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DISTRIBUTIONAL NATIONAL ACCOUNTS: METHODS AND ESTIMATES FOR THE UNITED STATES*

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This article 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 pretax and posttax income, making it possible to provide a comprehensive view of how government redistribution affects inequality. Average pretax real national income per adult has increased 60% from 1980 to 2014, but we find that it has stagnated for the bottom 50% of the distribution at about $16,000 a year. The pretax 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. 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, but the share of women falls steeply as one moves up the labor income distribution, and is only 11% in the top 0.1% in 2014. *JEL Codes:* E01, H2, H5, J3.

I. INTRODUCTION

Income inequality has increased in many developed countries over the past 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. 2011–2017). 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 spending on goods and services such as education, police, and defense. Yet we do not have a comprehensive measure of how the distribution of pretax income differs from the distribution of posttax 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's labor force participation—and gender inequality generally—that have occurred over the past century.

This article 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 U.S. national income—such as Census Bureau estimates (U.S. 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 pretax and posttax income. Posttax series deduct all taxes and add back all transfers and public spending, so that both pretax and posttax 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 dynamics of income across the entire spectrum—from the bottom decile to the top 0.001%—which, we believe, is more accurate than existing inequality data. Our estimates capture employee fringe benefits, a growing source of income for the middle class 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 pretax and posttax income consistent with macro aggregates. These micro-files contain all the variables of the national accounts and synthetic adult 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, and so on—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 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 statements and balance sheets, and so on, in a standardized, internationally agreed on, and regularly improved 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 to be comprehensive, consistent, and explicit about what assumptions we are making and why. We view our article 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 who benefits from government spending, and refined estimation techniques are developed—just as today's national accounts are regularly improved. Third, our estimates of incomes at the top of the distribution are based on tax data, and hence disregard tax evasion. Because top marginal tax rates, tax evasion technologies, and tax enforcement strategies have changed a lot over time, tax data may paint a biased picture of income concentration at the very top.[3]

1. All the results will be made available on the World Wealth and Income Database (WID.world) website: http://wid.world/.

2. The Online Appendix and data files are available at http://gabriel-zucman.eu/usdina.

3. Using random audits and random leaks from offshore financial institutions, Alstadsæter, Johannesen, and Zucman (2017a) find that the top 0.01% richest Scandinavians evade about 25% of their taxes. Alstadsæter, Johannesen, and Zucman (2017b) investigate the implications of top-end tax evasion for wealth distributions in a sample of 10 countries, including the United States. In future work we plan to include estimates of tax evasion into our distributional national accounts.

The analysis of our U.S. 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 pretax income of the bottom 50% of adults has stagnated at about $16,000 per adult (in constant 2014 dollars, using the national income deflator) since 1980, 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 pretax 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 eight 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 they earn 81 times more today.

Second, government redistribution has offset only a small fraction of the increase in pretax 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% of earners have not been large enough to lift their incomes significantly.

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 derives from booming wages at the top end (Piketty and Saez 2003). 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 past 15 years derives from a boom in the income from equity and bonds at the top. Top earners were younger in the 1980s and 1990s but have been trending 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 up only about 16% of the top 1% labor income earners, and 11% of the top 0.1%.

The article is organized as follows. Section II relates our work to the existing literature. Section III lays out our methodology. In Section IV, we present our results on the distribution of pretax and posttax national income, and we provide decompositions of growth by income groups consistent with macroeconomic growth. Section V analyzes the role of changes in gender inequality, capital versus labor factor shares, and taxes and transfers for the dynamic of U.S. income inequality. We conclude in Section VI.

II. 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—King's famous social tables produced in the late seventeenth 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 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).[4] 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, which 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. (2011–2017) extended Kuznets's methodology to more countries and years but did not address this shortcoming.

4. Earlier attempts include King (1915, 1927, 1930).

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, an OECD Expert Group on the Distribution of National Accounts was created. A number of countries, such as Australia, have introduced distributional statistics in their national accounts (Australian Bureau of Statistics 2015) 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.[5]

There are two main methodological differences between our article 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, which cannot be studied properly with surveys because of top-coding, insufficient oversampling of the top, sampling errors, or nonsampling errors.[6] 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

5. Using tax data, Auten and Splinter (2017) have recently produced U.S. top income share series since 1960 by broadening the fiscal income definition. Instead of attempting to systematically match national income as we do, they add components to fiscal income. Their estimates capture about 88% of national income in recent years. They find much more modest increases in the top 1% income share for reasons we discuss in detail in the Online Appendix section C. Their work is still in progress and we will update our Online Appendix accordingly. Armour, Burkhauser, and Larrimore (2014) also construct distributions that go beyond the market income reported on tax returns.

6. Some studies have attempted to measure the world distribution of income by also combining national accounts with survey data but without using individual tax data (e.g., Sala-i-Martin 2006; Lakner and Milanovic 2013). Tax data are critical to capture the top and to reconcile survey income with macro income. Part of the gap between surveys and national accounts is also due to mismeasurement in national accounts, especially in developing countries where national accounts are not as well developed as in advanced economies (see Deaton 2005 for a thorough discussion).

comprehensive, including all forms of income that eventually accrue to individuals.[7] Although 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 pretax income with that of posttax income. Top income share studies only deal with pretax income, as many forms of transfers are tax-exempt. Official income statistics from the Census Bureau focus on pretax income and include only some government transfers (U.S. Census Bureau 2016).[8] Congressional Budget Office (2016) estimates compute both pretax and posttax inequality measures, but they include only federal taxes—disregarding state and local taxes, which amount to around 10% of national income—and do not try to incorporate government consumption, which is large too: about 18% of national income. By contrast, we attempt to allocate all taxes (including state and local taxes) and all forms of government spending to provide a comprehensive view of how government redistribution affects inequality.

## III.	Methodology to Distribute U.S. National Income

In this section, we outline the main concepts and methodology we use to distribute U.S. 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]

### III.A.	*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

7. Personal income is a concept that is specific to the U.S. National Income and Product Accounts (NIPA). It is an ambiguous concept (neither pretax nor posttax), 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.

8. In our view, not deducting taxes but counting (some) transfers is not conceptually meaningful, but it parallels the definition of personal income in the U.S. national accounts.

9. A discussion of the general issues involved in creating distributional national accounts and general guidelines are 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 U.S. distributional national accounts presented here, and from similar ongoing projects in other countries.

latest System of National Accounts,[10] as we do for all other national accounts concepts used in this article. 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.[11] 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 nonhuman 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. 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

10. See United Nations (2009) for a thorough presentation of the System of National Accounts.

11. 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 United States owns a share of less than 10% (classified as portfolio investments). Symmetrically, national income deducts all the primary income paid by the United States to nonresidents, including the undistributed profits reinvested in U.S. companies that are more than 10% foreign-owned.

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 III.C. Although national income includes all the flow returns to the factors of production, it does not include the change in the price of these factors; that is, it excludes the capital gains caused by pure asset price changes.[12]

National income is larger and has been growing faster than the other income concepts traditionally used to study inequality. Figure I 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.[13] 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 nonfilers (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% to 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

12. In the long run, a large fraction of capital gains arises from the fact that corporations retain part of their earnings, 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. Our micro-data also provide estimates of individual wealth by broad asset class as in Saez and Zucman (2016) that can be used to study capital gains due to price effects.

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

Source: Appendix Table I-S.A8b.
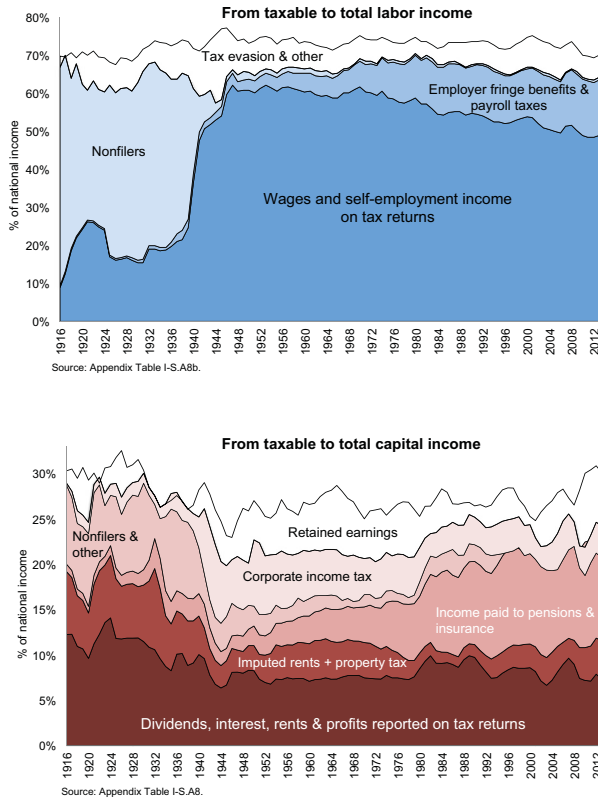

Source: Appendix Table I-S.A8.

FIGURE I

From Taxable Income to National Income (1916–2014)

The top panel decomposes total labor income into (i) taxable labor income re-ported on individual income tax returns (taxable wages and the labor share—assumed to be 70%—of reported noncorporate 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 noncorporate business income earned by nonfilers; (iv) tax evasion (the labor share of noncorporate business in-comes 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 noncorporate 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, nonfilers, nonmortgage interest and other discrepancies. Business taxes are allocated pro-portionally to each category of capital income. In both panels, sales taxes are allocated proportionally to each category of income. All categories are expressed as a fraction of national income (see Online Appendix Table I-A4 for complete details). Color artwork available at the online version of this article.

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 implies that tax data underestimate both the levels and growth rates of U.S. incomes.[14] They particularly underestimate growth for the middle class, as we shall see.

