Income Inequality in the United States:
Using Tax Data to Measure Long-Term Trends

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Abstract

Concerns about income inequality emphasize the importance of accurate income measures. Estimates of top income shares based only on individual tax returns are biased by tax-base changes, social changes, and missing income sources. This paper addresses these shortcomings and presents new estimates of the distribution of national income since 1960. Our analysis of pre-tax income shows that top income shares are lower and have increased less since 1980 than other studies using tax data. In addition, increasing government transfers and tax progressivity have resulted in rising real incomes for all income groups and little change in after-tax top income shares.

JEL Codes: D3, E01, H2, H5, J3

The idea that U.S. top income shares have increased dramatically since the 1960s has become widely accepted, fueled by the conclusions of studies using income tax data (Piketty and Saez, 2003; Piketty, Saez, and Zucman, 2018). Acceptance of this view has raised concerns that increasing inequality could indicate greater concentration of political power and increased rent-seeking (Stiglitz, 2012; Lindsey and Teles, 2017) or increased bargaining power of top earners (Piketty, Saez, and Stantcheva, 2014). Such concerns have led to speculation that increasing inequality could lead to decreasing institutional accountability, reduced economic efficiency, and stagnating middle-class wages. These concerns emphasize the importance of accurately measuring the distribution of income.

Estimating the distribution of income over long time periods, however, is complicated by major challenges. These include changes in social conditions (marriage rates, household size and composition) and demographics (age distribution). Rising education standards and increased college attendance have resulted in higher earnings but later entry into the labor force. Retirement incomes have changed due to expanded Social Security benefits and the shift from defined benefit to defined contribution plans. Periods of high inflation have distorted the measurement of income, and business cycles have had differential effects on income groups.

Compared to survey data, tax data better represent top income groups but introduce additional challenges. Tax rules and incentives for reporting income have changed over time as the result of tax legislation. Differential declines in marriage rates and changing household structures can lead to biased results when tax units are the unit of observation.[1] Important sources of income are missing in tax data, including government transfer payments and non-taxable employer-provided benefits. The share of income missing in tax data has increased over time, so that income on tax returns accounts for only about 60 percent of national income in recent years. In addition, there are many technical issues with respect to differences between what is reported on tax returns and what economists regard as current-year economic income. Failing to adequately address these issues can lead to biased conclusions.

This paper presents new estimates of the levels and trends of U.S. income shares that address these challenges. We start with income as reported on tax returns and develop an improved measure of market income—referred to as fiscal income—that corrects for tax reforms and technical tax issues as well as social changes such as declining marriage rates. We add missing income to account for total national income with estimates of pre-tax and after-tax income, showing the step-by-step effects of each adjustment. Our approach extends earlier studies estimating national account distributions (Pechman and Okner, 1974; Reynolds and Smolensky, 1977). We also estimate a broader pre-tax income measure that includes cash and in-kind transfers, which are excluded from national income, as well as a measure of income after taxes and transfers.

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[1] Tax units include all individuals filing a tax return together or who would file together in the case of non-filers. Tax units differ from households by including some dependents living elsewhere but excluding other unrelated adults living in the household. For example, cohabiting couples are considered as the same household but are separate tax units.

Results of our analysis based on distributing national income are similar to those of other recent studies. However, our results show lower top income shares and less upward trend than results based on fiscal income in Piketty and Saez (2003, hereafter PS) and modified national income in Piketty, Saez, and Zucman (2018, hereafter PSZ). We discuss reasons why our results differ from and improve upon both PS and PSZ. Due to the uncertainty of all such estimates, we provide a sensitivity analysis of our assumptions in allocating income not on tax returns.

Analysis only based on market income reported on individual tax returns, such as PS, implies that the top one percent share of fiscal income more than doubled from 9 to 19 percent between 1962 and 2019. One-third of this increase, however, occurred in the years just before and after the Tax Reform Act of 1986 (TRA86). This major reform lowered statutory tax rates and broadened the tax base, thereby substantially changing tax rules and incentives for reporting income and organizing businesses.[2] Concerns about the potential for TRA86 to affect inequality measures were raised by Feenberg and Poterba (1993), Slemrod (1996), and Gordon and Slemrod (2000). Our analysis addresses this issue by accounting for corporate retained earnings (i.e., profits after corporate tax not distributed as dividends), as well as base-broadening reforms that reduced tax-shelter losses. Without these adjustments, top income shares are understated in the 1960s and 1970s, when high individual income tax rates created strong incentives to shelter income inside corporations.

Our analysis also accounts for the differential decline in marriage rates, which decreased substantially in lower- and middle-income groups but only slightly at the top of the distribution. Holding all else equal, as the overall marriage rate decreased, more adults filed separate tax returns. This increased the total number of tax units, thereby increasing the number of high-income tax units in the top one percent. This differential decline in marriage rates overstates top income shares in recent years.

Accounting for these issues produces results that differ substantially from those using only fiscal income reported on tax returns and basing income groups on tax units (essentially PS). Our pre-tax top one percent share of national income increased 4.4 percentage points between 1979 and 2019, about half the increase in fiscal income (see Figure 1).[3] For after-tax income, which includes transfers, our analysis shows that the top one percent share increased only 1.4 percentage points. Over the longer period since the early 1960s, our analysis shows that the top one percent pre-tax share increased 2.6 percentage points. For after-tax income, our top income shares are about the same as in the early 1960s.

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[2] For discussions of TRA86, see the online appendix and Auten, Splinter, and Nelson (2016). Geloso et al. (2022) examined earlier reforms, showing that pre-WWII top income shares are overestimated when not correctly accounting for tax policy changes.

[3] We also find significant increases in pre-tax income shares for the highest groups between 1979 and 2019: from 3.2 to 5.4 percent for the top 0.1 percent and 1.1 to 2.3 percent for the top 0.01 percent. See appendix Figure A1 and online data.
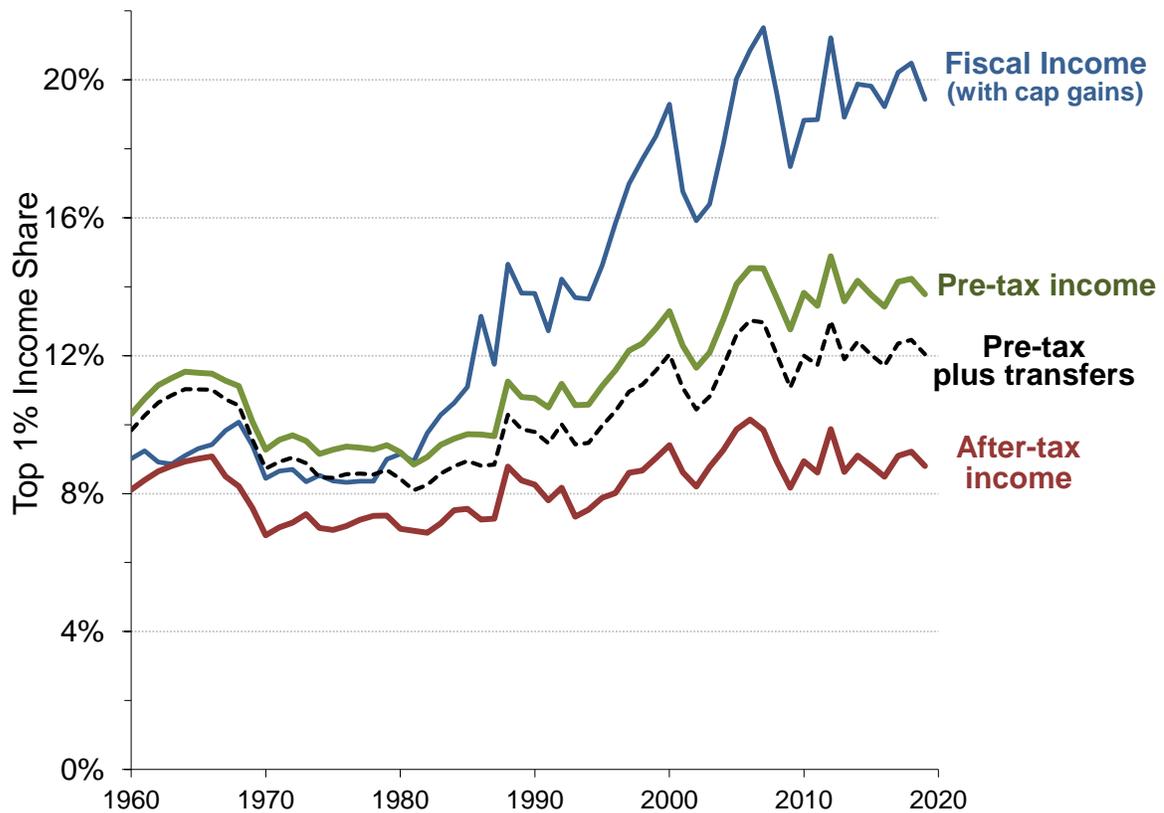
Figure 1: Top 1% income shares

Notes: Fiscal income includes capital gains with thresholds set without capital gains. Adjustments used to estimate pre-tax national income, pre-tax plus transfers, and after-tax income are listed in Tables 1 and 2 and described in detail in the online appendix. Annual values are shown in appendix Table A1.
Sources: Authors' calculations and in Piketty and Saez (2003 and updates) for fiscal income.

Our results are more optimistic about the bottom half of the distribution. PSZ estimated that average real pre-tax incomes of the bottom 50 percent remained virtually unchanged between 1979 and 2019. In contrast, our analysis shows that real pre-tax incomes increased by more than one-third and real after-tax income increased by two-thirds for the bottom half of the distribution. While the bottom 50 percent pre-tax income share decreased by 5.1 percentage points, after-tax income shares decreased only 3.1 percentage points over this period. Thus, taxes and transfers offset 40 percent of the decline in the bottom 50 percent share of pre-tax income. These results highlight how lower-income groups benefitted from increasing transfers and tax cuts, such as expanded refundable credits and other relief that contributed to a more progressive tax system.[4]

Why do our results differ from PS and PSZ? The main reason is methodological differences in allocating income not on tax returns. Our top one percent pre-tax income share is 6 percentage points (pp) lower than the PSZ estimate for 2014, the last year in the original published paper. The largest differences are from allocating underreported business income (2.0 pp), accrued

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[4] Congressional Budget Office (2022) data show that between 1986 and 2019 top-quintile average federal tax rates increased 1 percentage points while tax rates of the middle-quintile and bottom-quintile decreased 5 and 11 percentage points, respectively.

retirement income (1.0 pp), and corporate taxes (0.7 pp), as well as correcting for how income is reported on tax returns (0.4 pp).

Different treatments of business losses and pension income prove to be particularly important. Our analysis corrects for the large tax shelter losses prior to TRA86 and adds back net operating loss carryovers from prior years, which are not current-year income. Our approach also accounts for business losses when allocating underreported income because detailed IRS audit studies show that returns with business losses account for a significant share of underreported business income (Auten and Langetieg, 2020). In contrast, PSZ ignored business losses and allocated underreported income only by positive reported income, thereby overstating top income shares. Our retirement income allocation methodologies also produce quite different results. This is largely because PSZ treated non-taxable pension and retirement account amounts as income, although almost all reflect assets being rolled over from one account to another.[5]

These differences are not merely differences in opinion. Each of our allocations result in a more consistent income definition over time (due to better accounting for tax policy changes and demographic changes) or use data ignored by PSZ (such as IRS audit studies used in national income aggregates). Our analysis corrects the tax sample to remove both non-resident filers and dependent filers who receive over half of their support from others as well as other filers under age 20. Our approach accounts for increases in the share of single-parent households and changing family size, as well as for falling marriage rates. We also correct for many special features of how income is reported on individual and corporate tax returns and how this has changed over time. While many improvements have only small or offsetting effects on top income shares, their cumulative effects can be significant and have varying effects on different parts of the income distribution.

We are not alone in finding lower levels and smaller increases in U.S. top income shares. Other studies find similar levels and changes when using broad measures of income. Combining tax return and Census data, Fixler, Gindelsky, and Johnson (2019) estimated a top one percent share of personal income in 2012 of 13 percent, identical to our estimate for pre-tax plus transfers income. Using Survey of Consumer Finance data, Bricker et al. (2016a) found that the top one percent share increased 3 percentage points between 1988 and 2012, compared to our estimated increase of 4 percentage points. Using tax return and Census data, the Congressional Budget Office (2022) estimated that the top one percent share of before-tax income increased from 9 to 16 percent between 1979 and 2019, compared to our pre-tax income share increase from 9 to 14 percent over this period. Using internal Census data to overcome top-coding issues, Burkhauser et al. (2012)

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[5] Saez and Zucman (2020) acknowledged this problem with their analysis and revised the original PSZ estimates to partially address this issue slightly lowering their top income shares in recent years. See additional discussion in section IV.B.

estimated that the top one percent pre-tax income share increased only 4 percentage points from 10 to 14 percent between 1967 and 2006, similar to our estimates of 11 to 15 percent over this period.

Our paper makes several important contributions to the U.S. income inequality literature. We provide the only distributional estimates based on tax returns and other administrative microdata that follow the national income definitions, account for major tax reforms, and are informed by IRS detailed audit data. Our analysis addresses limitations of prior work by more carefully accounting for how income is reported on tax returns and allocating income not on these returns. Our analysis also addresses limitations of prior studies based on survey or earnings data which miss many income sources.[6] We address the uncertainty created by the need to impute components of national income not reported in tax data by showing our step-by-step adjustments and imputations as well as providing sensitivity tests of less certain assumptions. This allows other researchers to see the effect of each adjustment and consider alternative estimates based on different combinations of assumptions. Finally, we compare our methodology with PS, PSZ, and the Congressional Budget Office so that readers will have a better understanding of why our estimates differ from other studies using tax data.

