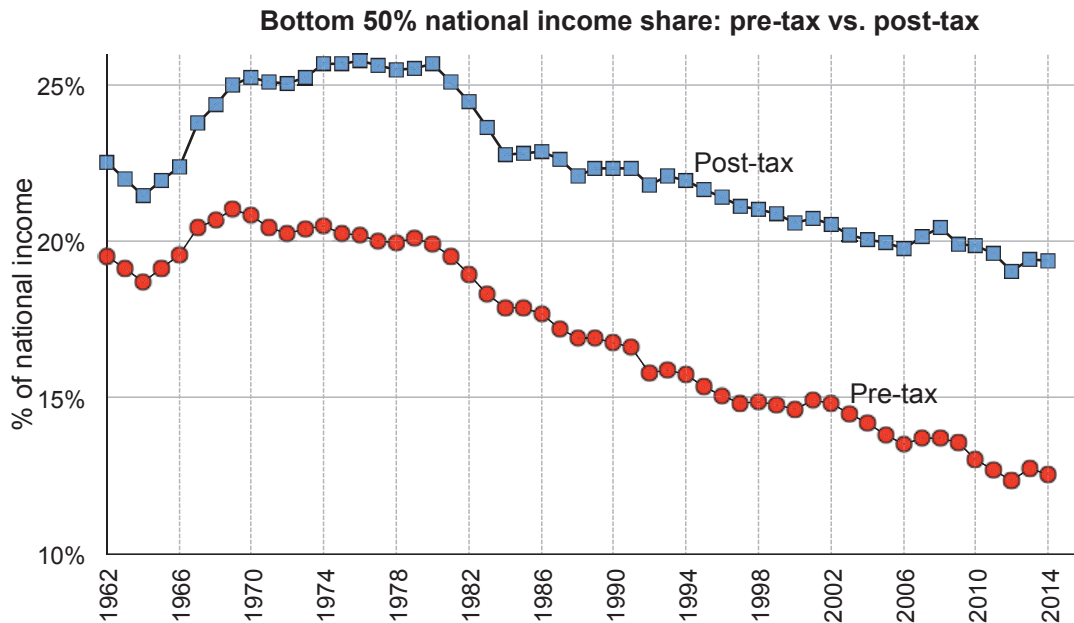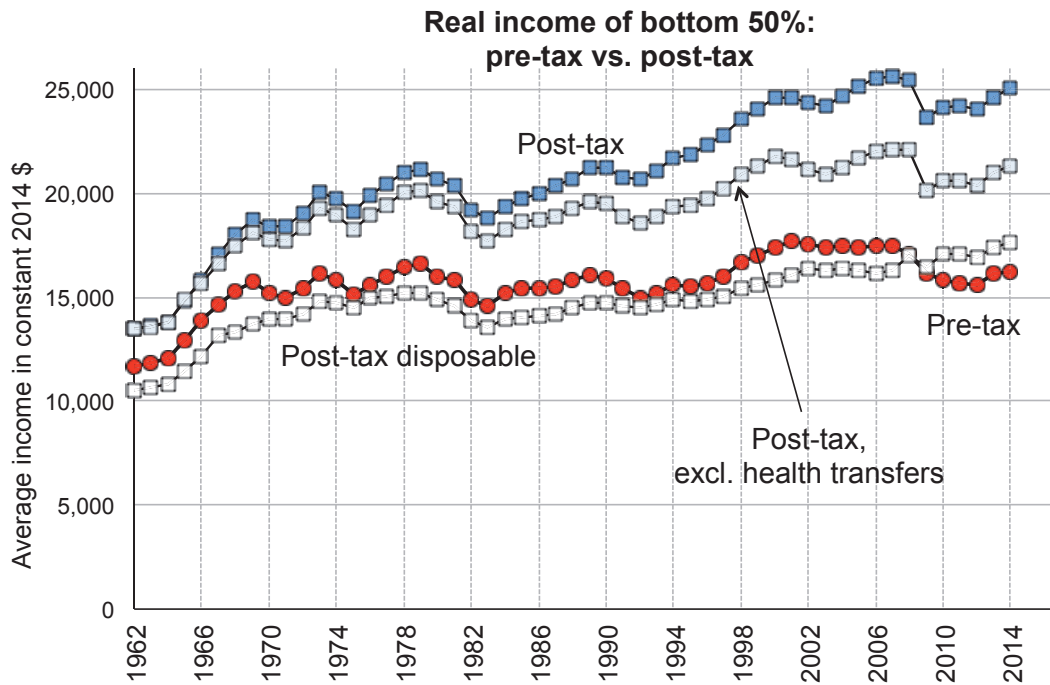
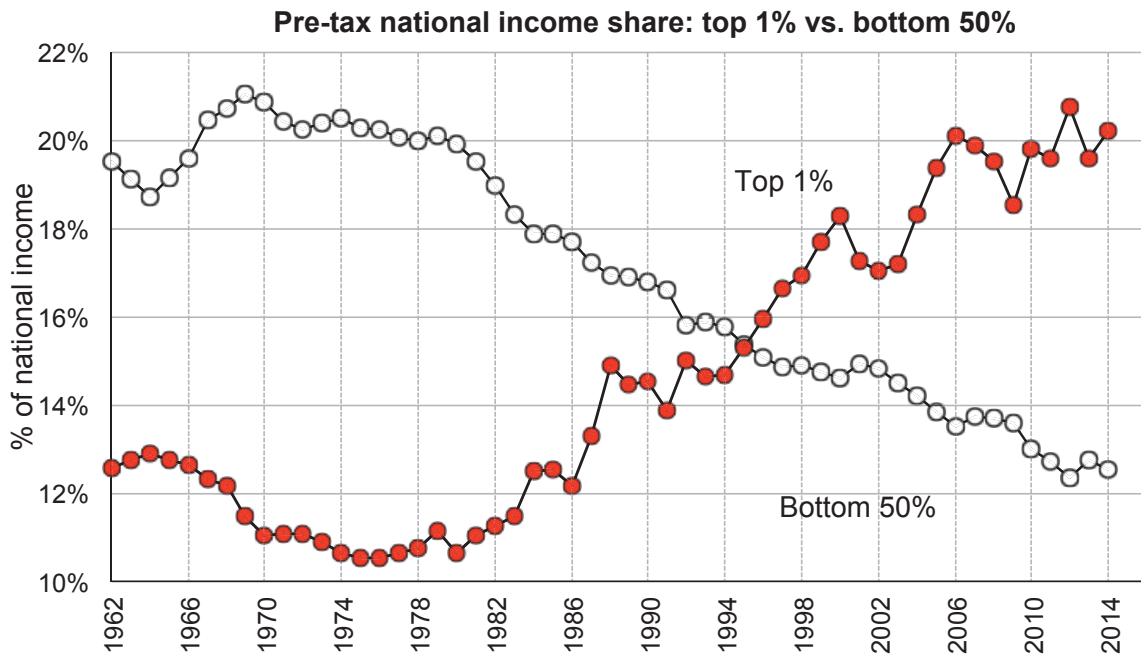Source: Appendix Tables II-B7, II-C7 and II-C3c.

Notes: The top panel figure depicts the bottom 50% adult income shares pre-tax and post-tax since 1962. The unit is the individual adult and incomes within married couples are split equally. The bottom panel depicts the bottom 50% average real income per adult for four income definitions: (a) pre-tax national income, (b) post-tax disposable income (subtracting taxes, adding cash transfers but not in-kind transfers and collective public expenditures), (c) post-tax national income (adding all transfers and collective public expenditures minus the government deficit), (d) post-tax national income but excluding Medicare and Medicaid benefits.

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Figure 4: Bottom 50% Real Incomes by Age Groups

Real pre-tax income of bottom 50%, by age group

Source: Appendix Tables II-B7 and II-B7b.