III.B. *Pretax Income and Posttax 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: pretax factor income, pretax national income, and posttax national income. The key difference between pretax factor income and pretax national income is the treatment of pensions, which are counted on a contribution basis for pretax factor income and on a distribution basis for pretax national income. Posttax national income deducts all taxes and adds back all public spending, including public goods consumption. By construction, average pretax factor income, pretax national income, and posttax national income are all the same in our benchmark series (and equal to average national income), which makes comparing growth rates straightforward.

1. Pretax Factor Income. Pretax 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 retirees 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

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14. As shown by Online Appendix Figure S.18, average per-adult national income has grown significantly more than average survey or tax income. This is true even when using the same price index (e.g., the national income deflator) and unit of observation (e.g., individual adults instead of tax units or households).

factor incomes can yield certain insights, especially if we restrict the analysis to the working-age population. For instance, it allows us to measure the distribution of labor costs paid by employers.

2. Pretax National Income. Pretax national income (or more simply pretax income) is our benchmark concept to study the distribution of income before government intervention. Pretax 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 difference with factor income is that pretax income includes Social Security (old-age, survivor, and disability insurance) benefits, unemployment insurance benefits, and private pension benefits, while it excludes the contributions to Social Security, private pensions, and unemployment insurance.[15] Pretax 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.[16]

3. Posttax National Income. Posttax national income (or more simply posttax income) is equal to pretax income after subtracting all taxes and adding all forms of government spending—cash transfers, in-kind transfers, and collective consumption expenditures.[17] 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

15. Contributions to private 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 Online 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 posttax income, see below).

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

17. Social Security and unemployment insurance taxes were already subtracted in pretax income and the corresponding benefits added in pretax income, so they do not need to be subtracted and added again when going from pretax to posttax income.

not just cash transfers—is that it ensures that posttax income adds up to national income, just like factor and pretax income.[18]

Our objective is to construct the distribution of factor income, pretax income, and posttax 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 pretax income, before describing how we deal with taxes and transfers to obtain posttax income.

III.C. *From Fiscal Income to Pretax National Income*

The starting point of our distributional national accounts is the fiscal income reported by taxpayers to the IRS on individual income tax returns. The main data source for the post-1962 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, which 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 which in particular include age information.[19] 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 since 1913 (U.S. Treasury Department, Internal Revenue Service, Statistics of Income, 1916–present). As a result, our series cover the top 1% since 1913, the top 10% since 1917 (tax data cover only the top 1% pre-1917), and the full population since 1962. We can present breakdowns by age since 1979. Tax data contain information about most of the components of pretax income, including private pension distributions (the vast majority of which are taxable), Social Security benefits (taxable since 1984), and unemployment compensation

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18. Government spending typically exceeds government revenue. To match national income, we add back to individuals the government deficit proportionally to taxes paid and benefits received; see Section III.D.

19. 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 nonfilers' characteristics, which are used in this study.

(taxable since 1979). However, they miss a growing fraction of labor income and about two-thirds of economic capital income.

1. Nonfilers. To supplement tax data, we start by adding synthetic observations representing nonfiling tax units using the Current Population Survey (CPS). We identify nonfilers 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.[20]

2. Tax-Exempt Labor Income. To capture total pretax 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 nontaxable health and pension fringe benefits to individual workers using information reported in the CPS.[21] Fringe benefits have been reported to the IRS on W2 forms in recent years (data on employee contributions to defined contribution plans are available since 1999, and health insurance contributions since 2013). We have checked that our imputed pension benefits are consistent with the high-quality information reported on W2s.[22] They are also consistent with the results of

20. The IRS receives information returns that also allow us to estimate the income of nonfilers. Saez (2016) computes detailed statistics for nonfilers using IRS data for the period 1999–2014. We have used these statistics to adjust our CPS-based nonfilers. Social security benefits, the major income category for nonfilers, 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 nonfilers statistics (perhaps due to the fact that very small wage earners may report zero wage income in CPS). We adjust our CPS nonfilers to match the IRS nonfilers characteristics; see Online Appendix Section B.1.

21. 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) separately for each year, and we impute coverage at the micro-level using these estimated probabilities. For health, we then impute fixed benefits by bin, as estimated each year from the CPS and adjusted to match the macroeconomic total of employer-provided health benefits. For pensions, we assume that the contributions of pension plan participants are proportional to wages winsorized at the 99th percentile.

22. 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 pension contributions (and now health insurance as well) available on W2 wage income tax forms.

Pierce (2001) and Monaco and Pierce (2015), who study nonwage compensation using a different dataset, the employment cost index micro-data. Like these authors, we find that the changing distribution of nonwage benefits has slightly reinforced the rise of wage inequality.[23]

3. Tax-Exempt Capital Income. To capture total pretax 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, nonmortgage debt, pensions, municipal bonds before 1986, and homes and mortgages for nonitemizers—using the Survey of Consumer Finances.[24] 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 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

23. In our estimates, the share of total nonwage 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 Online Appendix Table II-B15.

24. For complete methodological details, see Saez and Zucman (2016).

tax avoidance might also have changed over time as top dividend tax rates rose and 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.

4. Tax Incidence Assumptions. Computing pretax 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 article, 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.[25]

First, we assume that taxes neither affect the overall level of national income nor its distribution across labor and capital. Hence, pretax and posttax income both add up to the same national income total, and taxes on capital are borne by capital only, while taxes on labor are borne by labor only. In a standard tax

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25. For a detailed discussion of our tax incidence assumptions, see Online Appendix Section B.4.

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.[26] This implies, for instance, that payroll taxes are entirely paid by workers, irrespective of whether they are nominally paid by employers or employees. These are strong assumptions, and they are 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 infrastructure is paid for and how it contributes to the production function). This is beyond the scope of the present article and is left for future work.

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 corporate equities.[27] 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, while 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.[28] We have tested a number of alternative tax incidence assumptions, and found only second-order effects on the level and time pattern of our pretax income series.[29] Our

26. 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.

27. Harberger (1962) shows that under reasonable assumptions, capital bears 100% of the corporate tax but that the tax is shifted to all forms of capital.

28. 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 little difference to the level or trend of our income shares, as sales taxes are not very important in the United States and have been constant at 5%–6% of national income since the 1930s; see Online Appendix Table I-S.A12b.

29. 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.

incidence assumptions are broadly similar to the assumptions made by the U.S. Congressional Budget Office (2016) which produces distributional statistics for federal taxes.[30] 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 pretax income—they do not matter for posttax series, which by definition subtract all taxes.

III.D. From Pretax Income to Posttax Income

To move from pretax to posttax 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 out taxes and spending at the federal versus state and local level.

1. 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,[31] and Supplemental Security Income. Together, they make up about 2.5% of national income; see Online Appendix Table I-S.A11. (Remember that Social Security pensions, unemployment insurance, and disability benefits, which together make up about 6% of national income, are already included in pretax income.) We impute monetary transfers to their beneficiaries based on rules and CPS data.

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30. The 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 U.S. 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 U.S. 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 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.

31. Food stamps (renamed the Supplemental Nutrition Assistance Program as of 2008) is not a monetary transfer, strictly speaking, because 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).

2. 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). Because the number of Medicaid beneficiaries is underreported by about 20% in the CPS, we blow up multiplicatively the recorded number of beneficiaries across 40 bins of income deciles × marital status × above or below 65 years old to match the total number of beneficiaries from administrative records. Medicare and Medicaid benefits are imputed as a fixed amount per beneficiary at cost value, separately for each program.

3. Collective Expenditure (Public Goods Consumption).   We allocate collective consumption expenditure proportionally to posttax disposable income, defined as pretax income minus all taxes plus all individualized monetary transfers. 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 posttax 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 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 have small effects on its growth, because public goods spending has been constant at 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 posttax disposable income.[32] This can be justified from a lifetime perspective where

32. 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

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 lump sum per child.[33] This slightly increases the level of bottom 50% posttax incomes without affecting the trend.[34]

4. 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 government spending 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 posttax incomes would have been much stronger in the aftermath of the Great Recession had we not allocated the deficit back to individuals.[35]

IV. The Distribution of National Income

We start the analysis with a description of the levels and trends in pretax income and posttax income across the distribution. The unit of observation is the adult, that is, the U.S. resident

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individual consumption expenditure (together with public health spending) rather than in collective consumption expenditure.

33. 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.

34. See Online Appendix Figure S.21.

35. Interest income paid on government debt is included in individual pretax 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 U.S. residents in proportion to taxes paid and government spending received (50/50).

aged 20 and over.[36] 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.[37] Throughout this section, the income of married couples is split equally between spouses. We analyze how assigning each spouse her or his own labor income affects the results in Section V.A.

IV.A. *The Levels of Pretax and Posttax Income in 2014*

To get a sense of the distribution of pretax and posttax national income in 2014, consider first Table I. Average income per adult in the United States is equal to $64,600—by definition, for the full adult population, pretax and posttax 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, that is, about a fourth of the average income in the economy. Accordingly, the bottom 50% receives 12.5% (a fourth of 50%) of total pretax income. Table I further breaks down the bottom 50% into two groups, the bottom 20% and the next 30%. The bottom 20% earns very little pretax income, $5,400 in 2014. The next 30%—70 million adults with income between $12,800 (the 20th percentile) and $36,000 (the median)—earns $23,400 on average pretax.

Moving up the distribution, the middle 40%—the group between the median and the 90th percentile that can be described as the middle class—has roughly the same average pretax income as the economy-wide average, so their income share is close to 40%. The top 10% earns 47% of total pretax income, that is, 4.7 times the average income. There is a ratio of 1 to 20 between average pretax income in the top 10% and in the bottom 50%. For context,

36. We include the institutionalized population in our base population. This includes prison inmates (about 1% of adult population), the population living in old-age institutions and mental institutions (about 0.6% of the 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.