The following section briefly describes our income measures. Sections II and III discuss the data and adjustments used to construct these measures. Sections IV and V present the main results and sensitivity analysis. Section VI provides a summary and conclusion.

I. Measuring Top Income Shares with Consistent Definitions of Income

Using annual tax microdata, we start with PS *fiscal income* and sample definitions because these were seminal estimates that are still being updated and remain widely cited. Our first step is to estimate *improved fiscal income* that adjusts for major tax law changes (primarily TRA86), sample issues, and changing family structures (declining marriage and increasing single-parent rates). We then sequentially develop three income measures: *pre-tax income* that targets national income, *pre-tax income plus transfers* that includes government transfers, and *after-tax income* that includes government transfers and deducts federal, state, and local taxes.

Our pre-tax income measure follows the national income concept and therefore excludes transfer payments.[7] Pre-tax income plus transfers adds government transfers, which grew

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[6] In 2019, Census total money income is about 64 percent of national income (when cash transfers are added) due to missing income sources and underreporting. Survey of Consumer Finance before-tax family income is about 70 percent. Estimates of earnings inequality, even using administrative data (e.g., Guvenen and Kaplan, 2017), account for only about half of national income. Our estimates of wage inequality changes are broadly similar to prior estimates using administrative data. See the online data for incomes by source: wages, dividends, etc.

[7] National income equals GDP less capital depreciation plus net income from abroad. Smith et al. (2019) refer to Imputed National Income (INI). PSZ use the term Distributional National Income (DINA), but PSZ pre-tax income

substantially from 5 to 16 percent of national income between 1960 and 2019 (see Figure 2). This measure provides a more complete estimate of the economic resources available for consumption, saving, and paying taxes—especially for families receiving Social Security and unemployment insurance benefits, as well as other cash and in-kind transfers. This is our broadest definition of income and the most appropriate for measuring effective tax rates. This follows a long-standing public finance tradition of using broad measures of income for this purpose (Pechman and Okner, 1974; Office of Tax Analysis, 1987) and parallels the approach of federal government agencies.[8] Starting with pre-tax income plus transfers, after-tax income is estimated by subtracting federal, state, and local taxes and adding government deficits and government consumption to equal national income.
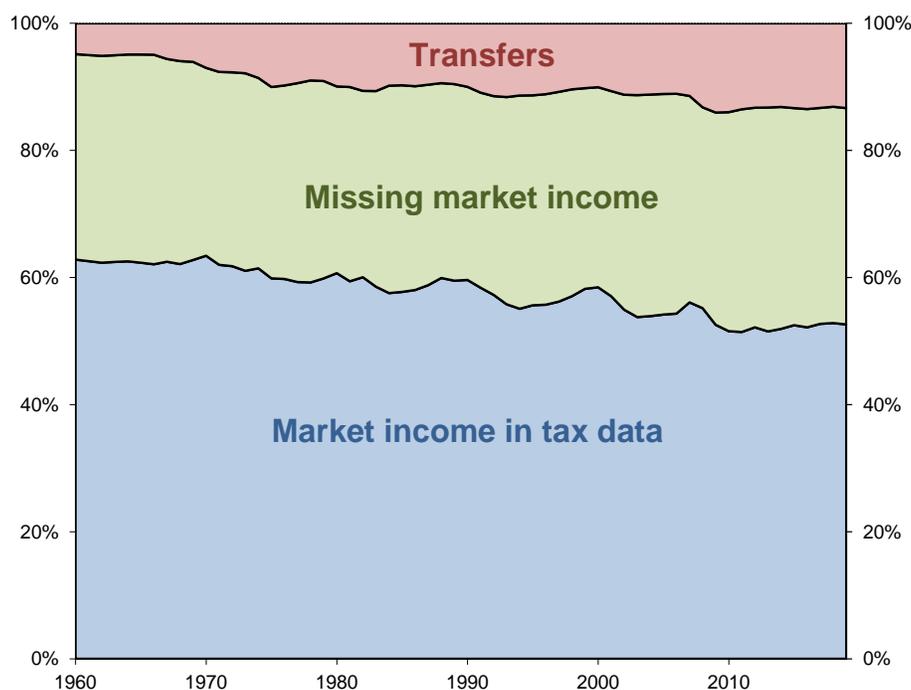
Figure 2: Income sources as a share of national income plus transfers

Notes: Specific adjustments to tax return income are listed in Tables 1 and 2. Sch. C and Other includes small amounts from unlisted sources, such as alimony, rents, etc. Corp. & Bus. Tax is federal and state corporate income tax and business property taxes. *Sources:* Authors' calculations.

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differs from the national income definition because it includes Social Security benefits and unemployment compensation and deducts the associated payroll taxes (making it a partially after-tax measure). Stiglitz, Sen, and Fitoussi (2009) discuss shortcomings of national income. Personal income used in some distribution studies, such as Fixler et al. (2016), includes transfer payments but excludes earnings retained inside businesses.

[8] For average tax rate income denominators, Treasury's Office of Tax Analysis includes both cash and near-cash transfers (including Medicaid). The Joint Committee on Taxation and Congressional Budget Office include social insurance benefits but not means-tested transfers, which are not reported in tax data.

The most significant tax reform in the period studied was TRA86, which lowered the top individual tax rate from 50 to 28 percent and broadened the tax base so as to be distributionally neutral. The base-broadening was targeted at high-income taxpayers, including repealing the 60 percent exclusion of long-term capital gains and limiting deductions for losses on passive investments. Before TRA86, the top individual tax rate was higher than the top corporate tax rate (50 percent vs. 46 percent), allowing certain sheltering of income in C corporations with retained earnings. The incentive for such sheltering had been even greater when the top individual rate was 91 percent before 1964 and then 70 percent until 1981. TRA86 lowered the top individual tax rate below the top corporate tax rate (28 percent vs. 34 percent), creating strong incentives for some corporations to switch from C to S corporations and to start new businesses as passthrough entities (S corporations, partnerships, or sole proprietorships).[9] This resulted in more business income being reported directly on individual tax returns because passthrough income is reported on individual tax returns while C corporation retained earnings are not. Our analysis accounts directly for the limitations on deducting losses and indirectly for the shift into passthrough entities by including corporate retained earnings. This leads to important findings for the 1960s and 1970s, when high individual income tax rates created strong incentives to shelter income inside corporations. Failing to make these corrections, would understate top income shares before 1987.[10]

TRA86 also dramatically increased the number of dependent filers, which would be inappropriately treated as separate low-income units if no adjustments are made. In the two years following TRA86, the number of dependent filers and filers younger than 20 years old increased from about 8 million to 13 million (Auten, Gee, and Turner, 2013). To address this issue and make our sample consistent over time and between tax and Census data, we remove dependent filers, other filers under age 20, and non-resident filers from the sample and increase the number of non-filing tax units accordingly. Without this correction, non-filing tax units are under-counted and top income shares overstated, especially since 1987.

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[9] This simple comparison ignores the double taxation of corporate income at the individual level and a 33 percent "bubble" rate that phased out the benefit of the 15 percent tax rate. Gordon and Slemrod (2000) and Auten, Splinter, and Nelson (2016) discussed the effects of TRA86 relative on business organization. Goolsbee (2004) examined other effects of tax rates on business organization.

[10] Studies in other countries have also found that inequality trends based on tax returns are biased when failing to account for tax reforms that changed incentives for corporate retained earnings. Wolfson, Veall, and Brooks (2016) estimated that including retained earnings of private corporations increased the Canadian top one percent income share in 2011 by about a third. Alstadsæter et al. (2015) found that an increase in the dividends tax rate caused a dramatic increase in corporate retained earnings in Norway. After the reform, tax return–based top one percent income shares were underestimated by about a third. Atkinson (2007) estimated that during the 1950s and early 1960s, including retained company profits increased United Kingdom top one percent income shares (excluding capital gains) by about half.

Social changes also bias comparisons of top income shares over time when measured using tax units. As marriage rates fell in the lower part of the distribution, this increased the total number of tax units, thereby increasing the number of high-income tax units in the top one percent. Another important social change is the increase in single-parent households. To address both issues, we follow the approach used by the Congressional Budget Office. This takes account of the two adults in married tax units, as well as dependents, and bases income groups on the total number of individuals. That is, each percentile has an equal number of individuals rather than an equal number of tax units. Without this correction there are too many individuals in the top one percent, overstating top income shares in recent decades.

Some sources of market income are not included on individual tax returns. To address this issue and fully account for national income, our pre-tax income measure includes tax-exempt interest, corporate retained earnings and taxes, employer-paid payroll taxes and insurance, imputed rental income on housing, underreported income, and other taxes and income (i.e., the missing market income in Figure 2). These excluded sources increased from an average of 34 percent of national income in the 1960s to 39 percent since 2000.[11] Because of the declining importance of corporate retained earnings and taxes and the growing importance of employer-paid taxes and health benefits, a larger share of these excluded sources now goes to those below the top of the distribution. Between 1962 and 2019, the top one percent share of capital income not included in fiscal income decreased from 4 to 2 percent of national income, due primarily to declining corporate retained earnings.[12] Meanwhile, the bottom 90 percent share of labor income not included in fiscal income increased from 4 to 12 percent of national income. Without these corrections, top income shares would be understated in the 1960s and overstated in recent decades.

II. Data

Our analysis uses annual samples of individual income tax returns from 1960 to 2019. These cross-section samples include between 80 and 360 thousand tax returns, with weights to make the sample representative of the filing population and oversampling of tax returns with high incomes. Most importantly for measuring top income shares, the samples include all tax returns with large total positive incomes (33,700 returns with over $8.5 million, about 0.2% of returns

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[11] Similarly, Foertsch (2016) discusses missing income sources and estimated that 2012 adjusted gross incomes on tax returns was 39 percent lower than NIPA personal income.

[12] Types of capital income excluded from fiscal income include tax-exempt interest, accrued retirement investment income, undistributed fiduciary income, imputed rents, and corporate retained earnings and taxes. The bottom 90 percent share of excluded capital income was unchanged at 12 percent. See online appendix Figure B16.

filed in 2019). Public use individual income tax files are used for years before 1979. Beginning with 1979, we use internal IRS Statistics of Income (SOI) individual income tax samples and Social Security Administration data including dates of birth. For years they are available, we link tax returns to Form 5498 to account for individual retirement account wealth and to Form SSA-1099 information returns to account for unreported Social Security benefits, primarily among low-income filers. In addition, we make use of other IRS information returns for estimating employer contributions for health insurance, income of non-filers, and excluded combat pay. We also use the Survey of Consumer Finances and Census Bureau's March Current Population Survey to estimate the distribution of several types of income and transfers not on tax returns.

Target totals for income not reported or partially reported on income tax returns are from the Bureau of Economic Analysis National Income and Product Accounts (NIPA). Note that corporate retained earnings are defined as undistributed C corporation profits and calculated as profits with inventory value and capital consumption adjustments less taxes and net corporate dividends. These amounts include reinvested earnings of incorporated foreign affiliates of U.S. corporations, that is, unrepatriated foreign earnings.

III. Distributing U.S. National Income Using Tax Data

This section describes the adjustments that move from individual income tax data to national income definitions. Our analysis starts by replicating PS fiscal income including capital gains. We then sequentially remove capital gains, which are not in national income, correct the sample by removing returns of dependent filers and non-residents, estimate non-filer incomes using IRS information returns, adjust for the effects of major tax reforms, add tax-exempt interest, make additions and corrections to various income components, and base income groups on the number of individuals rather than tax units (Section III.A). These adjustments result in *improved fiscal income*, a measure of tax-return income that is broader and more consistent over time. *Pre-tax income* consistent with national income is then obtained by adding income sources not included in tax data (Section III.B). Government transfers are then added to obtain *pre-tax plus transfers income*, which is the broadest measure of pre-tax income and better reflects economic resources of retired taxpayers and others relying on transfers, as well as being preferable for estimating average tax rates (Section III.C). Finally, the rest of government policy is accounted for by subtracting taxes and adding non-transfer spending and government deficits. This yields *after-tax income* and matches national income totals (Section III.D). While some of our adjustments reduce

top income shares, others increase top shares including ranking by size-adjusted incomes and adding tax-exempt interest, corporate retained earnings, and corporate taxes.

Section IV.A provides a summary of the results for our three income measures. Differences between our analysis and PSZ definitions and income allocations, as well as implications for top one percent income shares, are discussed in Section IV.B. Differences with Congressional Budget Office estimates are discussed in Section IV.C. The distributional effects of increases in tax progressivity and government transfers are shown in Section IV.D. Sensitivity of our results to alternative assumptions are presented in Section V.

A. *Improved Measure of Fiscal Income*

This section discusses five sets of changes to obtain an improved measure of fiscal income (i.e., reported market income in tax data) that is more consistent over time. The starting definition is PS fiscal income that includes capital gains. For filers, PS fiscal income equals total income (i.e., adjusted gross income plus statutory adjustments such as IRA contributions), but omits taxable Social Security and unemployment benefits. For non-filing tax units, fiscal income initially uses the PS assumption that non-filer income is 20 percent of the average income of filers. Since national income excludes capital gains, we remove capital gains and in a later step follow the national income definition by adding corporate retained earnings.