Real post-tax income of bottom 50%, by age group

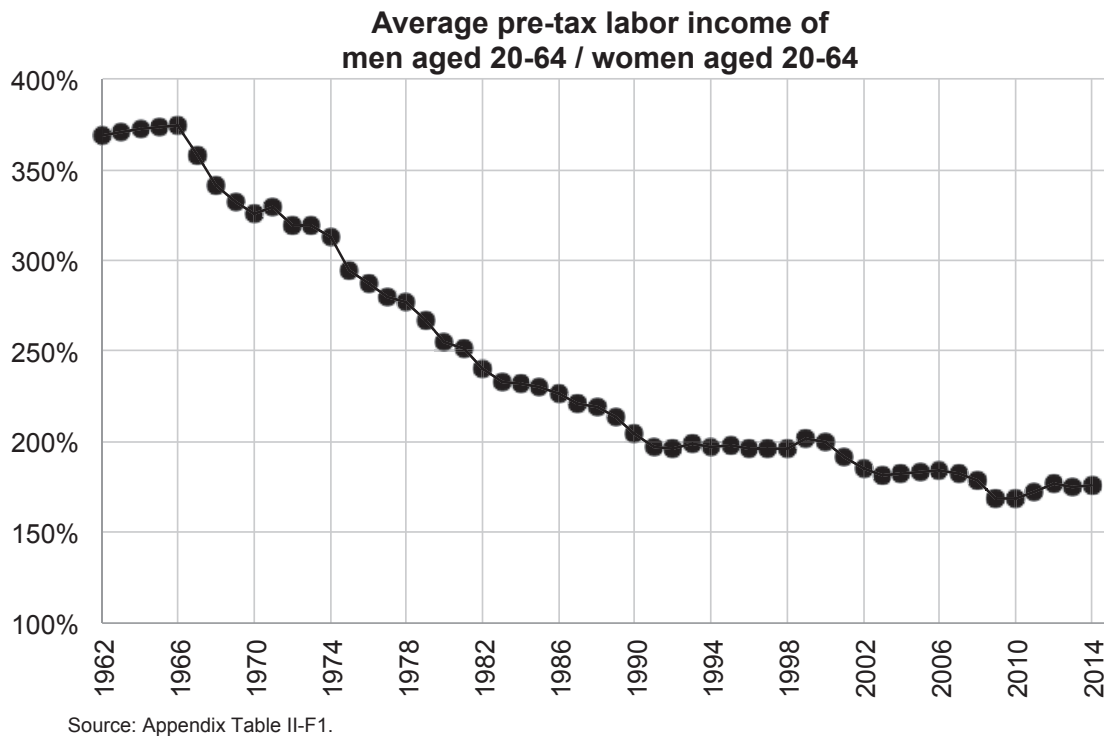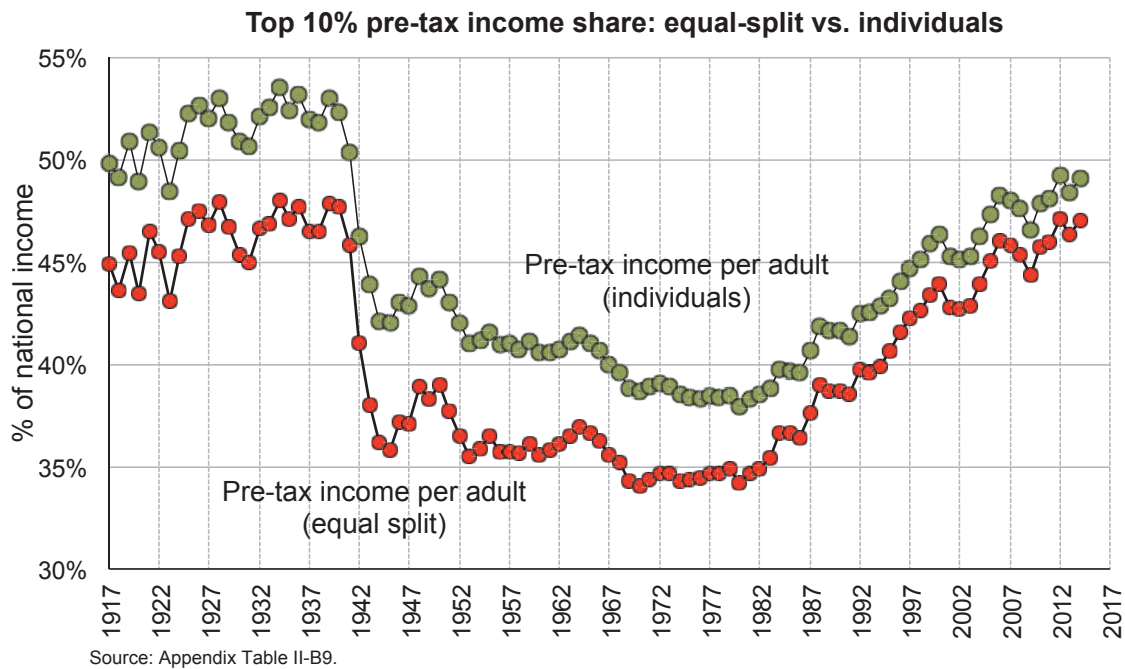Source: Appendix Tables II-C7, II-C7b and II-C7d.
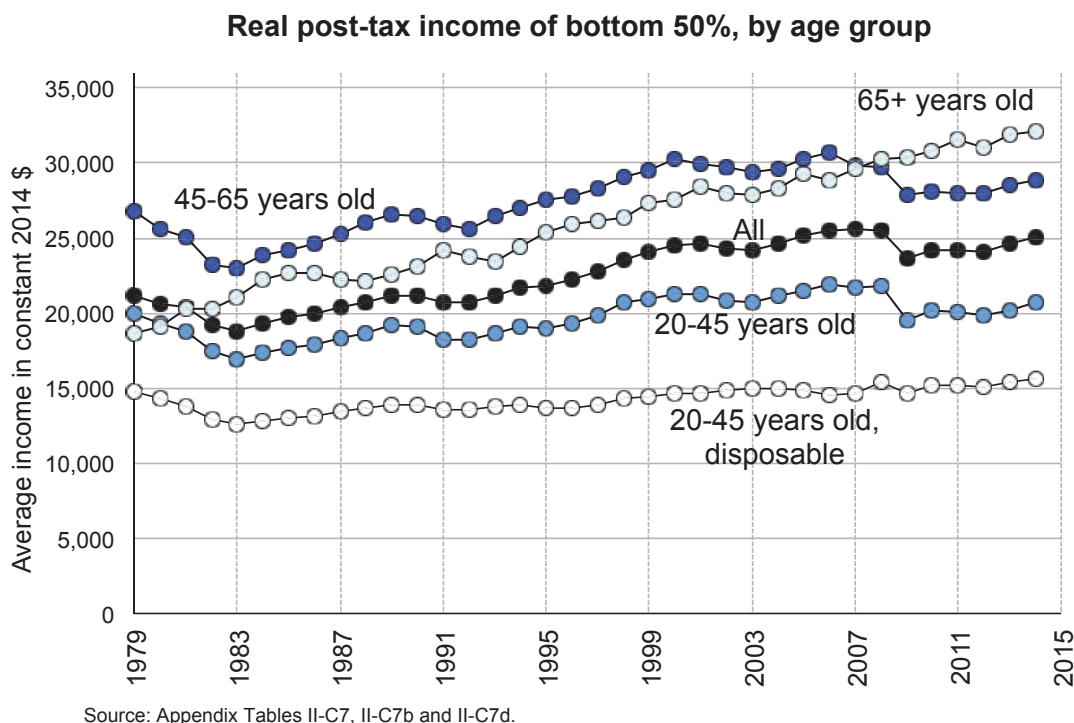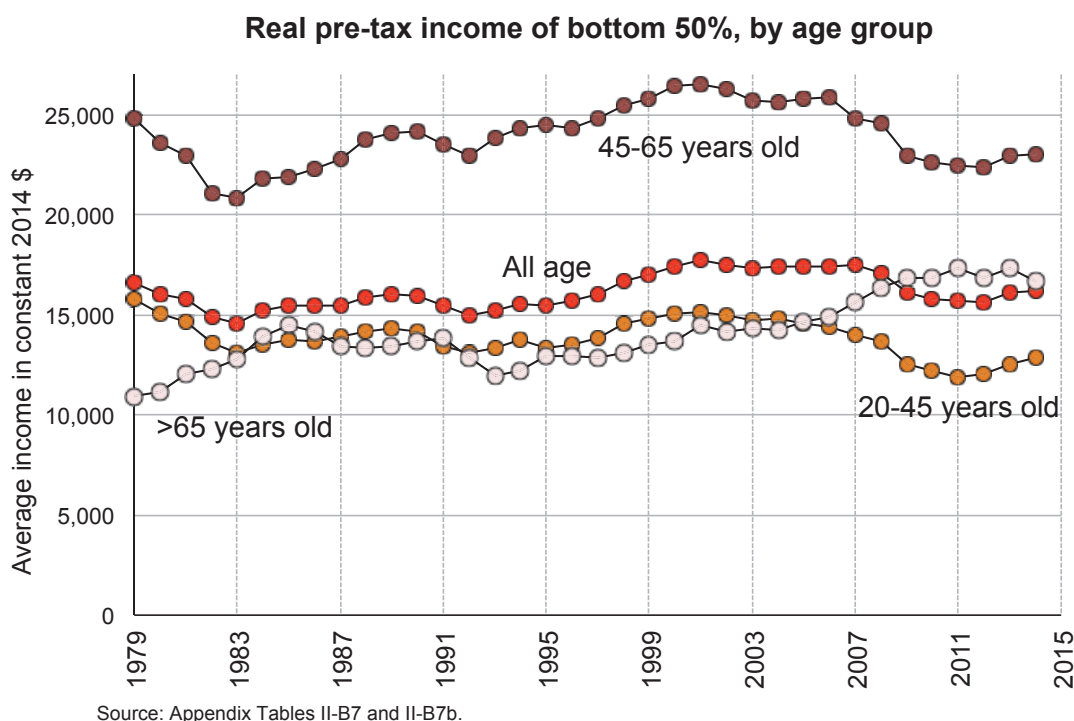
Notes: This figure depicts the bottom 50% real incomes per adult by age groups. The bottom 50% is defined within each of the three age groups, 20-44, 45-64, and 65+. The top panel figure depicts real incomes on a pre-tax basis while the bottom panel figure depicts real incomes on a post-tax basis. Pre-tax national income is after the operation of pension and unemployment insurance systems. Post-tax national income is after all taxes and transfer. Post-tax disposable income excludes in-kind transfers, collective consumption expenditure, and the government deficit. The unit is the individual adult and incomes within married couples are split equally.