37. The earned income of teenagers is very small (filers and nonfilers under the age of 20 earn less than 1% of total wages). This wage income is effectively reattributed back to all adults aged 20 and above proportionally to their wage income when we match national income totals.

TABLE I

THE DISTRIBUTION OF NATIONAL INCOME IN THE UNITED STATES IN 2014

Income group	Number of adults	Pretax national income			Posttax national income		
		Income threshold	Average income	Income share	Income threshold	Average income	Income share
Full population	234,400,000		$64,600	100%		$64,600	100%
Bottom 50%	117,200,000		$16,200	12.5%		$24,900	19.3%
Bottom 20% (P0–P20)	46,880,000		$5,400	1.7%		$13,100	4.1%
Next 30% (P20–P50)	70,320,000	$12,800	$23,400	10.9%	$22,700	$32,800	15.2%
Middle 40% (P50–P90)	93,760,000	$36,000	$65,300	40.4%	$43,900	$67,200	41.6%
Top 10%	23,440,000	$119,000	$304,000	47.0%	$110,000	$253,000	39.1%
Top 1%	2,344,000	$458,000	$1,310,000	20.2%	$383,000	$1,010,000	15.7%
Top 0.1%	234,400	$1,960,000	$6,000,000	9.3%	$1,520,000	$4,400,000	6.8%
Top 0.01%	23,440	$9,560,000	$28,100,000	4.4%	$6,870,000	$20,300,000	3.1%
Top 0.001%	2,344	$47,200,000	$121,900,000	1.9%	$34,300,000	$88,700,000	1.4%

Notes. This table reports statistics on the income distribution in the United States in 2014 for pretax national income and posttax national income. Pretax and posttax national income match national income. 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. Pretax national income fractiles are ranked by pretax national income, and posttax national income fractiles are ranked by posttax national income. Hence, the two sets of fractiles do not represent the same groups of individuals due to reranking when switching from one income definition to another.

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 yuan into dollars.[38] Further up, the top 1% earns about a fifth of total pretax income (20 times the 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.

Posttax national income is more equally distributed than pretax income: the tax and transfer system is progressive overall. Transfers play a key role for the bottom 50%, where average posttax income ($25,000) is 50% higher than pretax income. The 20th percentile is 80% higher posttax ($22,700) than pretax ($12,800) while median income is 20% higher.[39] There is, however, still a lot of inequality in posttax incomes. While the bottom 50% earns about 40% of the average posttax income, the top 10% earns close to four times the average. After taxes and transfers, there is thus a ratio of 1 to 10 between the average income of the top 10% and of the bottom 50%—still a larger difference than the ratio of 1 to

38. All our results in this article use the same national income price index across the U.S. 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 article. Should one deflate income differently across the distribution, then one should also use PPP-adjusted exchange rates to compare average U.S. 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).

39. Most of the difference between pretax and posttax income in the bottom 50% owes to in-kind transfers and collective expenditures. As shown by Online Appendix Figure S.23, posttax disposable income—that is, posttax income including cash transfers but excluding in-kind transfers or public goods—is only slightly larger than pretax national income for the bottom 50% today. That is, the bottom 50% pays roughly as much in taxes as it receives in cash transfers; it does not benefit on net from cash redistribution. It is solely through in-kind health transfers and collective expenditure that the bottom half of the distribution sees its income rise above its pretax 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 posttax disposable income (defined as pretax income minus all taxes and adding only monetary transfers) of bottom 50% adults was lifted by the large government deficits run during the Great Recession: Posttax disposable income fell much less than posttax income—which imputes the deficit back to individuals as negative income—in 2007–2010.

8 between average national income in the United States and in China.

In Online Appendix Table S.7, we also report the distribution of factor income, that is, income before any taxes and transfers, and before the operation of the pension system. Unsurprisingly, since most retirees have close to zero factor income, average bottom 50% income is lower for factor income ($13,300 on average in 2014) than for pretax income ($16,200).[40] For the top 10% and above, factor and pretax income are almost identical as Social Security and pensions are small at the top. For the working-age population, factor and pretax income are also always nearly identical.

IV.B. *The Distribution of Economic Growth in the United States*

Our new series on the distribution of national income make it possible to compute growth by income group in a way that is fully consistent with macro growth. Table II studies growth over two 34-year periods: 1946–1980 and 1980–2014. From 1946 to 1980, real macro growth per adult was strong (+95%) and equally distributed—in fact, it was slightly equalizing, as bottom 90% grew faster than top 10% incomes.[41] The bottom deciles experienced strong gains: +179% for the bottom quintile and +117% for the next 30%.

In the next 34-year period, aggregate growth slowed down (+61%) and became very skewed. Looking first at income before taxes and transfers, income stagnated for bottom 50% earners: for this group, average pretax income was $16,000 in 1980—expressed in 2014 dollars, using the national income deflator—and still is $16,200 in 2014. Pretax income collapsed for the bottom 20% (–25%), and barely grew for the next 30%. Growth for the middle-class was weak, with a pretax increase of 42% since 1980 for adults between the median and the 90th percentile. At the top, by contrast, income more than doubled for the top 10%;

40. The average factor income of bottom 50% earners is also significantly less than their posttax disposable income. That is, when one uses factor income as the benchmark series for the distribution of income before government intervention, the bottom 50% appears as a net beneficiary of cash redistribution. For detailed series on the distribution of factor income, see Online Appendix Tables II-A1 to II-A14.

41. Very top incomes (top 0.1% and above), however, grew more in posttax terms than in pretax terms between 1946 and 1980, because the tax system was more progressive at the very top in 1946.

TABLE II

THE GROWTH OF NATIONAL INCOME IN THE UNITED STATES SINCE WORLD WAR II

Income group	Pretax income growth		Posttax income growth	
	1946–1980	1980–2014	1946–1980	1980–2014
Full population	95%	61%	95%	61%
Bottom 50%	102%	1%	129%	21%
Bottom 20% (P0–P20)	109%	−25%	179%	4%
Next 30% (P20–P50)	101%	7%	117%	26%
Middle 40% (P50–P90)	105%	42%	98%	49%
Top 10%	79%	121%	69%	113%
Top 1%	47%	204%	58%	194%
Top 0.1%	54%	320%	104%	298%
Top 0.01%	76%	453%	201%	423%
Top 0.001%	57%	636%	163%	616%

Notes. The table displays the cumulative real growth rates of pretax and posttax national income per adult over two 34-year periods: 1980 to 2014 and 1946 to 1980. Pretax and posttax 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. Pretax national income fractiles are ranked by pretax national income while posttax national income fractiles are ranked by posttax national income. We assume that bottom 50% and middle 40% incomes grew at the same rate as average bottom 90% income over 1946–1962. The deflator used is the national income price deflator.

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%—10 times the macro growth rate, or about the same growth rate as that of China since 1980 (Piketty, Yang, and Zucman 2017). Such sharply divergent growth experiences over decades highlight the need for growth statistics disaggregated by income groups.[42]

Government redistribution made growth more equitable, but only slightly so. After taxes and transfers, income in the bottom quintile stagnated (+4%) over the 1980–2014 period while it grew by a meager 21% for the bottom 50% as a whole. That is, transfers erased about a third of the gap between macroeconomic growth (61%) and growth for the bottom half of the distribution (+1% before government intervention). Taxes did not hamper the upsurge of income at the top, which grew almost as much as pretax.

The top panel of Figure II provides a granular view of who benefited (or not) from growth, by showing the annualized real growth of pretax and posttax income for each percentile of the

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42. The picture is identical when one looks at factor income rather than pretax income—as shown by Online Appendix Table S.8, the average bottom 50% factor income has not grown at all between 1980 and 2014.

Average annual growth by percentile, 1980-2014

Average pretax income of the bottom 90%
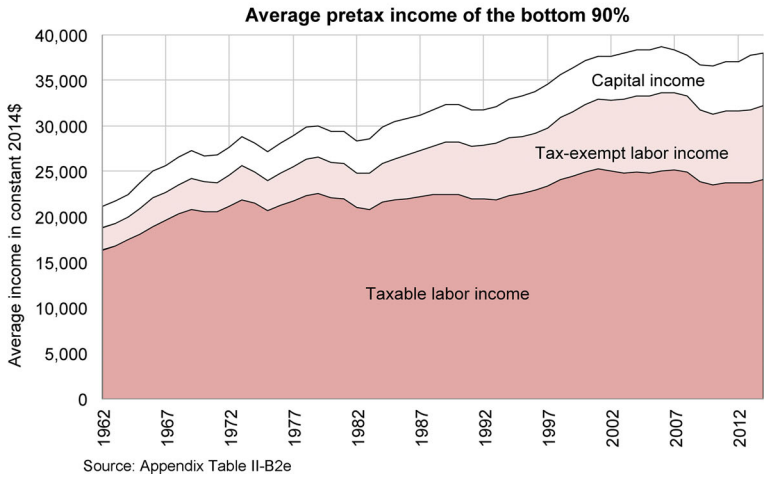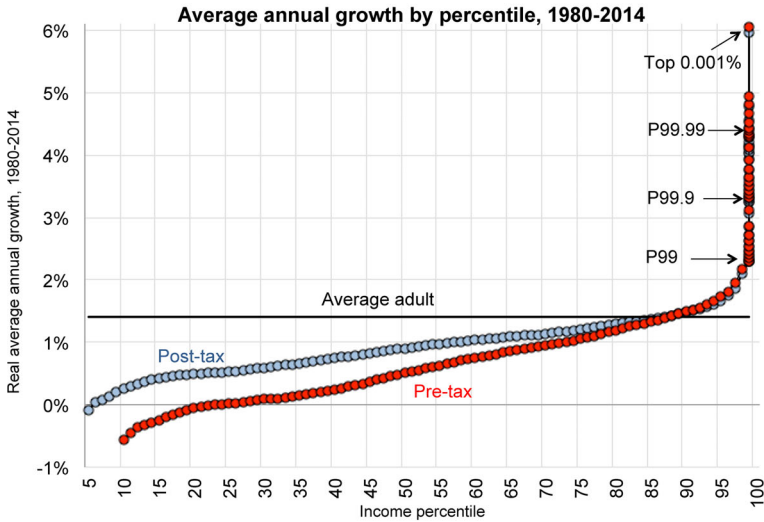