1. Correct the Sample: Limit Returns to Nondependent Adult Residents. It is important to start by ensuring our sample is consistent with the U.S. Census resident population age 20 or older. Census data are the basis for the PS estimate of the total number of filing and non-filing tax units, which we also target. Some tax filers, however, live abroad or are younger than 20 years old and not included in the baseline Census numbers. These returns are removed, thereby increasing the number of non-filer tax units. In addition, some filers age 20 and over are claimed as dependents on other tax returns, primarily college students. Since these filers are not independent economic units, they are also dropped from the sample and their income is allocated among tax returns with dependent children.[13] These corrections significantly affect the sample since 1987 due to a TRA86 provision that reduced the amount of exempt income for dependent filers from $1,080 in 1986 to $500 in 1987. This resulted in over 5 million additional tax returns, which if not removed would

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[13] Dependent filers age 19 years or older are generally full-time students who receive more than half of their support from taxpayers claiming an exemption for them. Thus, they are not comparable to fully independent tax units and typically have low incomes. The importance of this correction is illustrated by the increase in 20–24-year-old school enrollment from 13 percent in 1960 to 40 percent by 2012 (National Center for Education Statistics, 2018). Some elderly parents are also claimed as dependents.

be treated as independent tax units with very low incomes. We also correct for the effect of married couples filing separate returns, as the number of total tax units counts all married couples as one unit, but these married couples file two returns. As of 2019, there were 6.7 million filers under age 20, 4.6 million other dependent filers, 1.0 million non-resident filers, and 1.9 million married filing separately returns, altogether about 9 percent of all returns filed.

Non-filer incomes are based on information returns filed by third parties such as employers. Information returns have been used to estimate non-filer incomes in other studies (e.g., Mortenson et al., 2009; Heim, Lurie, and Pearce, 2014). We include income from the following information returns: SSA-1099/RRB-1099 (Social Security and disability insurance benefits), 1099-R (retirement distributions except rollovers), W-2 (wages and amounts withheld for income and payroll taxes), 1099-DIV (dividends), 1099-INT (interest), 1099-G (unemployment insurance benefits), 1099-MISC, and K-1s (partnerships and S corporation distributions). To account for non-filer income heterogeneity, we use information return data for resident individuals not observed on tax returns to estimate income for groups of non-filers.[14] This approach avoids the common but incorrect assumption that all non-filers have low incomes. Instead, it is consistent with the Treasury Inspector General for Tax Administration (2020) finding that some non-filers have relatively high incomes

Correcting the sample and basing non-filer incomes on information returns data, rather than using a fixed share of filer income, has a negligible effect on top income shares before TRA86. Since 1987, however, these changes reduce top income shares due to increases in non-filer incomes and the removal of millions of dependent filers.

2. Impose Post-TRA86 Loss Limits. To make our income measure consistent over time by accounting for the base-broadening reforms of TRA86, we apply post-TRA86 limitations on deductions of losses for rent and other business income to years before the reform. Data from tax returns just after TRA86 indicate that about 85 percent of high-income business losses would have been non-deductible under the new law. The largest effects occur in 1984 to 1986, just before the reform when this adjustment increases top income shares by 0.5 percentage points.[15]

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[14] There are 56 non-filer groups: two marriage, four age, and seven income groups. "Married" non-filer tax units are created by matching non-filing males and females living at the same address. Since information returns of non-filers are only available since 1999, we use information returns for 2000, 2010 and 2018 and interpolate for intervening years. For earlier years we adjust for changing demographic groups and inflation. As discussed in the online appendix, this approach of separate demographic and income groups approximates other estimates of non-filer incomes reasonably well.

[15] This adjustment also helps correct for generous accelerated depreciation rules enacted in 1981 that increased the use of tax shelters and reported losses on tax returns. Other TRA86 base-broadening effects are accounted for in later

3. Add Tax-Exempt Interest. Tax-exempt interest income reported on tax returns since 1987 is added to income. For earlier years, we rely on interpolations using the Survey of Consumer Finances and the 1962 Survey of Financial Characteristics of Consumers. Including tax-exempt interest modestly increases top income shares (0.3 percentage points) in the 1960s when holdings of tax-exempt securities were highly concentrated among the highest income taxpayers but has smaller effects in recent years due to broader holdings of these securities.

4. Correct Income Definition. Several corrections make the income definition more consistent with economic income. Excluded dividends before 1987 and tax-exempt combat pay are added to filer incomes. Net operating losses of a pass-through business reduce fiscal income in the year incurred and any unused loss can be carried forward to reduce taxable income in future years. To avoid double counting these losses and make our estimates consistent with national income, net operating losses carried forward from prior years are removed. State and local income tax refunds in fiscal income are removed because they are an adjustment for excess prior-year deductions, rather than income. Gambling losses claimed as an itemized deduction are deducted up to the amount of gambling income. Capital gains distributions reported directly on Form 1040 and ordinary gains from the sale of business property are also subtracted. Income from retirement accounts is generally included in fiscal income when it is distributed rather than when contributions are made. Contributions to certain accounts, such as 401(k) plans, are already excluded from fiscal income but others are included and therefore these contributions are subtracted. In addition, we remove taxable distributions of retirement accounts upon death and shift alimony payments from payors to recipients. These corrections are based on amounts reported on individual tax returns and in some cases on information returns. These adjustments can result in large income changes on some tax returns, substantially changing their rank in the income distribution and potentially affecting top income shares.

5. Base Income Groups on Numbers of Individuals and Rank by Size-Adjusted Income. To obtain a measure more relevant to economic welfare, we follow Congressional Budget Office (2022) by defining income groups based on all individuals (including primary and secondary taxpayers and dependents) and ranking tax units using size-adjusted incomes. Compared to groups based on tax units, this approach helps control for the bias introduced from the differential declines in marriage rates and declining tax-unit size. Size-adjusting incomes accounts for the costs of supporting dependents and the economies of scale from shared resources, such as housing.[16]

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steps. The post-TRA86 incentive to shift business organization from C corporations to S corporations and partnerships is accounted for by including retained earnings. Adding back net operating losses corrects for tax shelter losses carried over to later years.

[16] Controlling for both the falling marriage rate and tax-unit size helps account for the rising share of children under 18 years old living in single-parent households, which Census data show increased between 1960 and 2015 from 9 to 27 percent (see Table CH-1 at www.census.gov/data/tables/time-series/demo/families/children.html).

Marriage rates on tax returns declined from 67 to 37 percent between 1960 and 2019. However, marriage rates have remained high among the top one percent, decreasing only from 90 to 85 percent. Declining marriage rates outside the top of the income distribution increases income shares at the top of the distribution. Larrimore (2014) estimated that the differential decline of marriage rates explains 23 percent of the increase in household income Gini coefficients between 1979 and 2007.

For ranking tax units, we account for size differences by dividing tax-unit income by the square root of the number of individuals in the unit. This equivalence scale is used by the Congressional Budget Office (2022) and is similar to that used by the Census Bureau to set poverty thresholds and estimate income inequality (Cronin, DeFilippes, and Yin, 2012).[17] Size-adjusted incomes are only used to rank tax units and determine their income group. Income group shares are based on total tax-unit incomes so that they sum to national income.

Basing income groups on individuals and ranking by size-adjusted income have offsetting effects on top income shares. Basing income groups on individuals, rather than tax units, reduces top one percent income shares 1.5 percentage points in 1960 and 2.9 percentage points in 2019 (see Table 1).[18] Ranking by size-adjusted income moves some tax units with more individuals out of the top one percent and replaces them with more tax units with higher per-person income. This *increases* top one percent income shares by about one percentage point in earlier decades and 1.3 percentage points in 2019. The net effect of these two changes is a decrease in recent top one percent shares of 1.6 percentage points. Other studies have found similar effects on top one percent income shares from moving away from tax units as the unit of observation (Bricker et al., 2016b; Larrimore, Mortenson, and Splinter, 2021).

These changes provide an improved measure of fiscal income and its distribution. Table 1 shows that relative to fiscal income excluding capital gains, most of the decrease in the top one percent share in 2019 results from changing from ranking by tax units to grouping by individuals and ranking by size-adjusted income. As discussed in Section IV.B., this approach has similar effects as the PSZ approach of basing income groups on the number of adults and dividing the income of married tax units in half.

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[17] This approach differs from income shares of individuals, which results in higher measured inequality due to unequal spousal earnings (Saez and Veall, 2004). While individual-level estimates may make sense for the distribution of labor earnings, it is inappropriate for broad measures that include income from shared assets, such as imputed rent from housing.

[18] Growth in cohabitation explains some of this change. While there was relatively little cohabitation before 1970, more than 27 percent of couples living together are unmarried (Lundberg, Pollak, and Stearns, 2016). The rise in non-married couples means tax-unit incomes may understate the economic welfare of many single or head of household filers because the income of other members of the household is not included (Larrimore, Mortenson, and Splinter, 2021).

B. *Pre-Tax Income: Expansions*

The next step in computing pre-tax income is to add income sources included in national income but not reported on individual income tax returns: (1) corporate retained earnings and business taxes, (2) employer-paid benefits and payroll taxes, (3) income in retirement accounts, (4) correcting for high inflation, (5) underreported income, and (6) other components of national income. Table 1 and Figure 3 show the impact of these adjustments on top one percent income shares. The effects of adding retained earnings and corporate taxes decrease over time as the share of business activity shifts from C corporations to passthrough businesses. Meanwhile, the effects of employer-paid benefits and payroll taxes increase over time.

Table 1: Effects of adjustments on top 1% market and pre-tax income shares

	Top 1% income shares					Top 1% share changes				
Adjustments	**1960**	**1979**	**1985**	**1989**	**2019**	**1960**	**1979**	**1985**	**1989**	**2019**
Fiscal income (with capital gains)	9.0	9.0	11.1	13.8	19.4	—	—	—	—	—
Fiscal income (no capital gains)	8.3	8.1	9.2	12.8	18.0	–0.7	–0.9	–1.9	–1.0	–1.4
Adjustments to fiscal income & income groups										
Correct sample	8.3	8.1	9.2	12.6	17.3	*	*	*	–0.2	–0.8
Impose post-TRA86 loss limits	8.4	8.3	9.7	----	----	*	0.2	0.5	----	----
Add tax-exempt interest	8.7	8.6	10.1	12.9	17.4	0.3	0.3	0.4	0.3	0.1
Correct income definition	8.7	8.6	9.9	12.8	17.0	*	*	–0.1	–0.2	–0.4
Base groups on number of individuals	7.2	6.9	8.5	11.0	14.2	–1.5	–1.7	–1.4	–1.8	–2.9
Rank tax units by size-adjusted inc.	8.1	7.8	9.3	11.6	15.4	0.9	0.9	0.8	0.7	1.3
Improved fiscal income & total changes	**8.1**	**7.8**	**9.3**	**11.6**	**15.4**	**–0.9**	**–1.2**	**–1.8**	**–2.2**	**–4.0**
Expansions to fiscal income										
Fiduciary retained income	8.3	8.1	9.6	11.9	15.6	0.2	0.3	0.3	0.3	0.2
C-corporation retained earnings	10.6	9.9	10.7	12.3	16.3	2.3	1.8	1.0	0.4	0.7
C-corporation taxes	11.4	10.2	10.8	12.3	16.4	0.9	0.3	0.1	*	0.1
Business property tax	11.6	10.4	10.9	12.4	16.6	0.2	0.2	0.2	0.1	0.2
Inflation correction for interest	11.7	10.9	11.2	12.8	16.7	0.1	0.5	0.3	0.4	0.1
Underreported income	11.4	10.7	11.1	12.6	16.3	–0.2	–0.2	–0.2	–0.2	–0.4
Imputed rent	11.2	10.6	11.0	12.5	16.0	–0.2	–0.1	–0.1	–0.1	–0.3
Employer payroll tax	11.0	10.2	10.5	11.9	15.5	–0.2	–0.4	–0.5	–0.5	–0.5
Employer-paid benefits	10.9	9.9	10.1	11.4	14.6	–0.1	–0.3	–0.4	–0.5	–0.9
Retirement account income	11.2	10.1	10.8	11.8	14.8	0.3	0.3	0.6	0.4	0.2
Indirect taxes, non-profits, etc.	10.3	9.4	9.7	10.8	13.8	–0.8	–0.7	–1.0	–1.0	–1.0
Pre-tax income & total changes	**10.3**	**9.4**	**9.7**	**10.8**	**13.8**	**1.3**	**0.4**	**–1.4**	**–3.0**	**–5.6**

Notes: Total changes are relative to fiscal income including capital gains (thresholds set without capital gains). Sample corrections remove non-adult, dependent, and non-resident filers and adjust the number of non-filers accordingly. Imposing post-TRA86 loss limits makes many business losses non-deductible in earlier years. Among other changes, correcting the income definition adds back net operating losses that reflect economic activity in prior years. Basing income groups on the number of individuals means each percentile has the same number of individuals (rather than tax units). Ranking tax units by size-adjusted income controls for differences in the size of tax units. Expansions to fiscal income include income sources no on tax returns: fiduciary income retained in trusts and estates, corporate retained earnings (undistributed profits), corporate taxes that are part of pre-tax income, business property taxes, an inflation adjustment that increases business income due to lower real interest payments, underreported income based on IRS detailed audit studies, imputed rent on owner-occupied housing, employer-paid payroll taxes and benefits that are part of pre-tax income, retirement account income missing from tax returns, as well as various taxes and income sources (non-profits) included in national income but not in fiscal income. See the online appendix for detailed description of adjustments. Changes less than 0.05 percentage points are denoted by *. *Sources:* Authors' calculations and Piketty and Saez (2003 and updates) for fiscal income with capital gains.