Pre-tax national income share: top 1% vs. bottom 50%

Source: Appendix Table II-B1

Real average pre-tax income of bottom 50% and top 1% adults

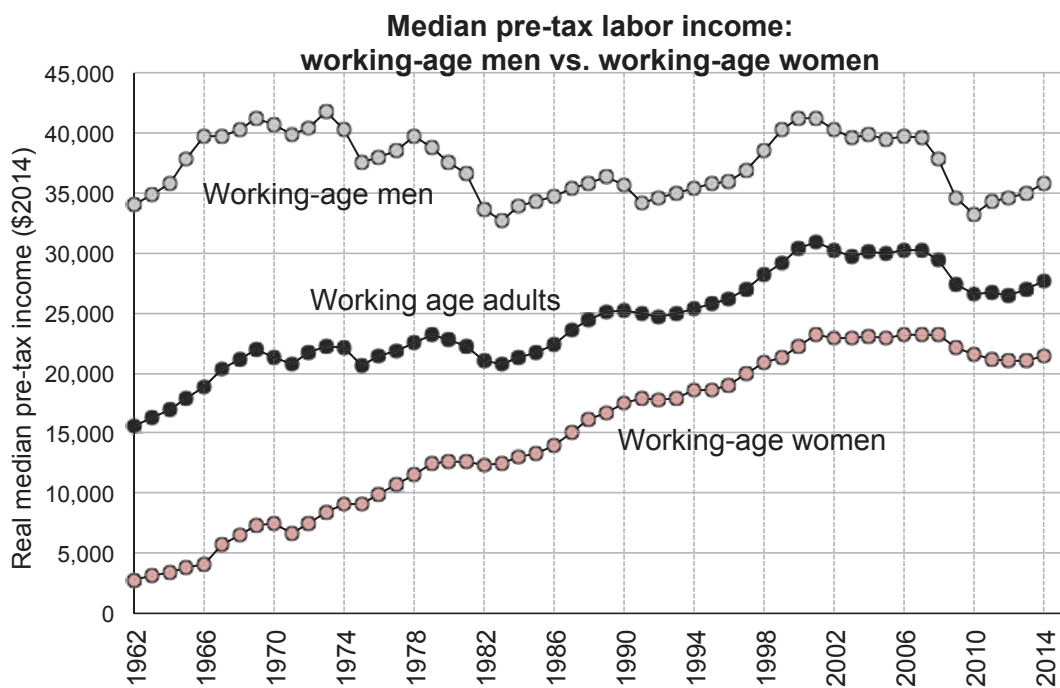Source: Appendix Tables II-B7 and II-B10

Notes: The figure contrasts the evolution of the top 1% vs. the bottom 50%. The top panel plots the top 1% pre-tax national income share and the bottom 50% pre-tax national income share since 1962. The bottom panel plots the top 1% real average pre-tax national income (on the left y-axis) and the bottom 50% real average pre-tax national income (on the right x-axis). The unit is the individual adult and incomes within married couples are split equally.

Figure 6: The Role of Within Couple Inequality and the Decline of the Gender Gap

Top 10% pre-tax income share: equal-split vs. individuals

Pre-tax income per adult
(individuals)

Pre-tax income per adult
(equal split)

Source: Appendix Table II-B9.

**Average pre-tax labor income of
men aged 20-64 / women aged 20-64**

Source: Appendix Table II-F1.

Notes: The top panel depicts the top 10% adults pre-tax national income share with two definitions of income: (a) equal split of income within married couples (our benchmark series), (b) split of factor labor income on an individual basis within couples (capital income, pension benefits and other benefits remain split equally). The bottom panel depicts the average pre-tax labor income of working-age men (aged 20 to 64, including men earning zero pre-tax labor income) divided by the average pre-tax labor income of working-age women (aged 20 to 64, including women earning zero pre-tax labor income). Pre-tax labor income is factor labor income plus pensions, Social Security, and unemployment insurance benefits, minus the corresponding contributions. Pensions and Social Security benefits are split 50/50 between spouses.