Source: Appendix Table II-B2e

FIGURE II

The Distribution of Economic Growth in the United States

The top panel displays the annualized growth rate of per-adult national income (pretax and posttax, with income equally split between spouses) for each percentile of the income distribution (with a zoom within the top percentile) over the 1980–2014 period. By construction, growth rates add up to the macro growth rate of 1.4% displayed as a horizontal thick line. The bottom panel decomposes the pretax 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.

distribution over the 1980–2014 period, with a zoom within the top 1%.[43] There are two striking results. First, the vast majority of the population—from the bottom up to the 87th percentile—experienced less growth than the (modest) macro rate of 1.4% a year. For instance, the 10th percentile declined by 0.6% a year pretax (+0.3% posttax); the 30th percentile stagnated pretax and grew 0.6% posttax; the 80th percentile grew 1.2% pretax (+1.3% posttax). Only the top 12 percentiles of the population achieved a growth rate as high or higher than the macro rate of 1.4%. Second, even percentiles 88 to 98 experienced unimpressive income gains, between 1.4% and 2.2% a year—in most cases less than the macro growth rate of U.S. incomes for the preceding generation, from 1946 to 1980. The only group that grew fast is the top 1%, whose average income increased 3.3% pretax and 3.2% posttax, with growth culminating at +6.0% a year for the top 0.001%. The top 1% has pulled apart from the rest of the economy—not the top 20%.

Our distributional national accounts show that there has been more growth for the bottom 90% since 1980 than suggested by the fiscal data studied by Piketty and Saez (2003). We find that bottom 90% pretax income has grown 0.8% a year from 1980 to 2014, an increase which, although modest, is significantly greater than the –0.1% a year one finds using fiscal data only (Saez 2008).[44] The main reason for this discrepancy is that the tax-exempt income of bottom 90% earners—which fiscal data miss—has grown since 1980. As shown by the bottom panel of Figure II, tax-exempt labor income accounted for 13% of bottom 90% income in 1962; it now accounts for 23%. Capital income has also been

43. Such growth incidence curves are commonly used in the development literature and the literature on global inequality (e.g., Lakner and Milanovic 2013), usually to display the growth of household disposable income (rather than pretax or posttax national income). In our context, the growth of the bottom 10 pretax income quantiles is not very meaningful because bottom 10% pretax incomes are close to 0 (and sometimes negative). This is why our figure starts at the 10th percentile for pretax income and at the 5th percentile for posttax income. We provide complete, annual series of pre- and posttax national income quantiles in our Online Appendix, Table II-B4 and II-C4.

44. The bottom 90% has grown slightly faster posttax, at 1.0% a year since 1980; see Online 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 posttax than pretax, 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.

on the rise, from 11% to 15% of average bottom 90% income—all of this increase derives from 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 hardly grown at all.[45]

IV.C. The Stagnation of Bottom 50% Incomes

Perhaps the most striking development in the U.S. economy over the past decades is the stagnation of income in the bottom 50%. This evolution therefore deserves a careful analysis.[46] The top panel of Figure III shows how the pretax and posttax income shares of the bottom 50% have evolved since the 1960s. The pretax 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. It then declined from about 21% in 1969 down to 12.5% in 2014. The posttax share initially increased more then the pretax 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 pretax share. The gap between

45. Two other factors explain why bottom 90% growth has been stronger than implied by fiscal income series. First, the inequality literature—including Piketty and Saez (2003)—deflates incomes by the CPI, while we use the more comprehensive and accurate national income price index. It is well known that the CPI tends to overstate 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). Second, the number of tax units (the unit of observation used by Piketty and Saez 2003) has been growing faster than the number of adults (our benchmark unit of observation) due to a secular decrease in the fraction of married tax units.

46. There is a large literature documenting the stagnation of low-skill wage earnings (see, e.g., Katz and Autor, 1999) and the evolution of the U.S. distribution of wage income (following Katz and Murphy 1992). The U.S. Census Bureau (2016) official statistics show very little growth of median family income in recent decades. Meyer and Sullivan (2017) document the evolution of the P50/10 and P90/P50 ratios for income and consumption. Our value added is to include all national income accruing to the bottom 50% adults, to contrast pretax and posttax incomes, and to be able to compare the bottom to the top of the distribution in a single dataset representative of the U.S. population.

Bottom 50% national income share: pretax vs. posttax

Source: Appendix Tables II-B1 and II-C1

**Real income of bottom 50%:
pretax vs. posttax**
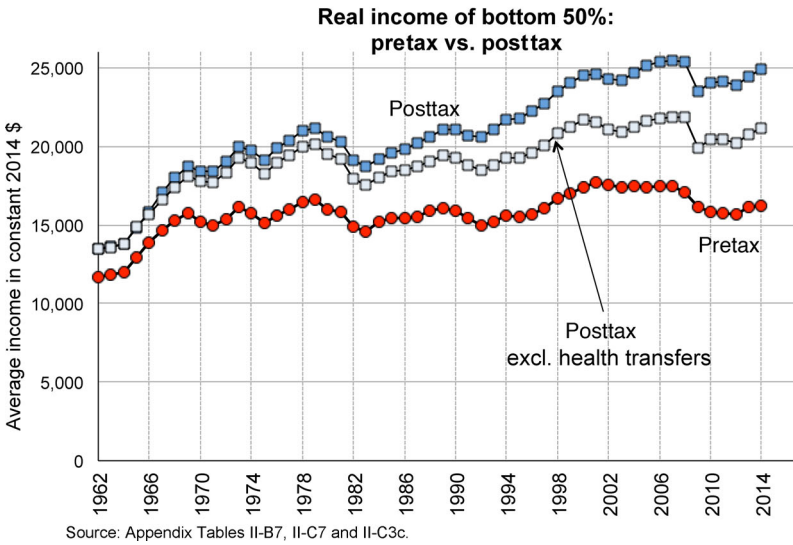

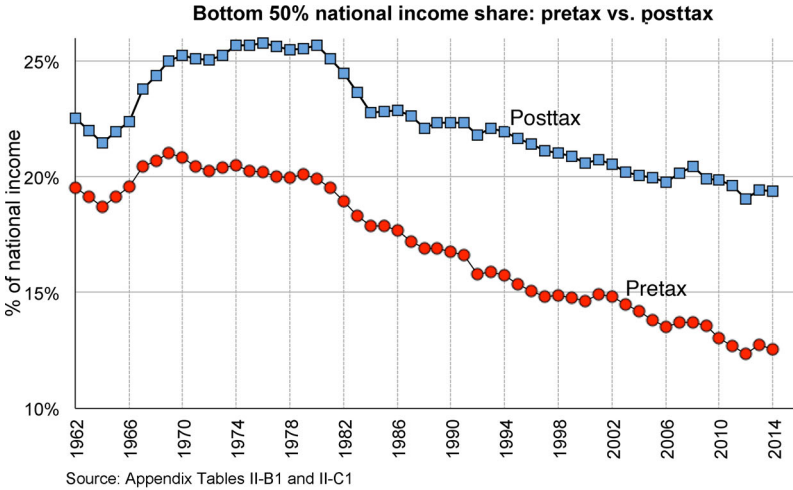Source: Appendix Tables II-B7, II-C7 and II-C3c.

FIGURE III

Pretax versus Posttax Bottom 50% Incomes

The top panel figure depicts the bottom 50% adult income shares pretax and posttax 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 three income definitions: (a) pretax national income, (b) posttax national income, (c) posttax national income but excluding Medicare and Medicaid benefits.

the pre- and posttax share increased over time. This is not due to the growth of Social Security benefits—because pretax income includes pension and Social Security benefits—but reflects the rise of transfers other than Social Security, chiefly Medicaid and Medicare. In fact, as shown by the bottom panel of Figure III, almost all of the meager growth in real bottom 50% posttax income since the 1970s comes from Medicare and Medicaid. Excluding those two transfers, average bottom 50% posttax 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 modest increase in their posttax 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 these programs—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.

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.[47] 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 split the population into different age groups, compute the distribution of income within each group, and consider how the average income among the

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47. In our view, both the annual and lifetime perspective are valuable. This article 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 lifetime inequality series is left for future research.

lowest 50% earners of each age range has evolved. We can do this computation starting in 1979 when age becomes available in internal tax data. For the working-age population, as shown by the top panel of Figure IV, 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% pretax income has collapsed since 1980: −20% for adults aged 20–45 and −8% for those between 45 and 65 years old. It is only for the elderly that pretax income has been rising, because of the increase in Social Security benefits and private pensions. 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.[48] After taxes and transfers, as shown by the bottom panel of Figure IV, 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 posttax bottom 50% income owes to the increase in income for the elderly.[49] For the working-age population, posttax bottom 50% income has hardly increased since 1980.

There are three main lessons. First, since income has fallen 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. Third, despite the rise in means-tested benefits—including Medicaid and the Earned Income Tax Credit,

48. The vast majority—about 80% today—of the pretax 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 pretax 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 Online Appendix Table II-B7c.