Pre-tax Income Expansions, Increases

Pre-tax Income Expansions, Decreases
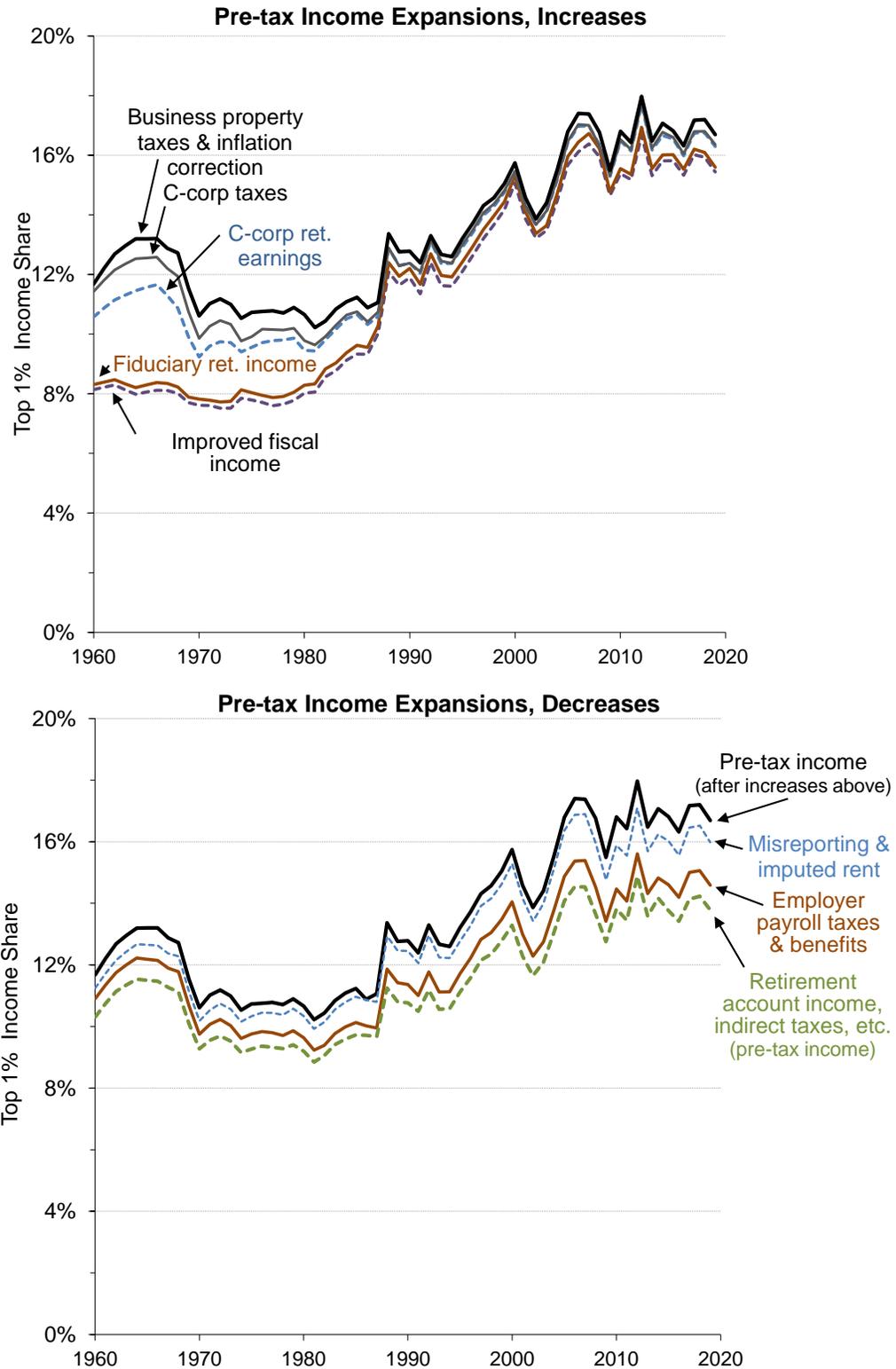
Figure 3: Top 1% income shares: Pre-tax income expansions

Notes: Income expansions start with improved fiscal income, which is PS fiscal income excluding capital gains after sample corrections, imposing TRA86 loss limits, adding tax-exempt interest, grouping by the number of individuals, and other income corrections. See text and Table 1 for description of adjustments. *Sources:* Authors' calculations.

1. Retained Earnings of Corporations and Business Taxes. Pre-tax corporate profits in national income include all income of capital owners regardless of whether profits are distributed, retained, or paid out in taxes. Corporate profits distributed as dividends are already included in taxable income. Since retained earnings are not reported on individual tax returns they must be allocated among various corporate owners: retirement accounts, non-profits/governments, and private individuals.[19] We allocate corporate retained earnings from national accounts data, which excludes capital gains and includes estimated corporate income underreporting (see definition in Section II). This increases top one percent income shares about 2 percentage points in the 1960s, when C corporations accounted for a large share of business activity, but only about half a percentage point in recent decades due to the shift to passthrough businesses and the growth of more evenly distributed retirement assets.

Retirement account ownership of corporate stock increased dramatically from 4 percent in 1960 to around 50 percent since 1985. These estimates are based on Federal Reserve Financial Accounts and include private and public pensions, IRAs, and life insurance funds. This portion of retained earnings is allocated by earned income for the share of corporate ownership by defined benefit (DB) plans and otherwise by the share of defined contribution (DC) account wealth. DC wealth is based on individual-level IRA asset values reported on Form 5498 information returns when available and otherwise allocated using income and age groups in the Survey of Consumer Finances (SCF).[20] Our retirement account ownership shares are similar to those in the Federal Reserve's Distributional Financial Accounts—for example, both have top one percent (ranked by income) shares of 7 percent in 1989 and 6 percent in 2018 (see online appendix Table B2).[21] The portion of retained earnings reflecting ownership by non-profit organizations and government, which ranges between 5 and 9 percent, is allocated half per capita and half by wages to account for both the redistribution and consumption spending of non-profits and governments.

The remaining retained earnings associated with non-retirement private ownership are allocated to individual tax returns. Three-quarters of these retained earnings are allocated based on

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[19] Corporate passthrough entities (S corporations and REITs) are removed before estimating ownership shares because they have little or no undistributed profits. Our approach to allocating ownership of C corporations closely follows Rosenthal and Austin (2016).

[20] For the DB allocation, *earned income* includes wages, self-employment income, and up to $40,000 of taxable retirement distributions. These amounts are generally set to zero for the bottom 40 percent of tax units (ranked by wages) to account for low-wage employees usually not being covered by DB plans and top-coded at $300,000 to account for DB limitations. DC wealth shares since 1993 and for 1989 are based on Form 5498 IRA asset values linked to individual tax returns. For other years and to account for non-IRA amounts, total DC wealth is based on the percent having a DC account, mean DC wealth, and the standard deviation of DC wealth for each of 8 income and 4 age groups in the SCF. See the appendix for details.

[21] See www.federalreserve.gov/releases/z1/dataviz/dfa/distribute/chart (accessed Oct. 3, 2021), where 1989 is the earliest year available. Note that top wealth shares ranked by wealth are higher than when ranked by income.

a tax unit's share of dividends and one-quarter based on its share of realized capital gains. As shown in the sensitivity analysis, the results are robust to alternative assumptions. We favor using dividends received as the primary indicator of corporate ownership (Smith et al., 2023). The portion allocated to capital gains accounts for ownership of corporations not paying dividends and the large portion of capital gains from the sale of corporate stock (including gains from private equity investments). While the timing of realized capital gains can differ substantially from retained earnings, they tend to equalize over the long run (Pechman, 1985; Clarke and Kopczuk, 2017).[22]

Pre-tax national income includes taxes paid by businesses and is allocated based on assumptions about economic burden. Following Joint Committee on Taxation (2013) and Congressional Budget Office (2012), we allocate 25 percent of corporate taxes to wages.[23] The rest is allocated to individual tax returns based on the ownership of corporate capital (allocated as for retained earnings) and interest-bearing assets (allocated by taxable interest).[24] Including corporate taxes increases the top one percent income share 0.9 percentage point in 1960, when corporate tax rates were higher and corporate ownership was more concentrated, but has little effect in recent decades. Business property taxes are first divided among non-housing capital ownership shares (e.g., corporate equity, retirement accounts, and passthrough equity) and then allocated to tax filers as for corporate and retirement account ownership and by the absolute value of passthrough business income.

2. Employer-Provided Benefits and Payroll Taxes. Employer-provided insurance is non-taxable and an important addition to tax-based incomes. These benefits include health and life insurance and workers' compensation and increased from 1 to 5 percent of national income between 1960 and 2019. The distribution of employer-provided health insurance, which makes up most of these benefits, is based on health insurance amounts reported on Form W-2 in 2013 and 2015. While the magnitude of these benefits has increased substantially, its distribution has been found to be similar in 1992 (see online appendix and Warshawsky, 2016). Contributions to Flexible Spending Accounts (FSAs) are excluded from taxable income and therefore added back. Employer-provided insurance and FSA contributions reduce the top one percent income share only marginally in the 1960s but by nearly one percentage point by the mid-2000s.

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[22] Larrimore et al. (2021) take the alternative approach of using annual accrued capital gains. The use of accrued gains produces a more volatile series and, in combination with other methodological differences such as basing income groups on tax units, results in the average top one percent share being several percentage points higher than our estimates.

[23] There are various reasons for believing a portion of the burden falls on wages, including reduced labor productivity from a smaller capital stock. In addition, compensation of executives is often based on corporate profits and their wages are affected by stock option values. Some empirical studies support this view. In the U.S., Suárez Serrato and Zidar (2016) estimated that wages bear one-third of state corporate taxes and Liu and Altshuler (2013) estimated that the average wage share is between 60 and 80 percent. Following Joint Committee on Taxation (2013), we also allocate 5 percent of passthrough business income taxes to wages.

[24] The Congressional Budget Office (2012), Joint Committee on Taxation (2013), and Office of Tax Analysis, U.S. Treasury Department (Cronin et al., 2013) all distribute the corporate tax burden in part by interest received by individuals.

The full burden of employer payroll taxes is generally assumed to fall upon workers and considered part of their pre-tax economic income. Payroll taxes are estimated based on wages reported on tax returns for filers and on Form W-2 for non-filers up to the taxable maximum thresholds (e.g., $132,900 in 2019). Including payroll taxes paid by employers reduces top one percent income shares half a percentage point in recent decades.

3. *Retirement Account Income*. The treatment of retirement savings and income presents difficult choices when thinking about measuring income (Nelson, 1987). The usual options are to count retirement income when it accrues or when it is distributed. Under the accrual approach, contributions to retirement accounts are counted when the income is earned and investment income on retirement savings is counted as it accrues. The accrual approach, however, results in many retired people having little income. Counting retirement income when distributed provides a better measure of current incomes of retired people and matches the timing of tax burdens. The distribution approach is therefore used in most studies measuring comprehensive income. Following a distribution approach, we retain taxable income from pensions, retirement accounts, and annuities already in fiscal income but exclude retirement account contributions to prevent double counting. Since income accruing in retirement accounts has exceeded distributions and accrued amounts are included in national income, the excess accruals are added to conform to national income retirement totals. These amounts are allocated the same way as the retirement account portion of retained earnings.

4. Correcting for High Inflation. High inflation rates, most importantly in the 1970s and early 1980s, distort the measurement of income. Real interest income of individuals is overstated but business profits are understated due to overstated real interest deductions (Steuerle, 1985). To account for inflation, we make three adjustments to interest flows (for a similar approach, see Feldstein, 1988). First, we decrease household net interest receipts by the fraction accounted for by inflation, estimated as the PCE inflation rate divided by the Aaa corporate bond rate. Second, we increase business income by the inflation component of net interest payments. Third, we estimate the effect of inflation on government interest payments as the difference between household interest decreases and business income increases so that total income is unchanged. Since lower real government interest payments likely decrease current or future taxes, we allocate this difference by federal and state income taxes. These adjustments increase top one percent income shares by an average of 0.4 percentage points in the 1970s and 1980s when inflation was high, but only 0.2 percentage points in other years.

5. Underreported Income. Amounts reported in tax data can differ from amounts in national income due to underreporting of income on tax returns as well as definitional differences. Our allocation of underreported income is based on the IRS National Research Program (NRP) and Taxpayer Compliance Measurement Program (TCMP) detailed audits studies, which are the basis for underreported income included in national income. We use tabulations by Auten and Langetieg (2020) from these studies covering six periods from 1988 through 2013. To capture the heterogeneity of misreporting across filers, the ratio of detected misreporting to reported income is provided for ten ratio groups and 11 reported income groups, including two negative income groups. The appropriate share of tax returns in each reported income group is randomly allocated to each ratio group and misreporting ratios are applied, including a large no change group. To account for undetected underreporting, we apply the distributionally consistent gradient multipliers proposed in Auten and Splinter (2021). This method produces results similar to NRP-based estimates of the distribution of underreporting in Johns and Slemrod (2010) and DeBacker et al. (2020), as seen in online appendix Figure B5. Total underreporting amounts are calculated separately for wages and salaries, rental income, farm income, and S corporation net income. For nonfarm proprietor income, we use the misreported amounts as reported in the national accounts. Since the IRS audit studies only include filers, five percent is allocated to non-filers. We also account for other differences, such as faster depreciation in tax data than in national accounts due primarily to expensing on tax returns. See the online appendix for details.

Adding underreported income reduces top one percent shares of pre-tax income an average of only one-quarter of one percentage point between 1960 and 2019. For after-tax income, adding underreported income increases the top one percent share one-tenth of a percentage point before 2000 and one-third of a percentage point since (see online appendix Figure B6).