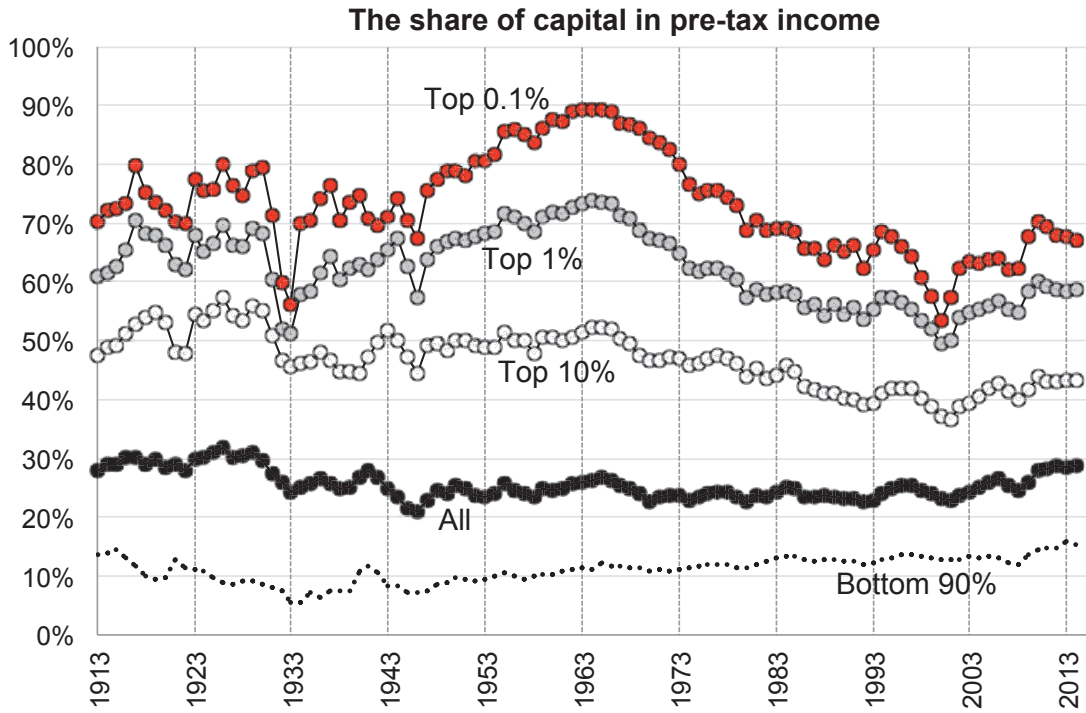Figure 7: Gender Gaps Across the Distribution

Median pre-tax labor income:
working-age men vs. working-age women

Working-age men

Working age adults

Working-age women

Real median pre-tax income ($2014)

Source: Appendix Table II-B13.

Share of women in the employed population,
by fractile of labor income

All

Top 10%

Top 1%

Top 0.1%
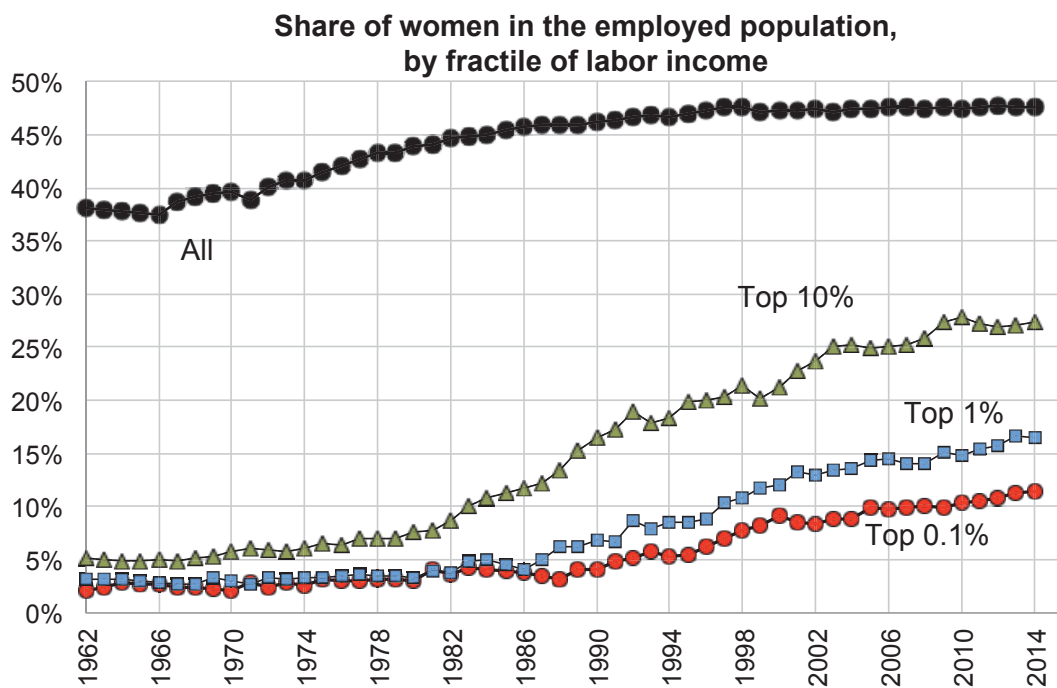
Source: Appendix Table II-F1.

Notes: The top panel shows the median pre-tax labor income among all working-age adults (20 to 64), men, and women. Pre-tax labor income includes pensions, Social Security, and unemployment insurance benefits and exclude the corresponding contributions. The bottom panel depicts the share of women in various groups of the distribution of factor labor income. Factor labor income excludes pensions, Social Security, and unemployment insurance benefits and is gross of the corresponding contributions. The groups are defined relative to the full population of adults with positive factor labor income (either from salaried or non-salaried work).

Figure 8: Capital Share and Age in Top Income Groups

The share of capital in pre-tax income

Source: Appendix Table II-B2d.

Average age by pre-tax income group
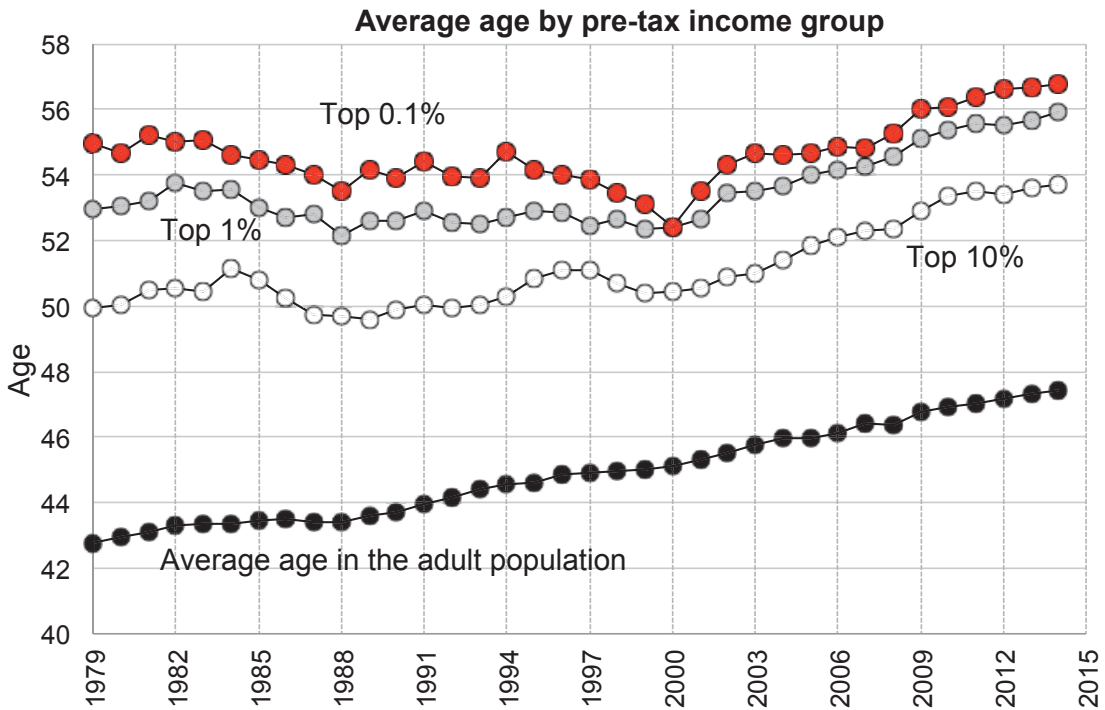
Source: Appendix Table II-F2.

Notes: The top panel depicts the share of capital income in the pre-tax national income of various income groups:
(i) full adult population, (ii) top 10% incomes, (iii) top 1% incomes, (iv) top .1% incomes. Total pre-tax income
is the sum of capital income and labor income so the chart can also be read symmetrically from the top x-axis
line as the fraction of labor income in top groups. The bottom panel depicts the average age in various income
groups: (i) full adult population, (ii) top 10% incomes, (iii) top 1% incomes, (iv) top .1% incomes.