49. In turn, most of the growth of the posttax 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 posttax 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 Online Appendix Table II-C7c and Online Appendix Figure S.5.

Real pretax income of bottom 50%, by age group

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

Real posttax income of bottom 50%, by age group

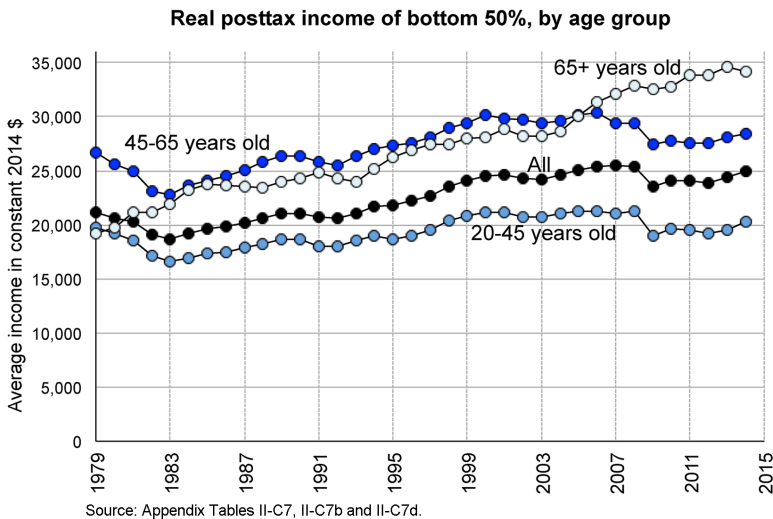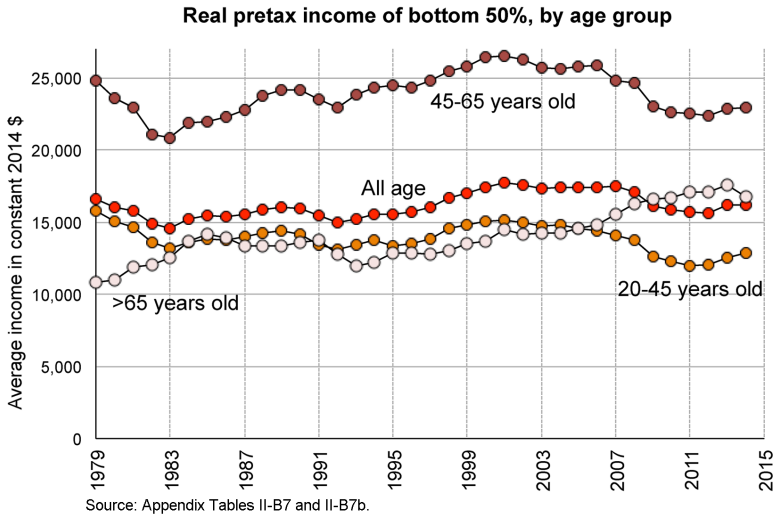Source: Appendix Tables II-C7, II-C7b and II-C7d.

FIGURE IV

Bottom 50% Real Incomes by Age Groups

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 pretax basis and the bottom panel figure depicts real incomes on a posttax basis. Pretax national income is after the operation of pension and unemployment insurance systems. Posttax national income is after all taxes, transfers, and government spending. The unit is the individual adult and incomes within married couples are split equally.

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 past three decades. There are clear limits to what taxes and transfers can achieve in the face of massive changes in the pretax distribution of income like those that have occurred since 1980.

Another factor contributing to the dynamic of bottom 50% incomes is the evolution of marriage rates. While about 70% of U.S. adults were married in the 1960s, this share has declined to 50% in recent years, and the decline has been stronger for low-income Americans (e.g., Cohn et al. 2011). In our benchmark series that split income equally among spouses, marriage has an equalizing effect; lower marriage rates for the bottom 50% contribute to rising inequality. One way to assess the role played by changes in marriage rates is to consider individualized income series where each spouse is given his or her own labor income. While pretax bottom 50% income has stagnated since 1980 when income is equally split, it rises a little bit when income is individualized, from $11,200 pretax in 1980 (in constant 2014 dollars) to $13,900 in 2014 (Online Appendix Figure S.9). Individualizing income, however, is too extreme a way to neutralize changes in marriage rates, because in individualized series marriage can increase inequality by making the spouse work less—which is one of the reasons why bottom 50% individualized incomes are so low in the 1960s and 1970s. The marriage-rate-controlled change in bottom 50% incomes is between the two polar cases of equal splitting (full redistribution between spouses) and individualization (no redistribution); measuring it would require us to estimate the evolution of empirical sharing rules within couples, which we leave for future research.

IV.D. *The Rise of Top Incomes*

The stagnation of income for the bottom 50% contrasts sharply with the upsurge of income at the top. Figure V displays the share of pretax and posttax income going to the top 10% and top 1% adults since 1917 and 1913, the earliest years federal income tax statistics can be used to analyze these groups (Piketty and Saez 2003). Top pretax income shares have been rising rapidly since the early 1980s and have now returned to their peak of the late 1920s. The top 1% used to earn 11% of national income in the late 1960s and now earns slightly over 20%. We saw in Figure III,

Top 10% national income share: pretax vs. posttax

Source: Appendix Tables II-B1 and II-C1

Top 1% national income share: pretax vs. posttax

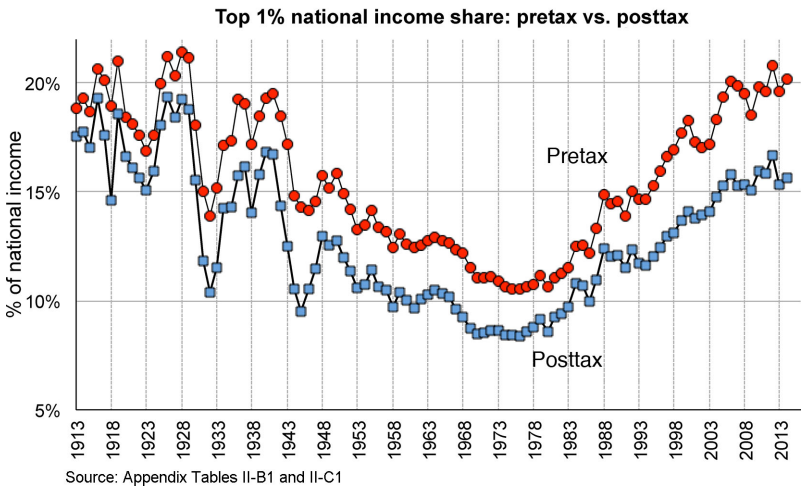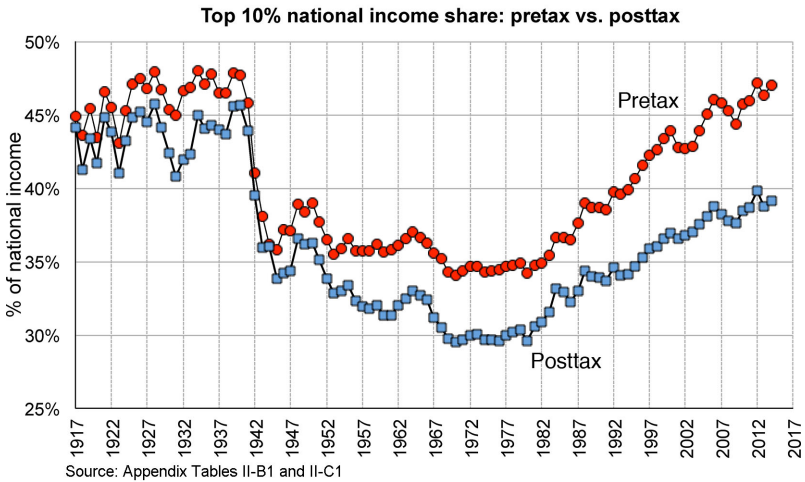Source: Appendix Tables II-B1 and II-C1

FIGURE V

Top Income Shares

The figure displays the share of national income pretax and posttax 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 U.S. residents aged 20 and above. Incomes within married couples are equally split. Pretax national income is factor income after the operation of the public and private pension systems and unemployment insurance system. Posttax national income is defined as pretax income minus all taxes plus all government transfers and spending (federal, state, and local). Both pretax and posttax national income add up to national income.

top panel, that the bottom 50% used to get slightly over 20% and now gets 12%. Hence, the two groups have basically switched their income share. In other words, the top 1% income has made gains large enough to more than offset the fall in the bottom 50% share, a group 50 times larger.[50] While average pretax 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. As a result, while top 1% adults earned 27 times more income than bottom 50% adults 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 Online 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 U.S. income concentration.

Top posttax income shares have also surged, although they have not returned to their level of a century ago. Early in the twentieth century, when the government was small and taxes low, posttax and pretax top incomes were similar. Pretax and posttax 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. Although posttax inequality has increased significantly since 1980, it has risen less than pretax inequality. Between 1980 and 2014, the top 10% income share rose by about 10 points posttax and 13 points pretax. Because of the significant 2013 tax increases at the top, top income shares have increased less posttax than pretax in very recent years. Overall, redistributive policies have prevented posttax inequality from returning all the way to pre–New Deal levels.

The U-shaped evolution of top income shares over the last century is similar to the one seen in fiscal income series (Piketty and Saez 2003).[51] 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. The similarity between our top

50. 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 Online Appendix Table II-B1).