6. Other Income Expansions. While fiduciaries, including estates and trusts, distribute much of their income each year, some fiduciary income is retained and therefore missing from individual returns. Retained fiduciary income and taxes are allocated to individual tax returns by taxable fiduciary income, increasing top one percent income shares by 0.2 to 0.3 percentage points. Imputed rental income from owner-occupied housing is primarily allocated in proportion to deductions for real estate taxes. Since NIPA imputed rent is pre-tax, it includes property taxes. Imputed rent disproportionately increases middle incomes, lowering top one percent income shares an average of 0.2 percentage point. Sales taxes and indirect taxes are allocated by disposable income (defined below) less savings. Small amounts of business transfers and subsidies, surplus of government enterprises, and dividends and interest income of non-profits and governments are allocated half per capita and half by wages.

C. *Pre-Tax Plus Transfers Income*

National income can be misleading as a measure of economic welfare because it omits government transfers. We therefore provide an additional income measure that includes government cash and non-cash transfers: pre-tax income plus transfers (Table 2). To provide a sense of relative magnitudes in 2019: Social Security benefits were $1.03 trillion, unemployment benefits $30 billion, other cash transfers $400 billion, Medicare benefits net of premiums $820 billion, and Medicaid benefits $670 billion.

Social Security benefits have been partially taxable and reported on tax returns since 1984. For cases where taxpayers significantly underreported or failed to report this income, generally because their incomes were below the thresholds for Social Security being taxed, we use Form SSA-1099 information return data. This adds benefit amounts for more than 5 million returns in the 1990s and over 1 million returns in recent years. The 1985 distribution is used for allocating benefits in prior years because it is the first year SSA-1099 forms are available. For filers, unemployment insurance benefits are the amounts reported since 1981 and imputed in earlier years. As discussed above, non-filer benefits are based on Forms SSA-1099 and 1099-G. The NIPA value of other cash transfers—federal supplemental security income and cash transfers from state and local governments—is allocated using the 1989 to 2016 distributions from Census Bureau's March Current Population Survey (CPS) estimated by Larrimore et al. (2021). For this allocation, tax units are divided into ten demographic groups based on: age of the oldest person in the CPS-constructed tax unit (younger than 40, 40–64, and 65 years or older), presence of dependent children, and marital status. Each demographic group is then divided into one hundred income percentiles by improved market income plus Social Security benefits. Medicare benefits less premiums are allocated proportionally to filers and non-filers age 65 and older, except for high-wage filers likely receiving insurance through their employers. Finally, the NIPA value of remaining non-cash transfers, such as Medicaid and food stamps, is allocated like other cash transfers using CPS data. Following the national accounts, non-cash transfers are valued at cost.

As shown in Table 2, the inclusion of transfers decreases top one percent income shares with increasing effects over time: 0.5 percentage points in 1960, 0.7 in 1979, and 1.7 in 2019. Similarly, Bricker et al. (2016b) and Congressional Office (2018) both estimate that including transfers reduced the 2010 top one percent share by more than 2 percentage points.

Table 2: Effects of transfers, taxes, and government spending on top 1% income shares

Adjustments	Top 1% income shares					Top 1% share changes				
	1960	1979	1985	1989	2019	1960	1979	1985	1989	2019
Pre-tax income	10.3	9.4	9.7	10.8	13.8	—	—	—	—	—
Pre-tax Income Plus Transfers, Add transfers										
Social Security benefits	10.1	9.1	9.4	10.4	13.1	–0.2	–0.3	–0.3	–0.4	–0.7
Unemployment benefits	10.0	9.1	9.4	10.4	13.1	–0.1	*	*	*	*
Other cash transfers	9.9	8.9	9.2	10.2	12.9	–0.2	–0.1	–0.1	–0.1	–0.2
Medicare	----	8.8	9.1	10.1	12.5	—	–0.1	–0.1	–0.2	–0.4
Other non-cash transfers	9.8	8.7	8.9	9.9	12.0	*	–0.2	–0.2	–0.2	–0.5
Pre-tax income plus transfers & total changes	**9.8**	**8.7**	**8.9**	**9.9**	**12.0**	**–0.5**	**–0.7**	**–0.8**	**–0.9**	**–1.7**
After-tax Income, Remove taxes										
Federal indiv. income & estate tax	8.9	7.8	7.9	8.6	10.0	–1.0	–0.9	–1.1	–1.2	–2.1
State/Local individual income tax	8.8	7.7	7.7	8.4	9.5	–0.1	–0.1	–0.2	–0.2	–0.5
Corporate income tax	8.0	7.3	7.6	8.3	9.4	–0.7	–0.3	–0.1	–0.1	–0.1
Property tax	7.8	7.2	7.5	8.3	9.2	–0.2	–0.1	–0.1	–0.1	–0.2
Payroll tax	8.1	7.6	8.0	8.8	9.5	0.3	0.4	0.5	0.5	0.4
Sales and other taxes	8.4	7.8	8.2	9.0	9.7	0.2	0.2	0.2	0.2	0.2
After-tax Income, Add rest of government sector										
Government deficit/surplus	8.7	7.9	8.1	9.0	9.4	0.4	0.1	*	*	–0.4
Government consumption	8.1	7.4	7.6	8.4	8.8	–0.6	–0.6	–0.6	–0.7	–0.5
After-tax income & total changes	**8.1**	**7.4**	**7.6**	**8.4**	**8.8**	**–1.7**	**–1.3**	**–1.4**	**–1.5**	**–3.2**
Total changes: pre-tax to after-tax	—	—	—	—	—	**–2.2**	**–2.0**	**–2.2**	**–2.4**	**–5.0**

Notes: Tax totals are based on NIPA amounts. Fuel and utility taxes are not included. See the online appendix for detailed description of adjustments. * denotes changes between –0.05 and 0.05 percentage points. *Source:* Authors' calculations.

D. After-Tax Income

Taxes are subtracted from pre-tax income plus transfers sequentially to show the effect of each tax on top one percent shares. Overall, taxes are progressive and have become more progressive over time. Federal income taxes lower top one percent income shares about one percentage point in earlier decades but more than two percentage points in 2019. To match national income, two final adjustments account for the government sector by including government deficits/surpluses and government consumption (Table 2).

Federal individual income tax liabilities are the amounts reported on tax returns and amounts withheld for non-filers. The Additional Medicare Tax and the Net Investment Income Tax, which began in 2013, are included. Foreign tax credits are added back to federal income taxes because they reflect foreign income taxes paid on income included on tax returns. Refundable portions of tax credits, including earned income and additional child tax credits, result in negative average income tax rates in lower-income groups.

Since the estate tax encourages planning over many years prior to actual payment of the tax, we assume that estate and gift taxes are borne by decedents over the decade before their death. Using population tax data, we track the income group of decedents in the ten years prior to their

death to estimate the share of estate tax paid by decedents in these income groups. The estimated share of estate tax is then allocated to observations in these income groups each year. This approach accounts for year-to-year income variability among high-wealth individuals and is consistent with Joulfaian (2001) and Cronin and Eiler (2018), who found a higher correlation between wealth at death and income five years prior to death than the last full year before death. Relative to alternative approaches, such as the Piketty and Saez (2007) assumption that decedent income and wealth rankings are the same or the PSZ current-year income capitalization approach, our approach better reflects the complex relationships among income dynamics, wealth, and estate tax planning.

State and local income taxes and residential real estate taxes are based on itemized deduction amounts. Since nearly all tax returns at the top of the distribution itemize deductions, the deducted amounts provide good measures for top income groups, account for state-level heterogeneity, and capture most state income taxes (about 70 percent in early decades and 90 percent in recent decades).[25] Corporate income taxes and property taxes are those previously used in calculating pre-tax income. Payroll taxes include employee and employer taxes, as well as self-employment taxes reported on tax returns. The employee portion of payroll taxes uses previously calculated employer taxes except for three years with special rates (1984, 2011, and 2012). Sales and other taxes are allocated by disposable income (after-tax income prior to subtracting sales and other taxes) less savings. Public utility payments and fuel taxes are excluded from both taxes and government consumption because they are closer to "user fees" than taxes, a long-discussed perspective (Shoup, 1934). Government deficits/surpluses are allocated by federal payroll and income taxes paid because almost all deficits are at the federal level.

Government consumption includes expenditures valued at cost for national defense, education, streets and highways, and other non-transfer programs. Prante and Chamberlain (2007) argued for an equal per household allocation. The Congressional Budget Office (2013) considered the effects of allocating government consumption either all per capita or all by market income, suggesting both rely on problematic assumptions. Reynolds and Smolensky (1977, p. 50) allocated this spending half per capita and half by income, arguing that "households benefit on some equalitarian basis as well as in proportion to income." Riedel and Stichnoth (2022) present evidence supporting per capita allocation of public education spending, which is more than one-third of government consumption. To account for the mixture of types of government spending, we allocate government consumption half per capita and half by after-tax income.[26]

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[25] Between 1960 and 2017, generally at least 95 percent of the top one percent itemized deductions. The 2017 distribution is applied in later years due to deduction limitations. For recent years, state refundable tax credits are based on shares of federal refundable credits on a state-by-state basis. Details of allocations to non-itemizers are provided in the online appendix.

[26] Allocating all government consumption per capita per Riedel and Stichnoth (2022) would have little effect on our estimated trends but would generally lower top one percent shares three-quarters of a percentage point.

IV. Results

This section provides a summary our findings. First, we show how changing from a narrow to a broad measure of market income (fiscal income to national income) affects top income shares. Then we discuss differences between our national income estimates and PSZ national income estimates, as well as Congressional Budget Office expanded income. While the focus is on top one percent income shares, we also find that increases in income shares for the top 10 percent and top 0.1 percent are smaller than PS and PSZ for pre-tax income and that their shares of after-tax income are little changed (Figure A1). This section also discusses the effects of taxes and transfers on the distribution of after-tax income.

A. *From Fiscal Income to Broader Income Measures*

To summarize the effects of broadening the income measure from fiscal income to national income, consider the effects on top one percent shares in 1960 and 2019. In 1960, our sample and income corrections reduce the top one percent income share of fiscal income from 9.0 to 8.1 percent for improved fiscal income. Income expansions to match the definition of national income increase this share to 10.3 percent (Table 1 and Figure 3). The most important factor that increases the 1960 share is adding pre-tax C corporation income (including corporate retained earnings and taxes) in place of realized capital gains. This reflects the much larger C corporation share of business income prior to TRA86. For 2019, while the top one percent fiscal income share is 19.4 percent, our pre-tax income share is nearly one-third lower at 13.8 percent. The most important factors in this 5.6 percentage point (pp) difference are controlling for the declining marriage rate of lower-and middle-income tax units (2.9 pp), including employer-provided insurance (0.9 pp), replacing realized capital gains with C corporation retained earnings (0.7 pp), including the employer share of payroll taxes (0.5 pp), and including underreported income (0.4 pp).

Pre-tax plus transfer income includes government transfers, the largest of which is Social Security benefits. Relative to pre-tax national income, this measure avoids the problem of treating a large share of older retired individuals as having almost no income. In 1960, the top one percent income share is 9.8 percent, only half a percentage point lower than the pre-tax national income share because transfers were relatively small. In 2019, the top share is reduced by almost 2 percentage points from 13.8 to 12.0 percent (see Table 2). This difference suggests that about half of the increase in top market income shares was offset by increasing amounts of transfers.

After-tax income accounts for taxes and government spending. Progressive taxes, discussed more below, further decreased top one percent income shares: by 1.5 percentage points in 1960 and 2.3 percentage points in 2019. After-tax top one percent income shares fluctuate with the business cycle but remained relatively unchanged over the last six decades. The estimated increase in the top one percent after-tax income share since 1962 is a modest 0.2 percentage point.

A. Bottom 50% income shares

After-tax income

Pre-tax plus transfers

Pre-tax income

Fiscal income

B. Bottom 50% avg. real per capita income ($2019)

After-tax income

Pre-tax plus transfers

Pre-tax income
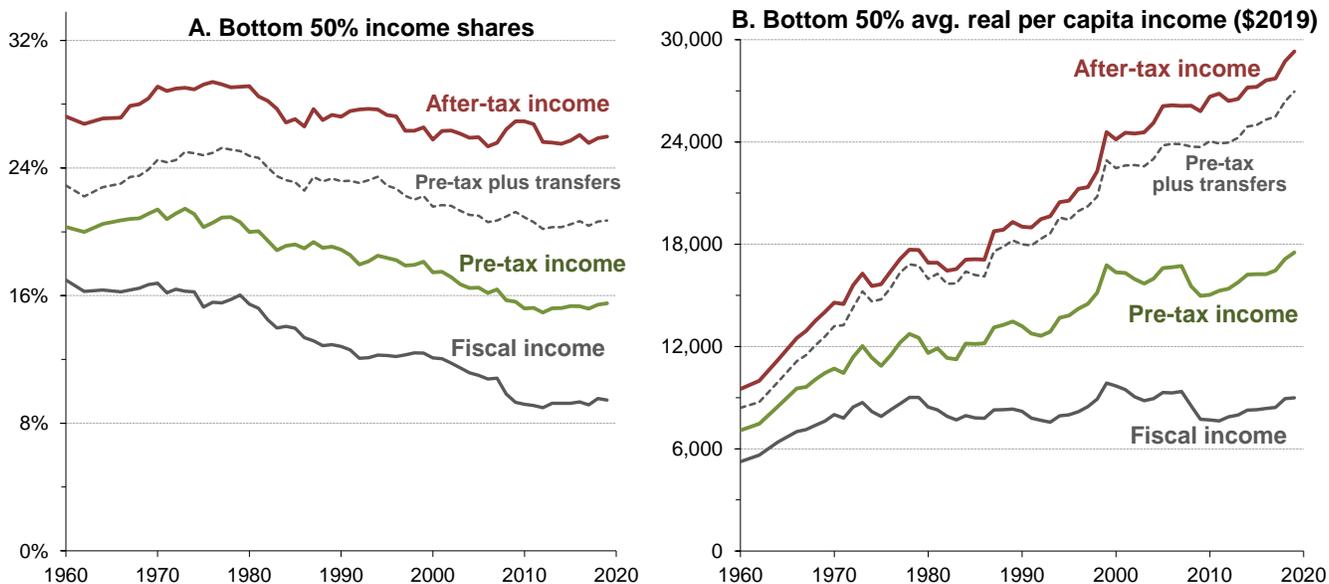
Fiscal income

Figure 4: Bottom 50% income shares and average per capita real incomes
Notes: Fiscal income excludes capital gains. Real incomes are indexed by the PCE. *Sources:* Authors' calculations.