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Figure 9: Labor and Capital Income of Top 1% Earners

Pre-tax labor income of top 1% adult income earners

Source: Appendix Table II-B2b.

**Pre-tax capital income of top 1% adult income earners**
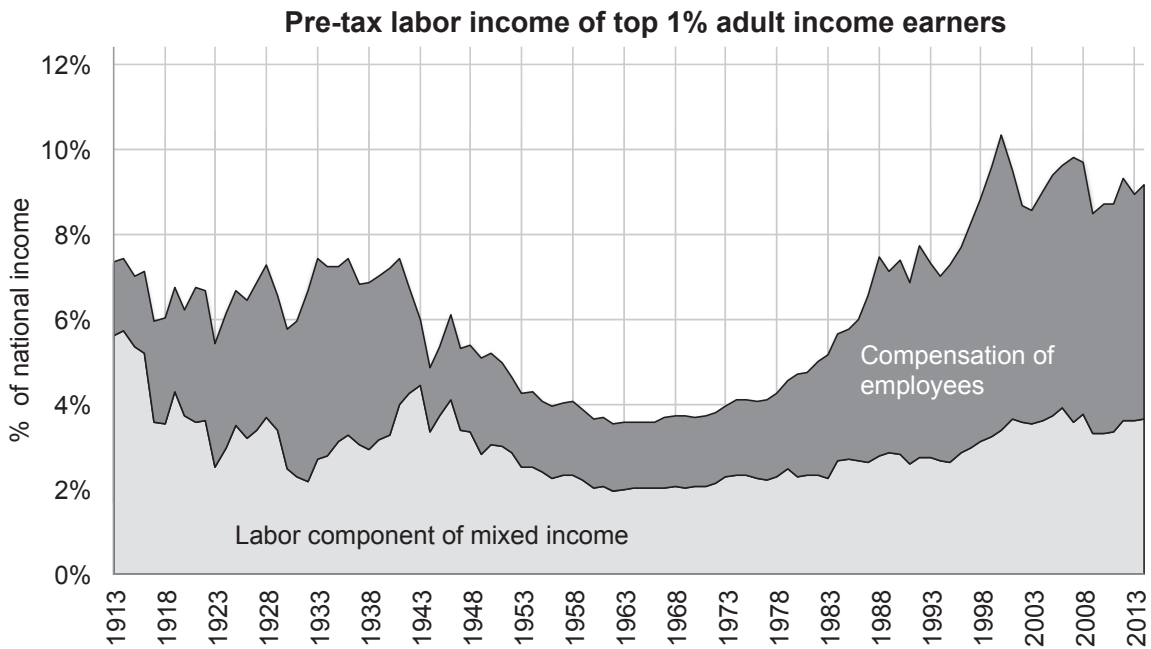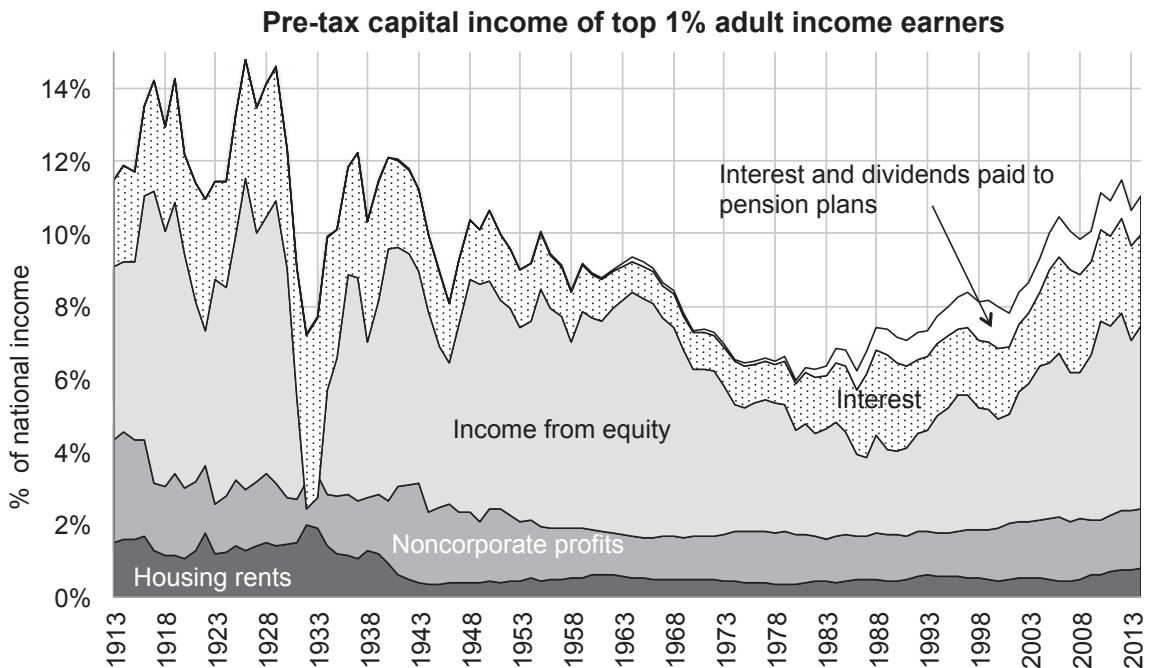
Source: Appendix Table II-B2b

Notes: The figure depicts labor income of the top 1% of pre-tax national income earners as a share of aggregate national income (top panel) and capital income of the top 1% as a share of aggregate national income (bottom panel). The sum of these two series is the top 1% income share depicted in Figure 2 (bottom-panel). Labor income is also decomposed into employee compensation and labor income from non corporate business profits. Capital income is decomposed into housing rents (net of mortgages), non-corporate profits, corporate profits, net interest, and profits and interests paid to pension and insurance funds.

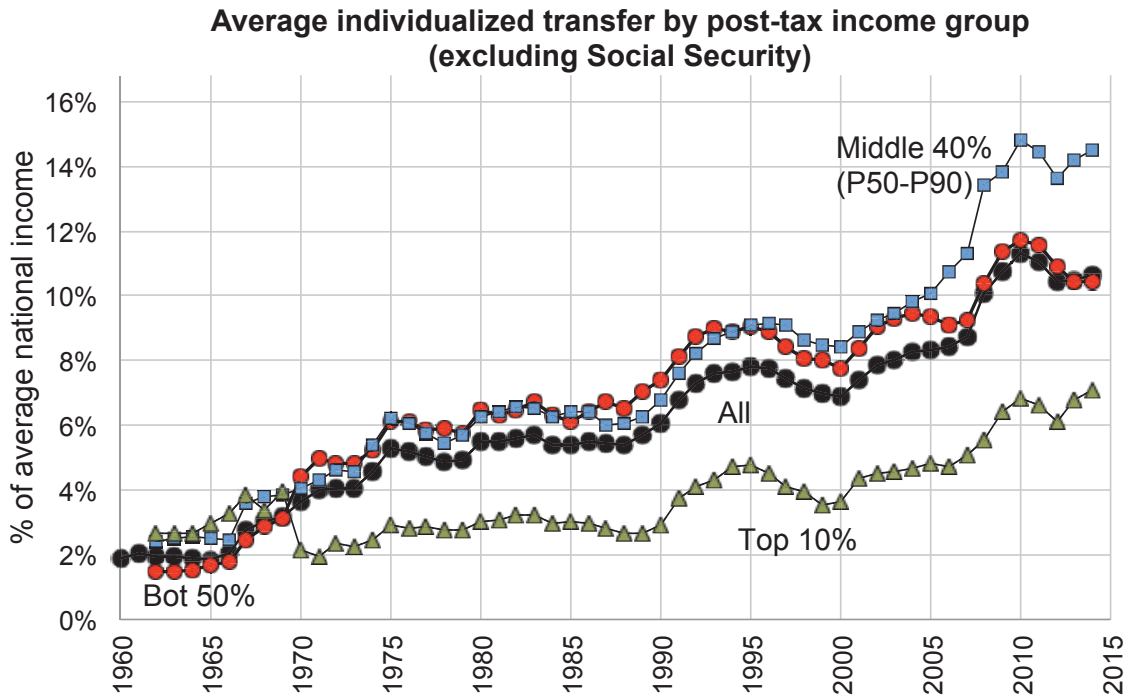Figure 10: Average Tax Rates Across the Distribution

Average tax rates by pre-tax income group

Source: Appendix Table II-G1.