51. Online Appendix Figures S.28 and S.29 compare and reconcile our top 10% pretax income share to the one estimated by Piketty and Saez (2003, series updated to 2015) based on fiscal income.

shares and those in Piketty and Saez (2003), however, masks two discrepancies that go in opposite directions. First, there is generally more inequality in pretax national income than in fiscal income, because most pretax capital income is not taxable—and capital income tends to be concentrated at the top. As Online Appendix Figure S.29 shows, the unequalizing effect of tax-exempt capital income was particularly strong in the 1950s and 1960s, when undistributed corporate profits were high.[52] Second, there tends to be less inequality among equal-split adults (our benchmark unit of observation) than among tax units (as used by Piketty and Saez 2003).[53] These two effects offset each other in 1980. But the unequalizing effect of accounting for tax-exempt income dominated before, while the equalizing effect of using equal-split adults as the unit of observation has dominated since then.

V. 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 U.S. incomes. We start by studying the effect of changes in gender inequality, before moving to changes in capital versus labor factor shares, and government taxes and transfers.

52. The gap between pretax 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 pretax income today.

53. In the United States, the number of households has been growing faster than the number of adults over the past decades, because of the decline of marriage and the rise of single-headed households. This divergence has accelerated since 1980 (+0.3% a year). Computing inequality across equal-split adults neutralizes this demographic trend and, as Online 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 the unit of observation is therefore a meaningful benchmark, as it abstracts from confounding trends in household size and gender inequality.

V.A. 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.[54] By construction, individualized series assign zero labor income to a nonworking spouse; comparing individualized and equal-split series thus makes it possible to assess the effect of changes in women's 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 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%.[55] We always split the capital income of married couples equally, due to the lack of information on property regimes.[56]

The long-run U-shaped evolution of pretax 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 VI, the difference has varied a lot over time. When women's 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

54. 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 variation 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.

55. 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).

56. 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 premarriage assets are generally not equally split.

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

Pretax income per adult
(individuals)

Pretax income per adult
(equal split)

Source: Appendix Table II-B9.

**Average pretax labor income of
men aged 20-64 / women aged 20-64**
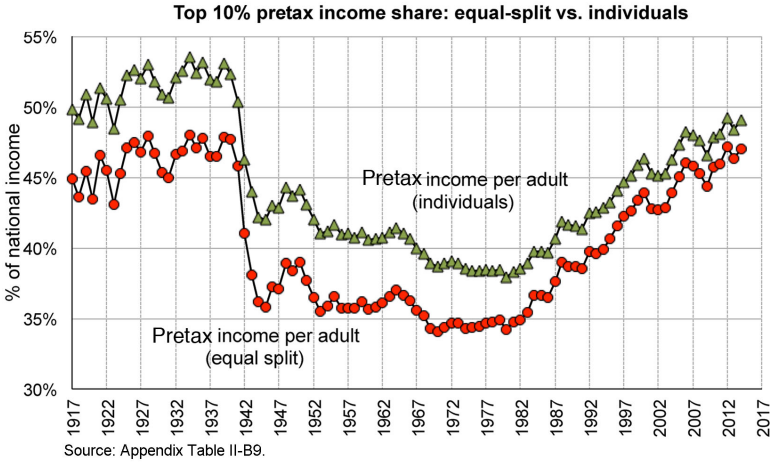
Source: Appendix Table II-F1.

FIGURE VI

The Role of Within-Couple Inequality and the Decline of the Gender Gap

The top panel depicts the top 10% adults pretax national income share with two definitions of income: equal split of income within married couples (our benchmark series), and 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 pretax labor income of working-age men (aged 20 to 64, including men earning zero pretax labor income) divided by the average pretax labor income of working-age women (aged 20 to 64, including women earning zero pretax labor income). Pretax 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.

(+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. The reduction in the gender gap has played an important role in mitigating the rise of inequality.

The bottom panel of Figure VI quantifies the extent to which the gender gap in labor income has shrunk since the 1960s. We take the total average pretax labor income of working-age (20–64) men and divide it by the total average pretax 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, for example, 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 a relevant metric to study overall inequality among adults.[57] 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—reported in Online Appendix Figure S.7— show that the gender gaps increase with age. Among adults aged 20–34, men earn 1.3 times more than women today; the ratio reaches about 2 for adults aged 55 to 64.

In the working-age population (including nonworkers), at the median, pretax labor income differences between men and women have diminished. As shown by the top panel of Figure VII, two forces are at play. For working-age women, the median pretax 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 pretax 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. For all working-age

57. There is a wide literature on the U.S. gender gap. See, for example, Blau, Ferber, and Winkler (2014) for a classical textbook treatment.

**Median pretax labor income:
working-age men vs. working-age women**

Source: Appendix Table II-B13.

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

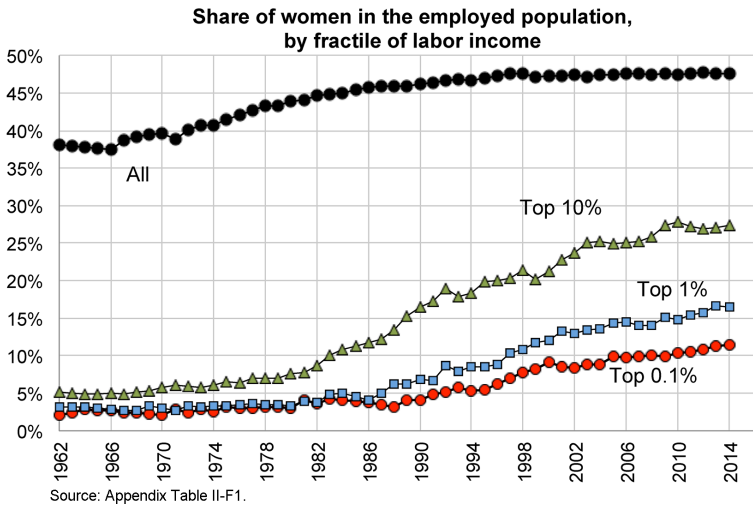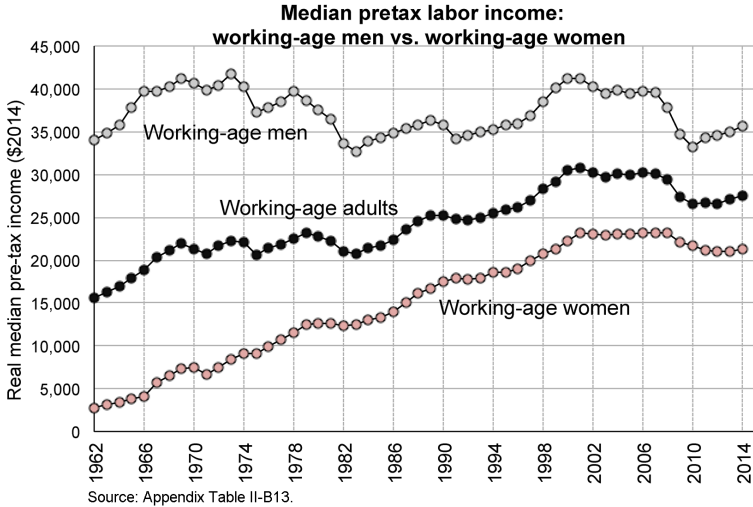Source: Appendix Table II-F1.

FIGURE VII

Gender Gaps across the Distribution

The top panel shows the median pretax labor income among all working-age adults (20 to 64), men, and women. Pretax labor income includes pensions, Social Security retirement and disability benefits, and unemployment insurance benefits and excludes 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 benefits, 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 nonsalaried work).

individuals, as a result, median pretax labor income is only 10% higher in 2014 ($27,500) than 25 years earlier in 1989.

Considerable gender inequalities persist at the top of the distribution. As the bottom panel of Figure VII 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 up 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 representation of women at the very top has only modestly increased since 1999. The glass ceiling is not yet close to being shattered.[58]

V.B. Decomposing Inequality at the Top: Labor versus Capital

Pretax 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 is $\alpha = \frac{Y_K}{Y}$ and the labor share is $1 - \alpha = \frac{Y_L}{Y}$. Our distributional national accounts make it possible to compute factor shares for each quantile of the distribution consistent with macroeconomic factor shares.[59] This comprehensive definition of capital income

58. 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 overrepresented particularly in the education sector) and the self-employed. Guvenen, Kaplan, and Song (2014) also use Social Security wage earnings and obtain similar results. Atkinson, Cesarico, and Voitchovsky (2016) study the share of women in top income groups in a sample of eight countries with individual taxation, but do not consider labor income and capital income separately.

59. To decompose the mixed income of noncorporate 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

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, capital income earned by trusts and estates, 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 (Karabarbounis and Neiman 2014; Piketty and Zucman 2014). In 2000, 23% of national income was derived from capital; this share increased to 30% in 2014. In fact, as shown by Online Appendix Table S.2, almost all the 2000–2014 growth of average national income per adult (0.6% a year on average over this period of time) stems from the rise of capital income: labor income per adult has grown by 0.1% per year, while capital income has grown by 2.2%. Corporate retained earnings have increased particularly fast.

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 VIII, for the bottom 90%, the capital share is always less than 20%. It has 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. The top 1% derives over half of their incomes from capital, the top 0.1% more than two thirds today. 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 90%. In other words, in the post–World War II decades, most top earners derived their income from assets. From the 1970s and 1990s, the fraction of top earners deriving their income from work grew. This process culminated in 2000 when the capital share in the top

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can assume the same factor shares in the noncorporate 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 nonhuman assets used by noncorporate businesses the same rate of return as the one observed on other assets. This makes very little difference on the total capital share, see Online Appendix Table I-S.A3.

The share of capital in pretax income

Source: Appendix Table II-B2d.