It is also important to consider the bottom half of the income distribution. Figure 4.A shows that the pre-tax income shares of the bottom 50 percent decreased 5 percentage points since 1962. The decrease was 4 percentage points after accounting for transfers and only 3 percentage points after taxes and transfers. Figure 4.B shows that real per capita pre-tax incomes of the bottom half of the distribution increased 135 percent since 1962. Real after-tax incomes nearly tripled (increased 193 percent). Since 1979, real per capita pre-tax incomes increased 40 percent and after-tax incomes increased 66 percent. Similarly, Congressional Budget Office (2022) found that real per capita incomes after taxes and including transfers of the bottom two quintiles increased 61 percent from 1979 to 2019.

A more comprehensive view shows that taxes and transfers have kept most income shares relatively unchanged. Figure 5A shows the combined effects of taxes and transfers on income shares of the top-, middle-, and bottom-income quintiles. While the top-quintile share of income before taxes and transfers increased 5 percentage points since 1962, it was virtually unchanged after taxes and including transfers it: decreases in the late 1960s offset by increases since 1979. The middle-quintile share declined slightly since 1962, but after taxes and transfers it increased slightly. The bottom-quintile share declined 1.3 percentage point since 1962 but increased 0.4 percentage point after accounting for taxes and transfers. In other words, increasing transfers and tax progressivity offset increases in top income shares of pre-tax income.
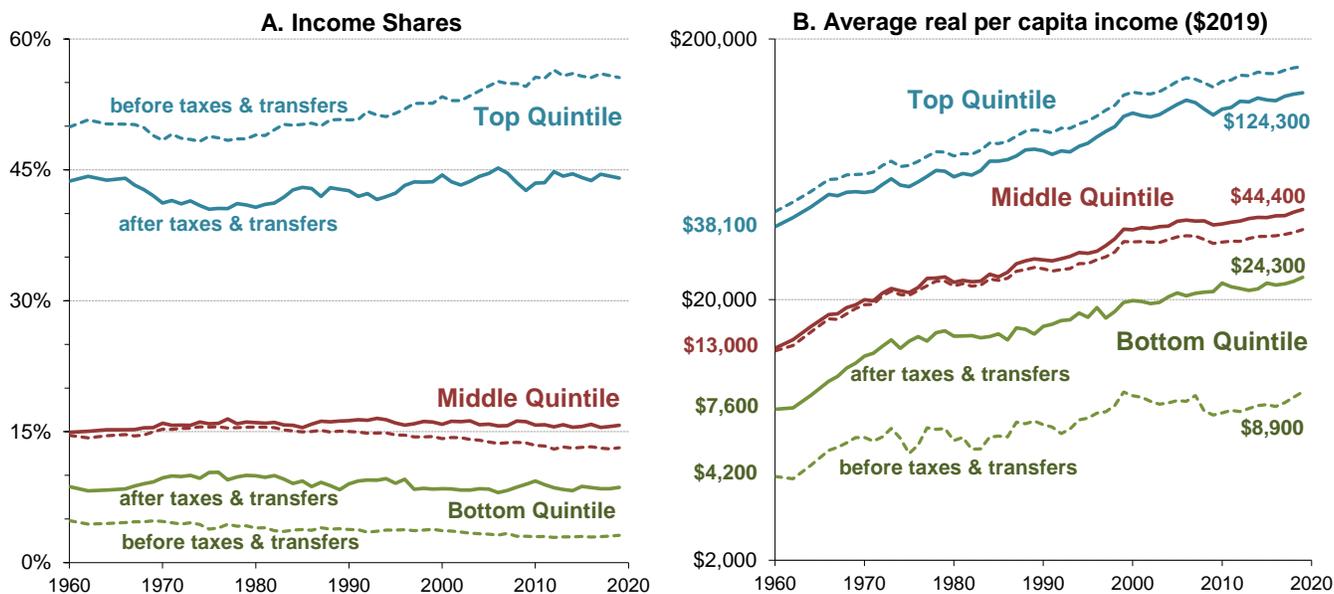
Figure 5: Income shares and per capita real incomes by quintile

Notes: Adjustments used to estimate pre-tax (before taxes and transfers), pre-tax plus transfers, and after-tax (after taxes and transfers) income are listed in Tables 1 and 2. Real incomes are indexed by the PCE and on a log scale. Amounts shown are for 1960 and 2019 rounded to nearest $100. For the bottom quintile, negative incomes are set to zero. *Sources:* Authors' calculations.

Also important is what happened to real incomes across the distribution. As shown in Figure 5B, real per capita income after taxes and transfers increased at similar rates for the bottom-, middle-, and top-income quintiles: tripling in all income groups. Real pre-tax incomes also increased substantially, more than doubling in all income groups. As discussed elsewhere, the larger growth of income after taxes and transfers reflects the growing importance of transfer payments and tax cuts for low- and middle-income taxpayers.

While our improved income measures provide a better understanding of the distribution of income in particular years, comparisons of cross-sections over time can be misleading. For example, a simple comparison of the 1979 and 2019 cross-sections would imply that the top one percent earned 22 percent of the increase in pre-tax income and 11 percent of the increase in after-tax income. A fundamental issue is that such comparisons convey the impression that it is the same people in the top of the distribution over time. Studies using panel data, however, show that the membership of income groups changes over time.[27] Among tax units in the top one percent each year, panel data show that only about 40 percent remained there for the subsequent three years and even fewer were there the prior three years (Auten, Gee, and Turner, 2013). In addition, mobility

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[27] Cross-sectional comparisons obscure individual-level income mobility as well as compositional changes. More than one-third of 1979 adults filing tax returns died by 2014 and were replaced by a new cohort who earned more than half of adjusted gross income in 2014.

studies show that those starting with low incomes enjoy the largest percentage increases in average income while those starting with the highest incomes suffer the largest declines in income in following years (Auten and Gee, 2009; Splinter, 2021). Similarly, many in the lowest income groups or in poverty are only there temporarily (Larrimore, Mortenson, and Splinter, 2022).

Life-cycle effects can also bias cross-sectional comparisons, especially due to the large Baby Boom cohort. The Baby Boom generation (born 1946 to 1964) reached their peak share of the top one percent about 2009, which corresponds with the peak years of the top one percent share of pre-tax income (Auten, Gee and Turner, 2013). This large cohort drives the strong correlation of 0.87 between the share of peak-income-aged adults (age 48 to 57) and the top one percent share of pre-tax income (online appendix Figure B20). Thus, for various reasons, the beneficiaries of economic growth cannot be inferred by comparing cross sections.

B. *Comparison with PSZ Estimates*

This section discusses the similarities and differences between the methodologies in our paper and those in the original PSZ paper. It is important to note that our pre-tax income analysis closely follows the NIPA definition of national income while PSZ uses a modified measure that includes Social Security benefits and subtracts the associated payroll taxes. This section compares our results through 2014, the last year reported in the original PSZ series. Our results are compared with the updated PSZ estimates through 2019 in Figure 6.[28]

Many of our adjustments have similar effects to those in PSZ. Our income groups based on all individuals and ranking by size-adjusted income and PSZ income groups based on the number of adults reduce top income shares by similar amounts. We both remove filers younger than 20 years old (PSZ only since 1979), most of whom are dependent filers. There is little uncertainty about the distribution of some amounts because they are reported on tax returns (income taxes, and Social Security benefits and tax-exempt interest in recent decades) or calculated from reported values (payroll taxes, and imputed rent and property taxes in recent decades).[29] Other allocations have similar effects on top shares because the top of the distribution receives only a small amount (transfers) or because the different data sources used suggest similar distributions (employer-sponsored insurance).

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[28] While this section compares our analysis to PSZ (2018) as published, Saez and Zucman (2020) presented revised estimates that partially addressed a problem we discuss below regarding retirement income. Revised PSZ estimates as of October 2021 reduced their top one percent income shares by about one percentage point in recent years. Figure 6 shows that revised PSZ national income top one percent shares remained at similar levels as PS fiscal income since 1988, despite many differences that imply lower national income top shares.

[29] Social Security benefits, however, are often unreported for lower-income returns. Unlike PSZ, our analysis uses information return data from the Social Security Administration to ensure the full correct amount is included.

While PSZ top one percent shares are consistently more than one percentage point higher in earlier decades, our estimated changes in top one percent income shares are similar. As shown in Table 3, from 1962 to 1979, the original PSZ pre-tax share decreases 1.4 pp and ours decreases by 1.7 pp. This similarity is because during these decades most of the income excluded from tax returns was from retained earnings and our allocation approaches have similar distributional effects.
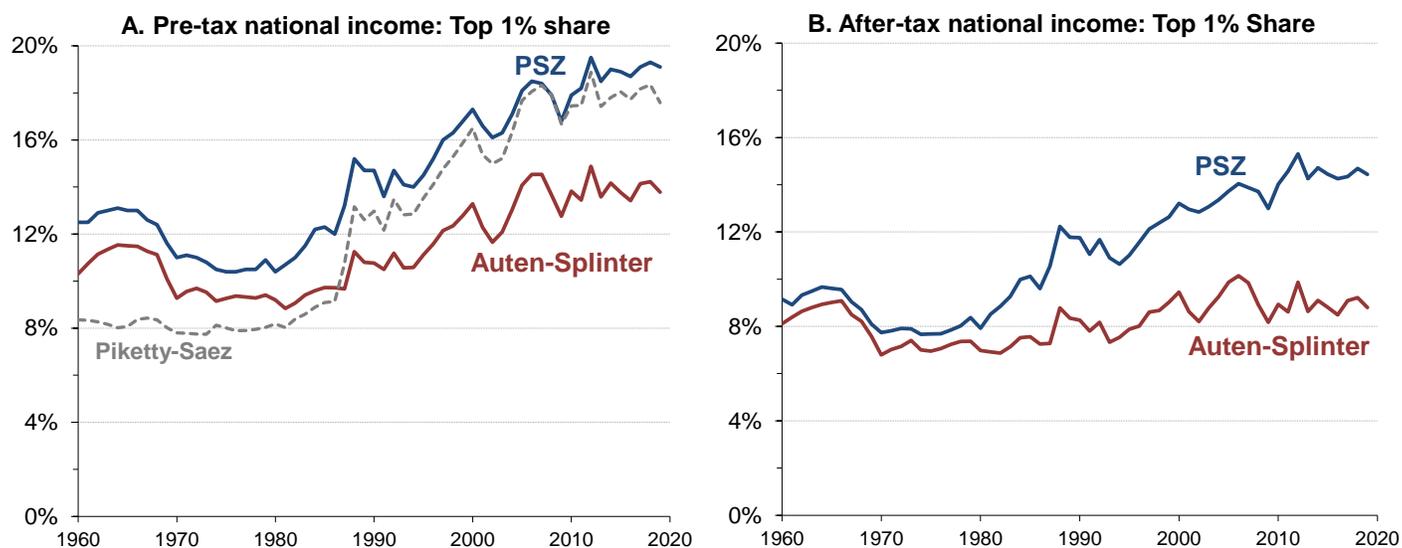
Figure 6: Top 1% shares of national income: Comparison with PSZ

*Note*s: Adjustments used to estimate Auten-Splinter pre-tax and after-tax income are listed in Tables 1 and 2 and described in detail in the online appendix. Piketty-Saez series excludes capital gains to make more comparable to national income. *Sources:* Authors' calculations, Piketty and Saez (2003 with updates), and Piketty, Saez, and Zucman (2018, updated series as of Oct. 2021, PSZ in figure)

Table 3: Comparison of top 1% income shares and changes

	1962	1979	2014	1962–1979 Change	1979–2014 Change	1962–2014 Change
Piketty-Saez-Zucman						
Pre-tax	12.6	11.2	20.2	−1.4	9.0	7.6
After-tax	10.1	9.1	15.7	−0.9	6.5	5.6
Auten-Splinter						
Pre-tax	11.1	9.4	14.2	−1.7	4.8	3.0
Pre-tax plus transfers	10.6	8.7	12.4	−2.0	3.7	1.8
After-tax	8.6	7.4	9.1	−1.3	1.7	0.5

Notes: Adjustments used to estimate various definitions of income are shown in Tables 1 and 2 and described in detail in the online appendix. *Sources:* Authors' calculations and Piketty, Saez, and Zucman (2018).

Since 1979, however, our conclusions about the levels and trends in top income shares are quite different, primarily due to differences in how to allocate national income components not on tax returns. PSZ estimated the top one percent share of pre-tax income increased by 9.0 pp (11.2 to 20.2 percent) from 1979 to 2014, while our analysis shows 4.8 pp (9.4 to 14.2 percent). Part of this difference is due to our adjustments for TRA86.[30] For after-tax income, the PSZ share increased 6.5 pp compared to our estimate of only 1.7 pp (7.4 to 9.1 percent). Over the full period from 1962 to 2014, the PSZ pre-tax top one percent share increases by 7.6 pp, while our estimate is a 3.0 pp increase. For after-tax income, the PSZ share increases 5.6 pp, while our share increases only 0.5 pp.