Taxes paid by the bottom 50%
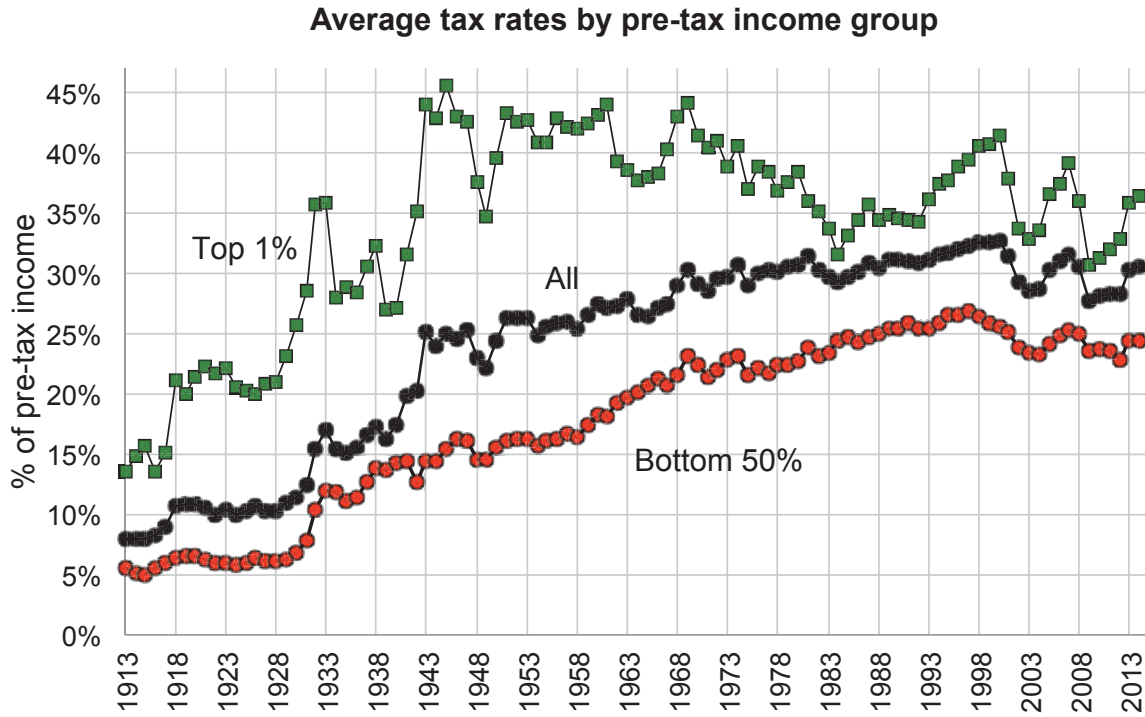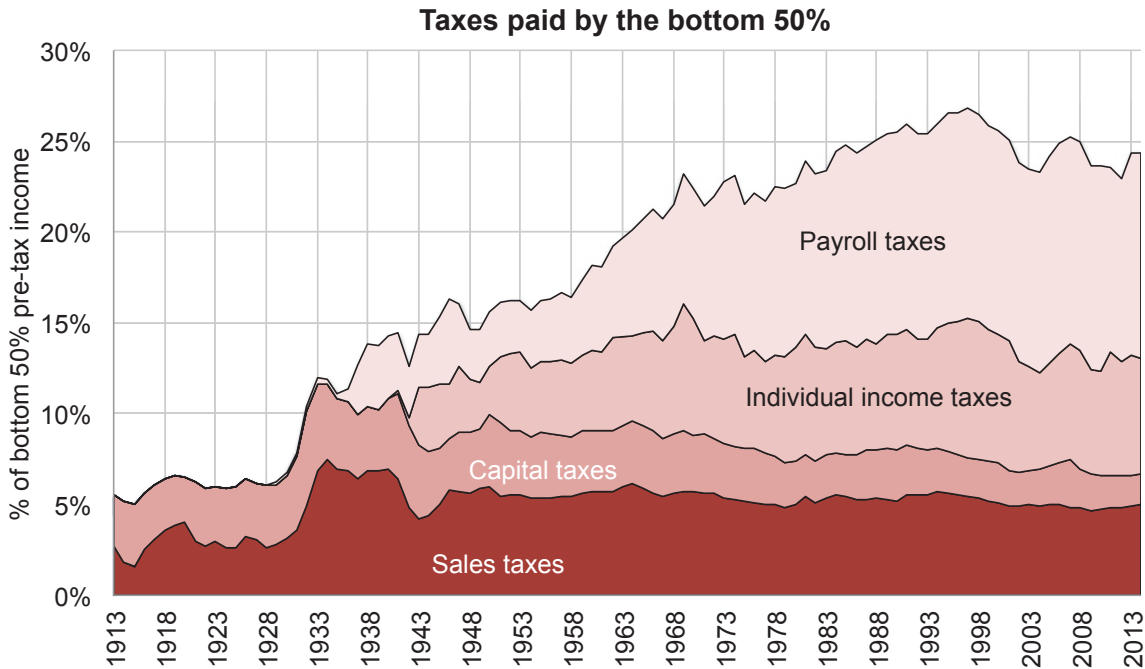
Source: Appendix Table II-G2

Notes: The top panel depicts the macroeconomic tax rate (total taxes to national income), and the average tax rate of the top 1% and bottom 50% pre-tax national income earners, with income equally split among spouses. Taxes include all forms of taxes at the federal, state, and local level. Tax rates are expressed as a fraction of pre-tax income. The bottom panel decomposes the taxes paid by the bottom 50%. Capital taxes include the fraction of corporate taxes, property taxes, and estate taxes that fall on the bottom 50%.