Top 1% pretax income share: labor vs. capital income
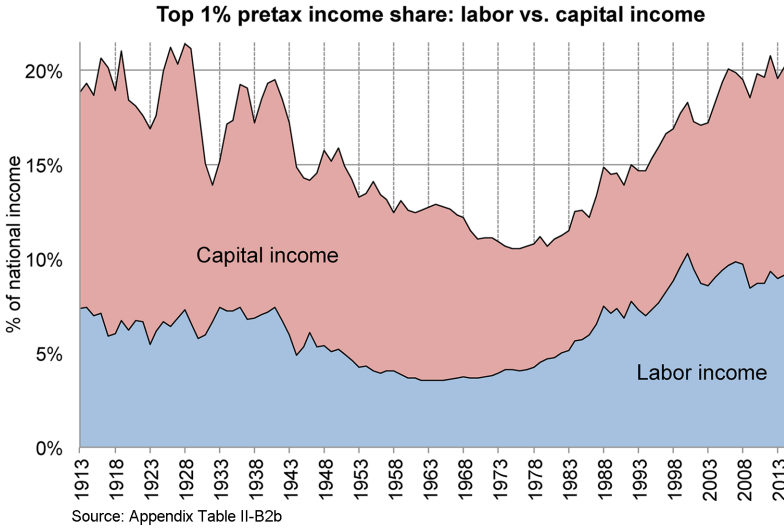

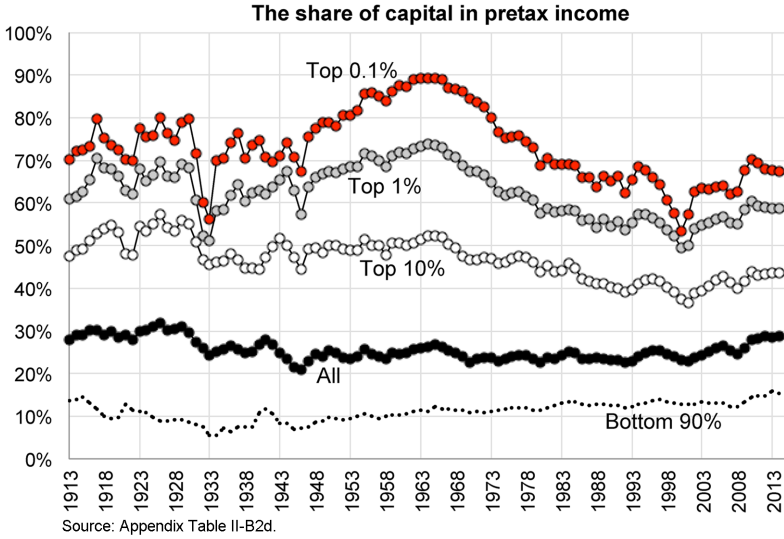Source: Appendix Table II-B2b

FIGURE VIII

The Capital Share across the Distribution

   The top panel depicts the share of capital income in the pretax national income of various income groups: full adult population, top 10% incomes, top 1% incomes, and top 0.1% incomes. Total pretax 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 decomposes the top 1% income share into labor income and capital income.

0.1% reached a low water-mark of 53%. Since then, the capital share has bounced back.[60]

One potential concern with the computation of factor shares is that the frontier between labor and capital can be fuzzy. The capital/labor split can be affected by shifting across tax bases. Is the rise of the capital share—especially at the top—a real phenomenon or an illusion caused by changes in tax avoidance? Smith et al. (2017) find that part of S-corporation profits correspond to disguised labor. However, other forms of tax-induced shifting go in the opposite direction. In all businesses with passive owners—that is, as long as there is at least one outside investor—active owners have incentives to pay themselves high wages, as any residual profit is split across all owners including passive investors. Moreover, in all closely held C-corporations, owners have incentives to pay themselves high wages too, because the top marginal labor income tax rate (43.4% in 2015) is below the top rate on distributed profits (50.5%). Taking into account all forms of shifting, it is unclear whether we overstate or understate the capital share.[61] In this context, we believe it is more justified to follow the standard national accounts labor/capital split in which all profits are treated as capital income.[62]

60. As shown by Online Appendix Figure S.33, changes in the age of top earners are consistent with this evolution. The average age of top earners declined from 1979 to 2000, consistent with the notion that the "working rich" were replacing capital income earners. Since 2000, this trend has reverted: top earners are growing older. The trend break in 2000 mirrors the reversal of the capital share.

61. If anything, it is likely that we underestimate the rise of the capital income share at the top over recent decades. Before the Tax Reform Act of 1986, top marginal rates on labor income and distributed profits were both high, so that owners had incentives to pay themselves low wages and low dividends, retain earnings and consume within firms. Part of the high retained earnings we observe from 1960 to 1985 (3.8% of national income on average) could thus correspond to disguised wages. In Online Appendix Figures S.37 and S.38, we investigate the effect of treating part of pre-1986 retained earnings as disguised wages. In Online Appendix Figures S.34, S.35, and S.36, we investigate the effect of treating 54% of S-corporation profits as labor income, as advocated by Smith et al. (2017). Because S-corporations profits are only a small part of top 1% income (about 1.5% of national income in recent years) the impact on our capital/labor split at the top is negligible.

62. In Online Appendix Figure S.10, we present another piece of evidence suggesting 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 has been the key driver of the rise of the top 1% income share in the twenty-first century. The bottom panel of Figure VIII decomposes the top 1% 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 turn, the key driver of the rise in capital income has been the rise in corporate retained earnings—an important macroeconomic phenomenon that could not be studied using individual income tax only. As shown by Online Appendix Table B.2f, out of the 1.9 points increase in the top 1% pretax income share since 2000, 1.4 points come from the rise of retained earnings. 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 as top capital incomes are saved at a high rate.

V.C. The Role of Taxes and Transfers

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

1. Taxes. The progressivity of the U.S. tax system has declined significantly over recent decades. The top panel of Figure IX shows how effective average tax rates vary across the income distribution.[63] 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 pretax

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capital income at the top, although the increase starts earlier—in the late 1980s rather than in the early 2000s.

63. Comprehensive tax rates including all levels of government have been computed by Pechman and Okner (1974) for 1966 but long, annual time series of comprehensive tax rates had not been computed before. Estimates of federal (but not state and local) taxes have been produced by the U.S. 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.

Average tax rates by pretax income group

Source: Appendix Table II-G1.

Taxes paid by the bottom 50%
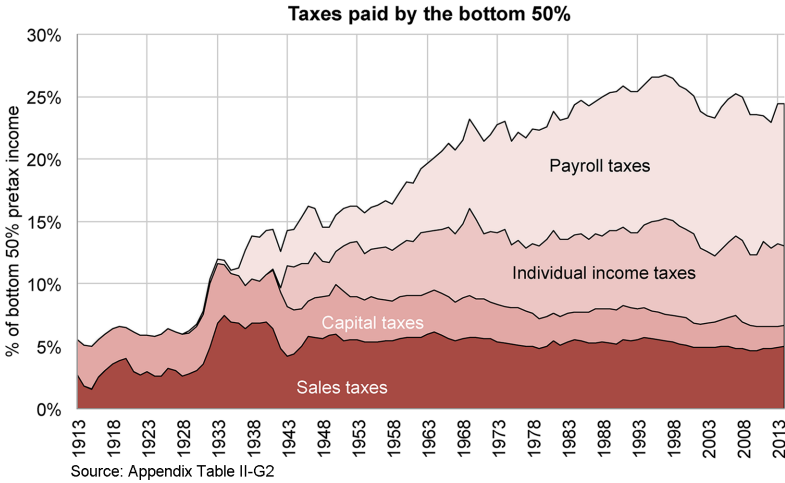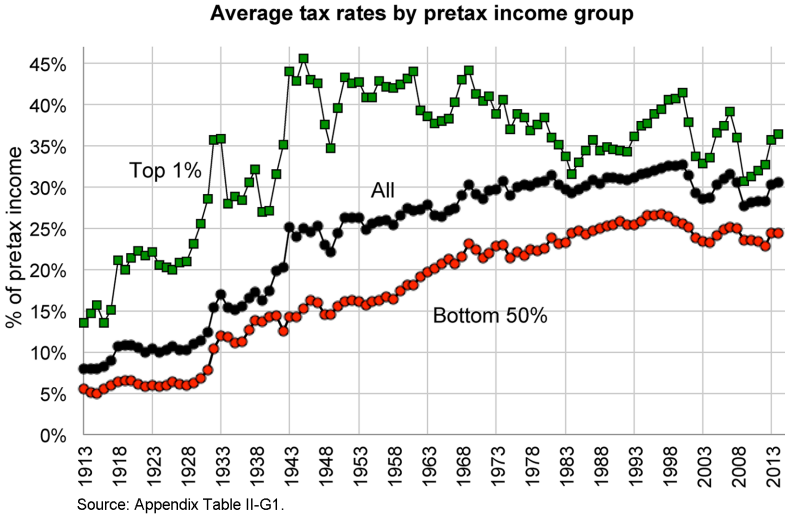

Source: Appendix Table II-G2

FIGURE IX

Average Tax Rates across the Distribution

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% pretax 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 pretax income. The bottom panel decomposes the taxes paid by the bottom 50%.

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 pretax 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 pretax income (just like national income) excludes capital gains due to pure price effects. 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 Online Appendix Table II-G2, the top 1% paid close to 20% of its pretax 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. It 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 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.[64] Although a significant development, it is worth noting that inequality was much lower in the 1980s than today, and the long-run decline in corporate and estate taxes 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 IX, this increase essentially derives from the rise of payroll taxes. In the 1960s, payroll taxes amounted to 5% of the pretax income of bottom 50% earners; today they exceed 10%. In fact, payroll taxes are now much more important than any other

64. The U.S. 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.

taxes—federal and state—borne by the bottom 50%. In 2014, payroll taxes amount to 11.3% of pretax income, significantly above the next largest items—federal and state income taxes, 6.6% of pretax income, and sales taxes, 4.7%.[65] 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 posttax income of working-age bottom 50% Americans.