To understand the effects of specific methodological differences, Table 4 shows the change in the top one percent share for each difference independently so that the results are not affected by the order of changes. In 2014, our top one percent pre-tax income share is 14.2 percent, 6.0 pp lower than the PSZ estimate. The largest differences are from our approaches in allocating underreported income (2.0 pp) and retirement income (1.0 pp). Other differences include our allocations of corporate income taxes (0.7 pp), other taxes (0.7 pp), and our corrections described in section III.A.4 for how income is reported on tax returns (0.4 pp).

One-third of the difference in 2014 is due to PSZ attributing much more underreported income to those with the highest reported incomes than found by the detailed IRS audits. This is primarily due to PSZ allocating underreported business income in proportion only to positive reported business income. The PSZ approach ignores the significant share of underreported business income found on tax returns with reported business losses, thereby overstating amounts on returns that do report large profits. It also ignores evidence that average underreporting rates tend to decline at higher levels of reported income (Johnston, 2008; Auten and Langetieg, 2020). In 2014, the PSZ approach implies distributing about 50 percent of underreported business income to the top one percent. However, audit data suggest that only about 15 percent should go to the final top one percent after re-ranking. The PSZ approach effectively removes underreported income found lower in the distribution and allocates it to the top.[31]

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[30] While reduced in magnitude, readers will notice there is still a jump our top one percent share between 1986 and 1988. This remaining jump is partly due to shifting of ordinary income from 1986 to 1987 and larger amounts from 1987 to 1988 when taxpayers had a full year to plan how to take advantage of the decrease in the top individual tax rate from 50 percent to 38.5 percent and then 28 percent. In addition, there was a dramatic increase in newly electing S corporations with income reported on individual tax returns and as discussed above, other base broadening was targeted at high-income taxpayers (see the on-line appendix and Auten, Splinter, and Nelson, 2016).

[31] A simplified computation explains the two percentage point gap in top one percent shares from differences in underreported income: 2% = [(50% – 15%) • $0.8 trillion in business income reporting gaps] / $15.2 trillion national income.

Table 4: Decomposition of differences in estimated top one percent income shares

Auten-Splinter approach	PSZ approach	Percentage point level difference			Percentage point difference in changes	
		1962	1979	2014	1979–2014	1962–2014
Pre-tax income						
Underreported income by IRS audit data	Underreporting by positive reported income	0.4	1.3	2.0	0.7	1.6
Include distributed & other retirement income	Retirement alloc. includes some rollovers	–0.2	–0.2	1.0	1.2	1.2
Other taxes by disposable income less savings	Other taxes by factor income less savings	0.2	0.2	0.7	0.5	0.4
Non-retirement pre-tax corporate income	PSZ non-retirement pre-tax corp. income	0.5	0.3	0.7	0.4	0.1
Various corrections to tax income definition	Use unimproved tax return market income	*	–0.1	0.4	0.5	0.4
Imputed rent by property tax deductions	Imputed rent by housing wealth estimates	0.3	0.2	0.3	*	–0.1
Limit returns to non-dependent U.S. residents	No adjustment	–0.3	–0.3	*	0.4	0.4
Groups by individuals/size-adjusted incomes	Groups by adults/equal-split married inc.	*	0.1	0.1	*	0.1
Non-profits/govt. income half per capita	Non-profits/govt. income all by income	*	*	0.1	*	*
Inflation correction	No correction	–0.1	–0.5	–0.1	0.4	*
Social insurance benefits/deficit excluded	Social insur. ben. incl., taxes deducted	*	*	–0.2	–0.1	–0.2
Subtotal: Pre-tax differences (PSZ less AS) & totals		**1.4**	**1.7**	**6.0**	**4.3**	**4.6**
After-tax income						
Govt. consumption allocated half per capita	Govt. consumption alloc. by after-tax inc.	0.8	0.6	1.3	0.7	0.6
Non-SS deficits by federal income taxes	Half by government transfers, half taxes	–0.2	*	0.4	0.4	0.6
Estate tax by prior decade decedent income	Estate tax by wealth distribution	–0.3	–0.2	*	0.2	0.3
Government transfers as described in text	PSZ distribution of government transfers	*	*	–0.1	–0.1	–0.1
Corporate taxes by wages/corp. ownership	Corporate taxes by capital ownership	–0.2	–0.2	–0.2	*	–0.1
Other taxes by disposable inc. less savings	Other taxes by factor income less savings	*	*	–0.3	–0.3	–0.3
Subtotal: After-tax differences (PSZ less AS) & totals		*	*	**0.5**	**0.5**	**0.5**
Total after-tax differences (PSZ less AS)		**1.4**	**1.7**	**6.6**	**4.8**	**5.1**

Notes: Auten-Splinter approach is described in text and in detail in the online appendix. Percentage point differences are from changing each assumption independently (as opposed to stacking changes) and therefore may not sum to the PSZ less AS difference. Results shown are the average changes in top one percent income shares of going from AS to PSZ and PSZ to AS assumptions (see online data for details). Note also that the total after-tax difference is after netting out the pre-tax differences. * denotes changes between –0.05 and 0.05.
Sources: Authors' calculations and Piketty, Saez, and Zucman (2018).

Differences in allocating private retirement income explain about one percentage point of the difference in pre-tax top one percent shares. Our 2014 retirement income is about half from taxable distributions (of which the top one percent receives about 2 percent) and half from inside buildup, which we allocate by retirement account assets (the top one percent receives about 7 percent). Overall, the top one percent receives about 6 percent of total retirement income. This is similar to the Federal Reserve's Distributional Financial Accounts estimate of the top one percent having about 6 to 7 percent of pension entitlements since 2008.[32] In comparison, PSZ online data indicate they allocated more than twice this share to the top one percent. The high PSZ share is largely due to their use of non-taxable as well as taxable IRA distributions and pension income reported on tax returns to allocate "investment income payable to pension funds"—i.e., inside buildup. While some pension and IRA distributions can be non-taxable, almost all of the largest non-taxable amounts on tax returns reflect rollovers (transfers of assets from one account to another).[33] Since these rollover amounts are asset values rather than income, they should not be mixed with income flows to allocate retirement income. Because the largest rollovers are concentrated among high-income individuals, the PSZ assumption significantly overstates top income shares. In recent updates, PSZ have partially addressed this issue but still assume too much (10 percent) of non-taxable amounts are income (see the online appendix for additional discussion).

The PSZ estimate of the top one percent share of after-tax income is much higher than ours (15.7 percent vs. 9.1 percent) in 2014, but most of this difference is explained by pre-tax differences. After accounting for pre-tax differences, the remaining net difference is only 0.5 percentage points. This small net difference is the result of several offsetting factors. The PSZ top one percent share is 1.3 percentage points higher due to allocating all government consumption by after-tax income, thereby ignoring the redistributive and public goods aspects of government consumption captured by our half per capita allocation. Another 0.4 percentage point is due to the PSZ allocation of government deficits half by transfer payments. Our allocation of deficits by current taxes is more consistent with the historical evidence than the PSZ assumption that current transfers would be significantly reduced.[34] These two effects, which raise PSZ top shares estimates, are largely offset by differences in distributing the burden of corporate and other taxes.

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[32] These estimates are based on the Survey of Consumer Finances, which is better suited to estimating pension wealth than annual distributions reported on tax returns. Estimates accessed Oct. 28, 2021, from www.federalreserve.gov/releases/z1/dataviz/dfa/distribute/chart

[33] In addition, when traditional IRAs are converted to Roth IRAs, previous non-deductible contributions to IRAs are treated as basis and thus reported as non-taxable amounts on Form 1040. Pensions can also be rolled over into other pension plans or retirement accounts. Some rollovers from one pension plan or retirement account to another are quite large, with the largest reflecting pension rollovers by executives. In 2014, for example, 79 percent of pension distributions reported by taxpayers with adjusted gross income of $1 million or more were tax-exempt. See the online appendix for more details.

[34] Ferriere and Navarro (2020) explain that historical government spending shocks were financed with higher tax progressivity; and Auten and Splinter (2020, p. 135) note that "federal surpluses have been followed by tax cuts (e.g., 1964 and 2001) and large federal deficits have preceded tax increases (e.g., 1982, 1984, and 1991)." In contrast, the PSZ approach implies that deficits result in cuts to Social Security benefits, Medicare and Medicaid, and refundable tax credits, which is inconsistent with historical experience.

The Congressional Budget Office (CBO, 2022) also produces widely cited estimates of top income shares using tax data. While our estimates are similar in 1979, CBO's top one percent before-tax income share was about 2 percentage points higher than ours in 2019. Most of the difference is from CBO ignoring retirement account ownership when allocating corporate taxes and CBO excluding the institutionalized population, imputed rents on owner-occupied housing, and the employee portion of employer-sponsored insurance (Auten and Splinter, 2019). Larger differences in some years are due to CBO's use of realized capital gains rather than retained earnings.[35] Both CBO's and our estimates suggest that including transfers and deducting taxes reduces top one percent shares by about 3 percentage points in recent years.

D. *Effects of Taxes and Transfers on Distribution Measures*

The top statutory federal individual income tax rate has fallen dramatically from 91 to 37 percent between 1960 and 2019. But top tax rates provide only a limited picture of the true tax burden of the top one percent. In the 1960s, only a tiny fraction of taxpayers actually paid the top tax rates (fewer than five hundred tax returns in 1962), in part due to tax avoidance behavior. TRA86 was designed to be distributionally neutral when it lowered the top tax rate to 28 percent but taxed capital gains at ordinary rates and closed many high-income tax shelters. Legislation in 1991 and 1993 increased progressivity by raising top income tax rates and adding base-broadening provisions targeted at high-income taxpayers (Auten, Splinter, and Nelson, 2016). Meanwhile, the bottom 90 percent has benefitted from lower tax rates and new or increased tax credits.

Figure 7 shows how total tax burdens by income class have changed over time. The upper panel apportions individuals evenly over the income distribution, highlighting the sharp increase in average tax rates for the top one percent, and the lower panel stretches out the top income groups. These average effective tax rates include federal, state, and local taxes (including payroll taxes for social insurance programs) and are as a percent of the pre-tax income plus transfers measure.[36] The progressive pattern in Figure 7 resembles that for federal income taxes burden estimates by the Congressional Budget Office, the Joint Committee on Taxation, Treasury's Office of Tax Analysis,

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[35] Typical holding periods for long-term gains are 5 to 8 years. Realization of gains accrued over many years can move these taxpayers into top income groups for that year thereby increasing top income shares. Total realizations also fluctuate across years due to changing capital gains tax rates and business cycle effects on realizations.

[36] This is a standard definition used by the Joint Committee on Taxation and Treasury's Office of Tax Analysis. While payroll taxes may appear regressive relative to annual income, the benefit side of Social Security, Medicare, and unemployment insurance programs are progressive (see online appendix Figure B16). Auerbach, Kotlikoff, and Koehler (forthcoming) addressed this limitation by moving from current-year to lifetime net tax estimates.

Piketty and Saez (2007), and the Tax Policy Center (Splinter, 2020a). Average tax rates of the top half of one percent and the top 0.01 percent were higher in 2000 and 2019 than in 1962 and 1979. Average tax rates for the bottom three quintiles were relatively constant between 1962 and 2000, but have decreased dramatically over the last two decades (especially for the bottom quintile), resulting in increased overall tax progressivity.[37] Congressional Budget Office and income tax data indicate that this was primarily due to the growth in low-income tax credits (Splinter, 2019). Thus, the increase in overall tax progressivity was driven primarily by individual income tax reductions for lower and middle-income taxpayers.[38]

Total tax burdens of the top one percent ranged from 32 to 46 percent between 1960 and 2019, averaging 38 percent with little trend (see online appendix Figure B14). Recently, top tax burdens were modestly higher: in 2019: 42 percent in 2019 compared to 38 percent in 1960. While the higher tax burden with falling statutory tax rates may seem surprising, it is consistent with earlier analyses of tax burdens in the 1960s.[39] Despite the persistence of the overall tax burden for the top one percent, the type of taxes paid has changed substantially. In 1960, about one-third of their taxes were from federal individual income taxes, one-third from corporate income taxes, and one-third from state and local taxes. In 2019, nearly two-thirds were from federal individual income taxes. This change in revenue sources reflects the shift in business organization from C corporations to pass-through businesses with income reported on individual tax returns. While property taxes decreased as a percent of income, state and local income taxes increased substantially for the top one percent.

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[37] The Kakwani index of tax progressivity summarizes average tax rates over the entire income distribution. While , changing little between 1962 and 1985, this index increased dramatically from 0.07 to 0.29 between 1985 and 2019 (see online appendix Figure B18).

[38] These results also highlight that the U.S. tax system is more progressive than in European countries, which rely more on regressive value-added and payroll taxes. As a result, while top one percent shares of pre-tax income are higher in the U.S. than in Europe, shares of after-tax income are both estimated to be 9 percent in 2017 (based on our U.S. estimates and European estimates from Blanchet, Chancel, and Gethin (2022)).