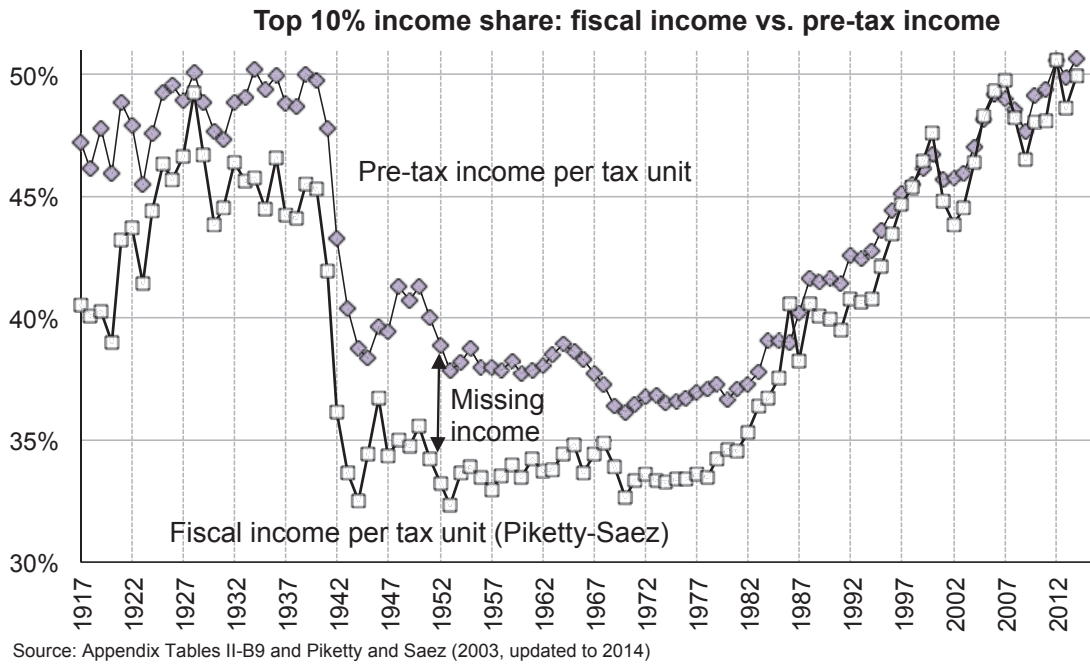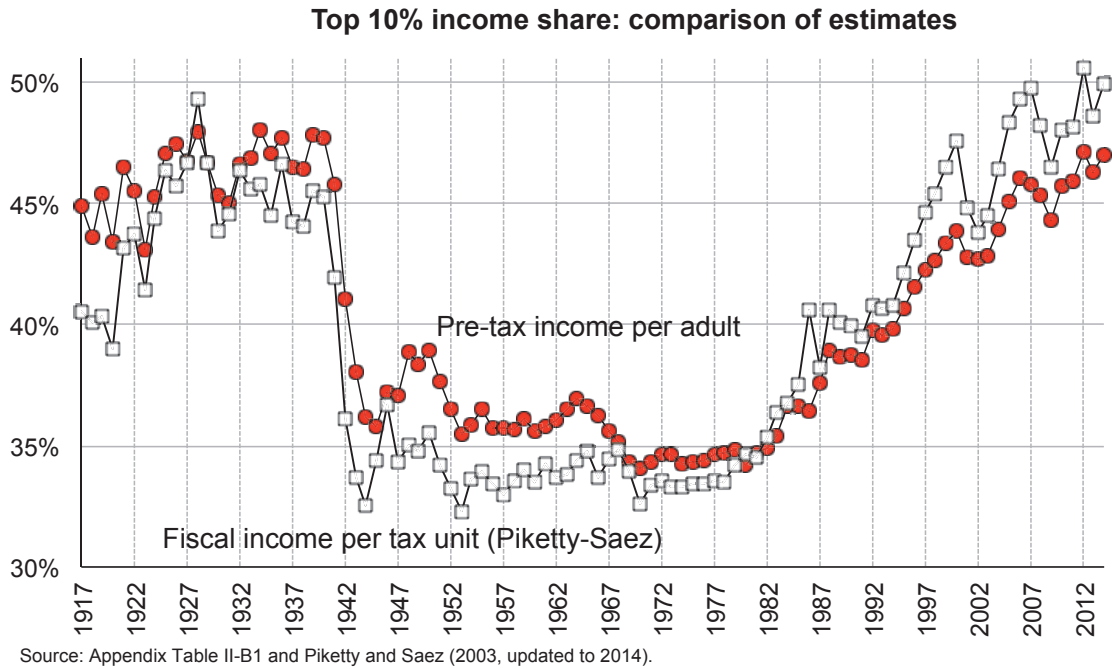Figure 11: Individualized Transfers Excluding Social Security

Average individualized transfer by post-tax income group (excluding Social Security)

Source: Appendix Table II-G4.

Real income of the middle 40%: the role of transfers
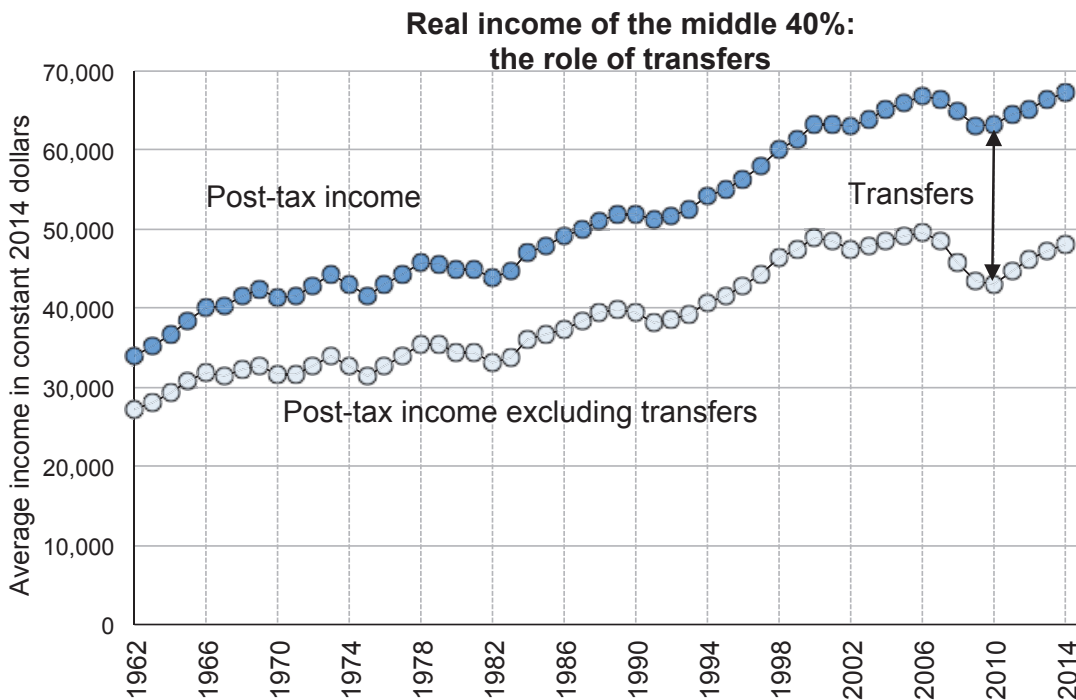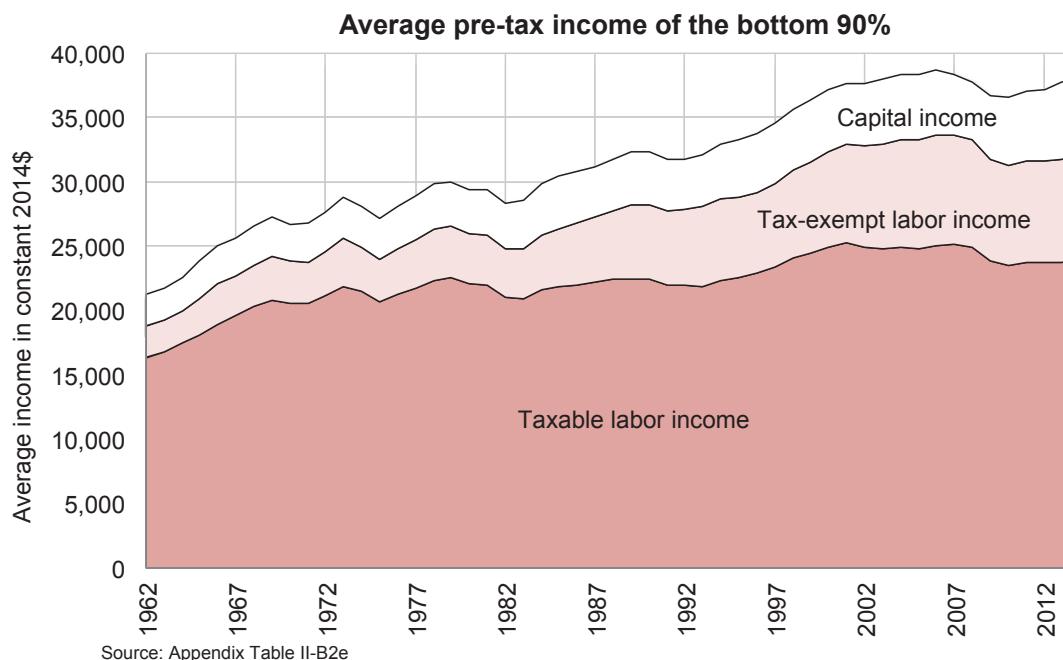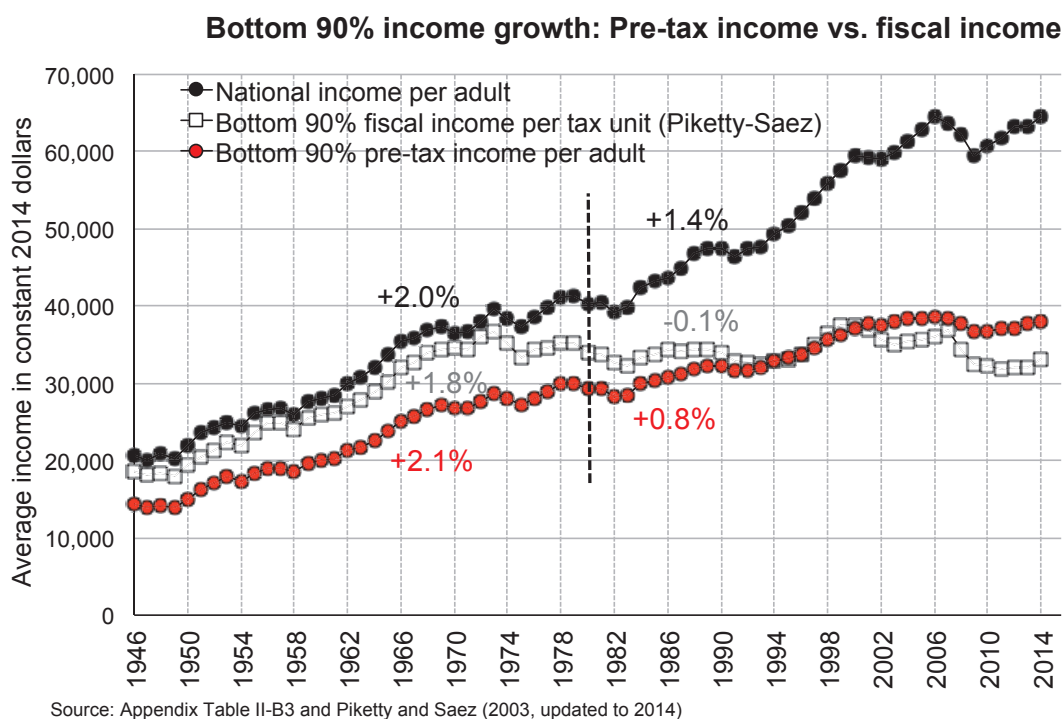