2. Transfers. One major evolution in the U.S. economy over the past 50 years is the rise of individualized transfers—monetary and more importantly in-kind. While public goods spending has remained constant around 18% of national income, transfers—other than Social Security, disability, and unemployment insurance, which are already included in pretax income—have increased from about 2% of national income in 1960 to close to 11% today; see Online Appendix Figure S.12 and Online Appendix Table I-S.A11. The two largest transfers are Medicare (4% of national income in 2014) and Medicaid (3.4%); other important transfers include refundable tax credits (0.8%), veterans' benefits (0.6%), and food stamps (0.5%).

Overall, individualized transfers tend to be targeted to the middle class. The top panel of Figure X shows the average transfer received by posttax income groups, expressed as a percent of the average national income in the full adult population.[66] Despite Medicaid and other means-tested programs which entirely go to the bottom 50%, the middle 40% receives larger transfers than the bottom 50% Americans, in particular because Medicare largely goes to the middle-class. In 2014, the bottom 50% received the equivalent of 10.5% of per-adult national income, the middle-class received more—14%—and the top 10% received less—about 8%. As shown by Online Appendix Figure S.13, there is a similar pattern when including Social Security benefits: the average transfer then amounts to close to 17% of average income, and 23% for the middle 40%.

65. In keeping with the national accounts conventions, we treat the nonrefundable 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.

66. 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 pretax income.

**Average individualized transfer by posttax income group
(excluding Social Security)**

Source: Appendix Table II-G4.

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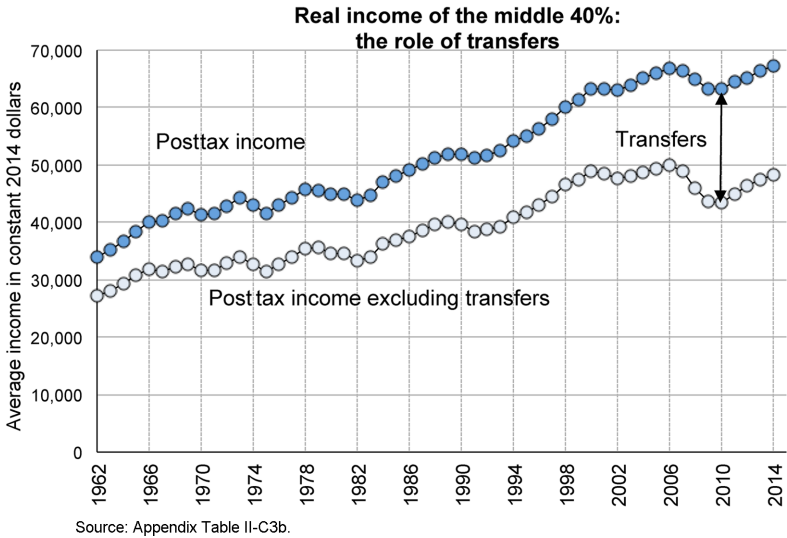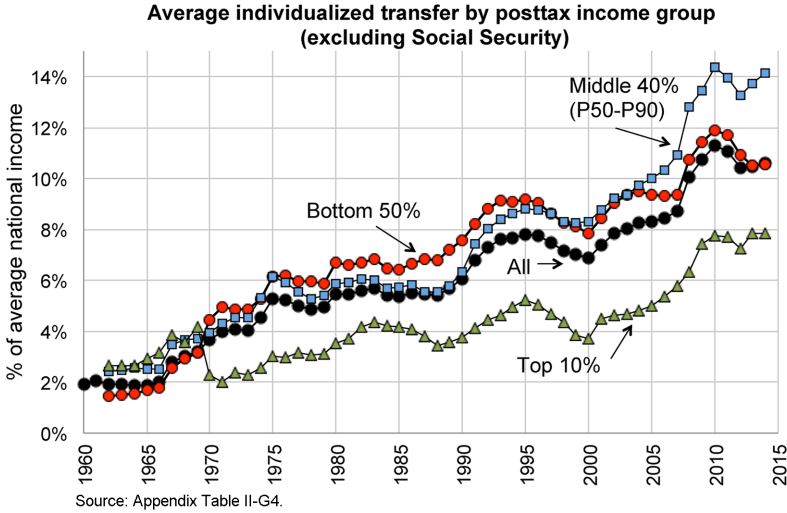

Source: Appendix Table II-C3b.

FIGURE X

The Role of Transfers

The top panel depicts average individualized transfers received by posttax national income groups, expressed as a percent of the average national income in the full adult population. These transfers exclude Social Security retirement and disability benefits, and unemployment insurance benefits. The bottom panel depicts the average posttax income of the middle 40% (top 50% excluding the top 10%), including versus excluding all transfers (individualized transfers and public goods spending).

The middle class appears as the main winner of redistribution: while it receives growing individualized transfers, its effective tax rate has remained stable at around 30% since the late 1960s. Transfers have played a key role in enabling its income to grow in recent years. As shown by the bottom panel of Figure X, without transfers average income for the middle 40% would not have grown at all from 1999 to 2014. In fact it grew 8%, thanks to an increase of 32% in transfers received excluding Social Security. Tax credits—the 2008 Economic Stimulus Payments, the American Opportunity Tax Credit, the Making Work Pay Tax Credit, and Health Insurance Premium Assistance Credits (in the context of the Affordable Care Act)—played a particularly important role during the Great Recession. Without transfers the average income of the middle class would have fallen by 11% between 2007 and 2009; thanks to transfers the decline was limited to 3%.

In contrast, given the dynamic in their pretax income, transfers have not been sufficient to enable bottom 50% incomes to grow significantly. As shown by Online Appendix Figure S.4, between 1999 and 2014, the posttax income of the bottom 50% excluding total transfers (individualized and collective) collapsed from $9,900 to $6,600; transfers were just enough to maintain posttax income constant at around $25,000.

VI. Conclusion

In this article, 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 quantify how government intervention shapes inequality by contrasting pretax and posttax income; to assess the effect of gender inequality on the overall distribution of income; to study how factor shares vary across the income spectrum; and to simulate the growth and distributional impacts of tax and transfer reforms. 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 data set should be seen as a prototype to be further developed and improved on—just like the national accounts themselves are regularly improved. Looking forward, our assumptions

and imputations could be refined 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 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 will ultimately be taken over, refined, published, and regularly improved on by government statistical agencies.

Second, distributional national accounts can be used to consistently compare income across countries. The same methodology as the one pioneered in this article 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.[67] As an illustration, Figure XI compares the average bottom 50% pretax national income in the United States to the average bottom 50% pretax income in France estimated by Garbinti, Goupille, and Piketty (2017) using similar methods. In sharp contrast with the United States, in France the average pretax income of the bottom 50% grew by 32% 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% lower in France than in the United States in 1980, it is now 16% higher. The bottom half makes more in France than in the United States today, even though average income per adult is 35% lower in France (partly due to differences in standard working hours in the two countries).[68] The diverging trends in the growth of bottom 50% 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 dynamics of income inequality.

In the United States, the stagnation of bottom 50% incomes and the upsurge in the top 1% coincided with reduced progressive taxation, widespread deregulation (particularly in the financial sector), weakened unions, and an erosion of the federal minimum

67. All the results will be made available online on the World Wealth and Income Database (http://WID.world).

68. Since the welfare state is more generous in France, the gap between the average bottom 50% income in France and the United States would probably be even greater after taxes and transfers. Garbinti, Goupille, and Piketty (2017) have not estimated posttax income series yet.
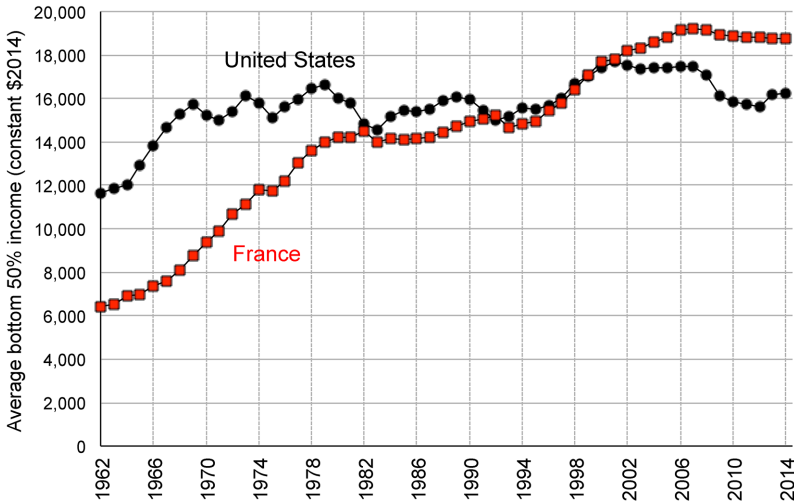
FIGURE XI

Average Bottom 50% Pretax Income: United States versus France

The figure depicts the average pretax 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 U.S. dollars using a purchasing power parity exchange rate of 0.819 euros per US$1 as estimated by the OECD. Estimates for France are from Garbinti, Goupille, and Piketty (2017).

wage. 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% pretax 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 pretax distribution, particularly at the top end (see, e.g., Piketty 2014; Piketty, Saez, and Stantcheva 2014).

Third, it would be valuable to produce U.S. state and local distributional accounts. 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 state-level outcomes. Our approach naturally lends itself to the definition of national income across geographical units by considering the individual national income of residents in each geographical unit.[69] 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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SUPPLEMENTARY MATERIAL

An Online Appendix for this article can be found at *The Quarterly Journal of Economics* online. Data replicating tables and figures in this article can be found in Piketty, Saez, and Zucman (2017) in the Harvard Dataverse, doi:10.7910/DVN/SLXCUJ. Data files are also available at http://gabriel-zucman.eu/usdina.

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