Source: Appendix Table II-C3b.

Notes: The top panel depicts average individualized transfers received by post-tax national income groups, expressed as a percent of the average national income in the full adult population. The bottom panel depicts the average post-tax income of the middle 40% (top 50% excluding the top 10%), including and excluding transfers.

Figure 12: Comparison with top fiscal income shares

Top 10% income share: comparison of estimates

Source: Appendix Table II-B1 and Piketty and Saez (2003, updated to 2014).

Top 10% income share: fiscal income vs. pre-tax income

Source: Appendix Tables II-B9 and Piketty and Saez (2003, updated to 2014)

Notes: The top panel compares our benchmark estimates of the share of pre-tax national income earned by top 10% adults (with income equally split between spouses) to the share of fiscal income earned by top 10% tax units estimated by Piketty and Saez (2003, updated to 2014). The bottom panel compares the share of pre-tax national income earned by top 10% *tax units* to the share of fiscal income earned by top 10% tax units estimated by Piketty and Saez (2003, updated to 2014). The second panel uses the same tax units for both series and hence captures the effect of missing income in fiscal income on the top 10% income share.

Figure 13: Growth for the bottom 90%

Bottom 90% income growth: Pre-tax income vs. fiscal income

Source: Appendix Table II-B3 and Piketty and Saez (2003, updated to 2014)

Average pre-tax income of the bottom 90%

Source: Appendix Table II-B2e

Notes: The top panel compares (i) the average real pre-tax national income of bottom 90% adults (with income equally split between spouses), (ii) the average fiscal income of bottom 90% tax units as estimated by Piketty and Saez (2003, updated to 2014), and (iii) average national income per adult. Bottom 90% pre-tax income per adult and national income per adult are deflated by the national income deflator, while bottom 90% fiscal income per tax unit is deflated by the CPI used by Piketty and Saez. The numbers report the real annualized income growth rate over 1946-1980 and 1980-2014. The bottom panel decomposes the pre-tax national income of bottom 90% adults (with income equally split between spouses) into taxable labor income, tax-exempt labor income (employee fringe benefits and employer payroll taxes), and capital income.

Figure 14: Bottom 50% Incomes in the US vs. France
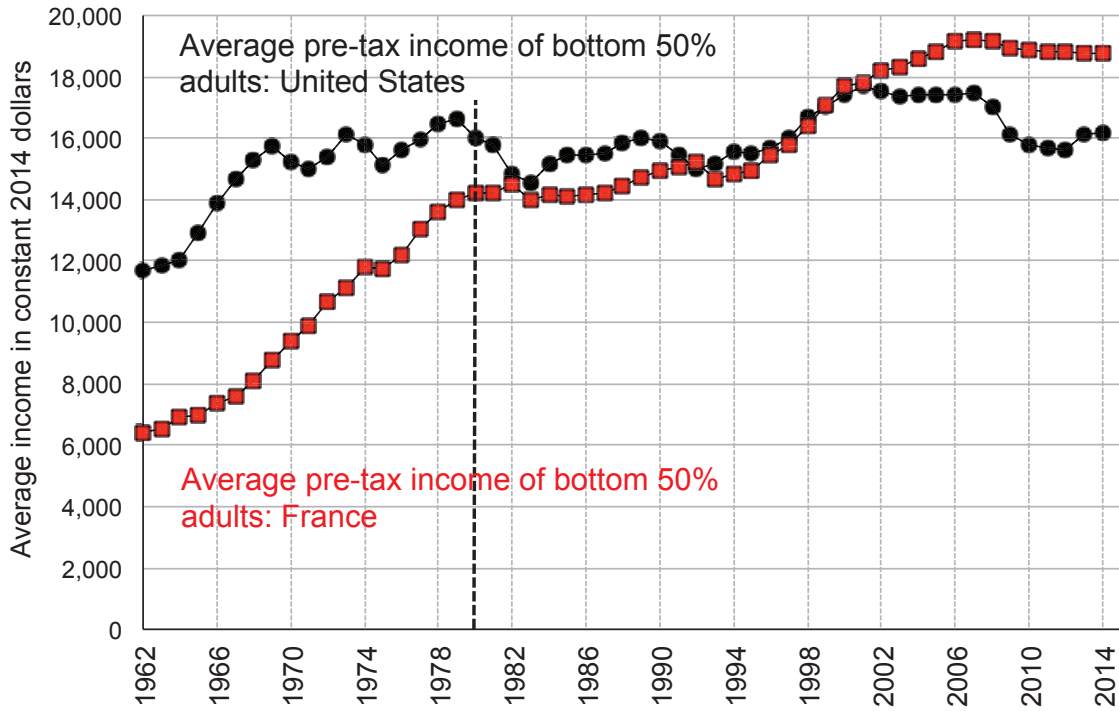
Notes: The figure depicts the average pre-tax national income of the bottom 50% adults from 1962 to 2014 in the United States and France. The unit is the individual adult and incomes within married couples are split equally. Series for France are expressed in 2014 US dollars using a Purchasing Power Parity exchange rate of .819 Euros per US dollar as estimated by the OECD. Estimates for France are from Garbinti, Goupille, and Piketty (2016).