[39] For the top one percent in 1966, Okner (1975) estimated that total federal, state, and local taxes ranged from 32 to 39 percent of his measure of adjusted family income using a broad range of incidence assumptions. Our estimate of 35 percent for 1966 falls in the middle of this range. The situation of high statutory but low effective tax rates in the 1960s has been described as "dipping deeply into great incomes with a sieve," a phrase originally used by Simons (1938, pp. 218–219) for similar policies in the 1930s.
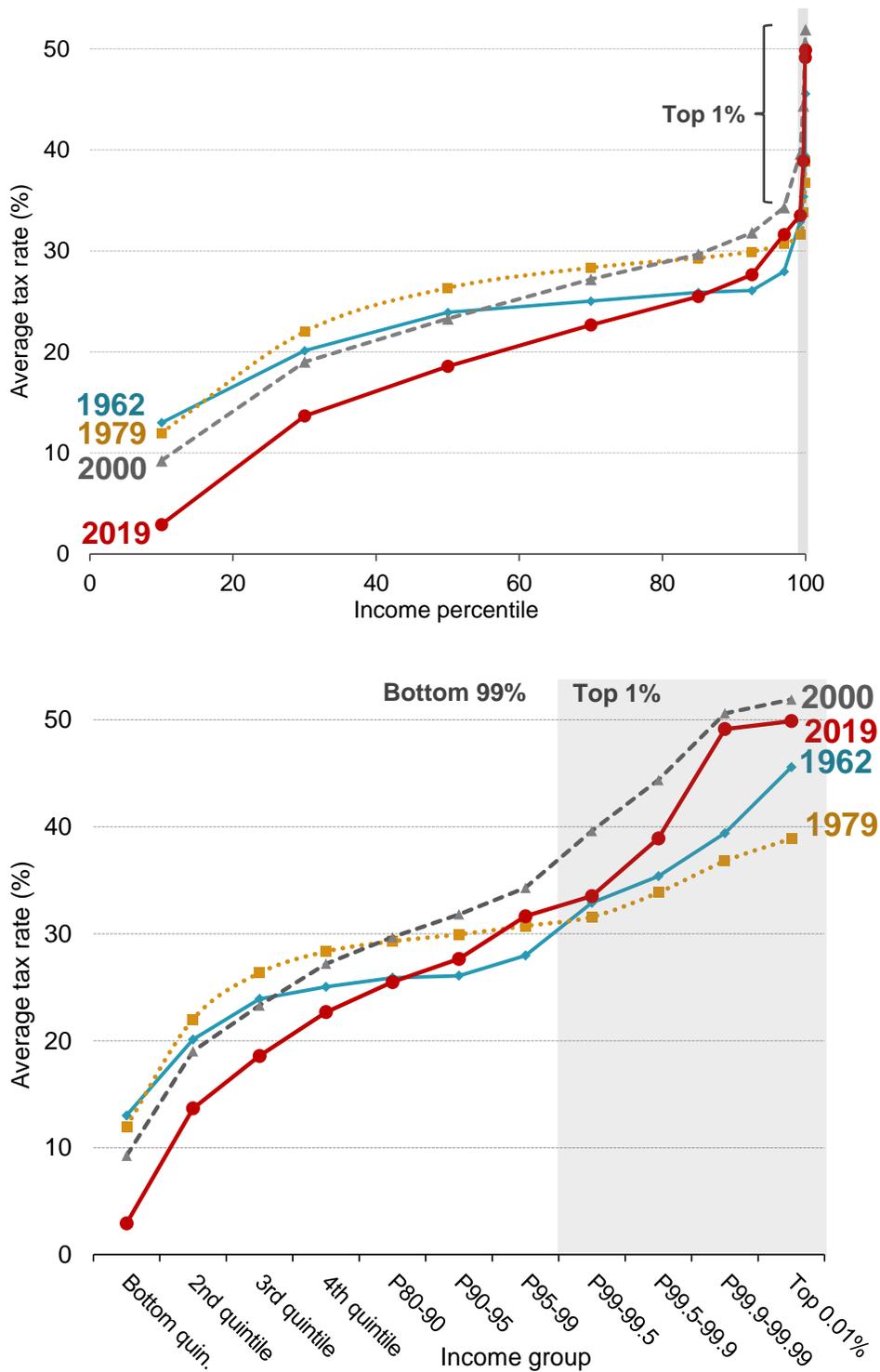
Figure 7: Tax progressivity increased over time

Notes: Average tax rates are taxes (federal, state, and local taxes, including payroll taxes) divided by the pre-tax income plus transfers measure. The upper panel shows income groups proportionally along the x-axis, with the top quintile split into four groups: P80–90, P90–95, P95–99, and the top 1%. The top 1% is shown in the narrow (proportional) range in gray. The lower panel disaggregates the top quintile such that it is not proportional along the x-axis. The top 1% is shown in the wide (non-proportional) range in gray. 1962 is the first non-recession year available and other years are business cycle peaks. *Sources:* Authors' calculations.

The net effect of changes in taxes and transfers since the 1960s was to increase redistribution toward low- and middle-income individuals. The combined effects of taxes and transfers on the income distribution are illustrated in Figure 8, which shows average net redistribution rates by income group for selected years. Net redistribution rates are transfers less taxes as a percent of pre-tax income. The negative net redistribution rates of high-income groups result from progressive taxes, as transfers to this group are small relative to income. The bottom quintile, however, receives substantial transfers and their redistribution rate increased from 47 to 104 percent between 1962 and 1979. Redistribution for the bottom quintile persisted at this higher level until the Great Recession, when it increased again before settling at 142 percent in the following economic expansion.[40] While only the bottom quintile received net transfers in all years, the second quintile received net transfers only since the 1980 recession. Similarly, the middle quintile has gone from being a net taxpayer to roughly breaking even since the Great Recession. These changes resulted from the decreasing share of the population paying income taxes as well as increasing amounts of transfers. Thus, increasing tax progressivity and transfers both contributed to increasing redistribution.[41]
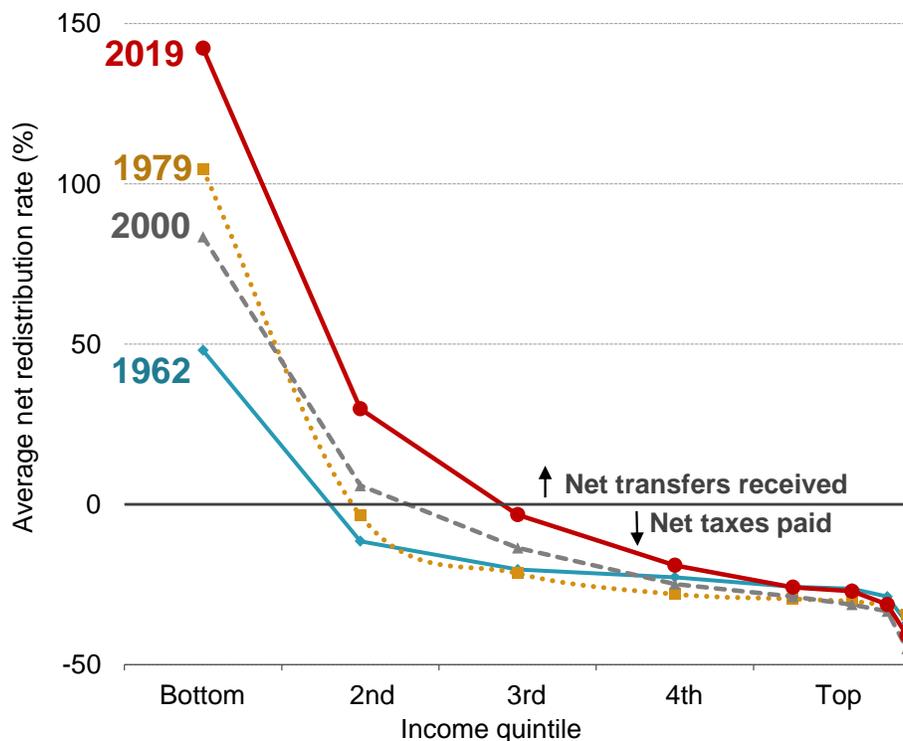
Figure 8: Redistribution increased over time

*Note*s: Average net redistribution rates are cash and non-cash transfers (excluding government consumption) less all taxes (federal, state, and local taxes, including payroll taxes) divided by pre-tax income of each income group. The top quintile is divided into four groups: P80–90, P90–95, P95–99, and the top 1%. *Sources:* Authors' calculations.

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[40] Congressional Budget Office data would imply a much larger bottom-quintile redistribution rate. This is due to our broader pre-tax income definition (Splinter, 2020a).

[41] Redistribution can also be measured by the Reynolds–Smolensky index, which captures the difference between the Gini coefficient before and after taxes and transfers. Before 1985, this index was countercyclical but relatively stable. Between 1985 and 2019, the Reynolds-Smolensky redistribution index increased by about half, from 0.09 to 0.13, indicating greater redistribution (see online appendix Figure B19).

V. Sensitivity Analysis

This section presents sensitivity tests of alternative assumptions and a discussion of offshore wealth. These sensitivity tests, shown in Table 5, suggest that while alternative assumptions can result in modestly higher or lower top income shares, they are generally within about a percentage point of our main results. As discussed in the online appendix, our tax-based analysis likely underestimates some economic resources of low-income households and there are additional uncertainties beyond those examined here.

The incidence of the corporate income tax has long been controversial, and researchers have drawn different conclusions. As discussed earlier, our analysis distributes 25 percent of the corporate tax burden by wages and 75 percent by corporate capital and interest-bearing assets. Using this approach, the top one percent shares of pre-tax income increased by 2.6 percentage points (11.1 to 13.8 percent) between 1962 and 2019. Distributing half of the corporate tax by wages (as suggested by some recent studies) and half by corporate capital and interest-bearing assets results in a larger increase of 2.9 percentage points (10.8 to 13.7). Distributing only by corporate capital and interest-bearing assets results in a higher top one percent pre-tax income share in 1962 and a smaller increase of 2.3 percentage points (11.5 to 13.8).[42]

Corporate retained earnings can also be allocated in different ways. Rather than distributing the portion not in retirement accounts 75 percent by dividends and 25 percent by capital gains, distributing 50 percent by dividends and 50 percent by capital gains slightly decreases top one percent after-tax income shares. Allocating only by dividends increases the top share by about two-tenths of a percentage point.

To account for economies of scale in tax units, our baseline estimates rank tax units by size-adjusted income. Note that this is only for ranking purposes as each unit retains its full income. Our size-adjustment uses the standard square-root equivalence elasticity of 0.5, which implies partial economies of scale. The assumption of no economies of scale (elasticity of 1) implied by the PSZ equal-split approach, increases top one percent income shares by 0.5 and 0.1 percentage point in 1962 and 2019 relative to our baseline estimates. Assuming full economies of scale (elasticity of 0) for ranking would reduce top one percent shares by 1.2 and 0.9 percentage points in these years. Our baseline estimates are thus between these two extreme assumptions.

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[42] Distributing the corporate tax to all non-housing capital, including non-C corporation capital, implies an infinite elasticity of substitution between different forms of business organization or a long-run equilibrium. While there was some immediate switching from existing C corporations to S corporation status following TRA86, most of the shift into the passthrough form occurred gradually from most new businesses forming as S corporations or partnerships. See the online appendix and Auten, Splinter, and Nelson (2016).

Table 5: Sensitivity analysis, changes in top 1% income shares

Alternative Allocation Assumptions	1962	1979	2019	1979–2019 Change	1962–2019 Change
Corporate tax burden alternatives (pre-tax income)					
25% wages/75% corporate capital (baseline)	11.1	9.4	13.8	4.4	2.6
50% wages/50% corporate capital	10.8	9.3	13.7	4.5	2.9
0% wages/100% corporate capital	11.5	9.5	13.8	4.3	2.3
Corporate retained earnings (after-tax income)					
individuals: 75% dividends/25% capital gains (baseline)	8.6	7.4	8.8	1.4	0.2
individuals: 50% dividends/50% capital gains	8.6	7.3	8.7	1.4	0.1
individuals: 100% dividends/0% capital gains	8.9	7.6	9.0	1.4	0.1
Economies of scale for ranking (after-tax income)					
Partial: square-root, equivalence elast=0.5 (baseline)	8.6	7.4	8.8	1.4	0.2
No economies of scale: equivalence elast=1	9.1	7.7	8.9	1.2	–0.2
Full economies of scale: equivalence elast=0	7.4	6.5	7.9	1.4	0.5
Costs of earning income (after-tax income)					
Employee/investment expenses, no adjustment (baseline)	8.6	7.4	8.8	1.4	0.2
Deduct employee/investment expenses	8.5	7.3	8.8	1.5	0.2
Multiple Changes (after-tax income)					
Changes increasing 2019 top share	8.7	7.5	9.3	1.8	0.6
Baseline	8.6	7.4	8.8	1.4	0.2
Changes decreasing 2019 top share	7.8	6.6	7.5	0.9	–0.3

*Note*s: Baseline assumptions are described in text and in detail in the online appendix. Assumptions for sensitivity analysis are described in the text. *Sources:* Authors' calculations.

Wage and investment income as reported on individual tax returns generally reflects *gross* income rather than *net* income. Distributional analysis of national income would better measure economic income if the expenses of earning income were netted against income. Accounting for about $100 billion employee business expenses is important for some middle-income occupations, especially truck driving and construction. In contrast, investment interest expenses of about $30 billion are concentrated at the top. Accounting for both would have little impact on top one percent shares in 2019 but would increase the bottom half share of the distribution by 0.1 percentage point in earlier years.

A more robust sensitivity test is to combine several allocations that increase (or decrease) top income shares. Changes to our approach that would *increase* 2019 after-tax top shares are including no government deficits/surplus and allocating non-retirement retained earnings by 100 percent dividends and 0 percent capital gains. Changes that would *decrease* 2019 after-tax top shares are size adjusting income for ranking using households rather than tax units (see Auten and

Splinter, 2019), allocating non-retirement retained earnings by 50 percent dividends and 50 percent capital gains, and allocating government consumption 75 percent per capita and 25 percent by income. Using these two sets of assumptions, the 2019 top one percent after-tax share ranges between 7.5 and 9.3 percent, more than one percentage point below and half a percentage point above our main estimate of 8.8 percent.[43]

Tax compliance changes before 1988, the earliest audit data on which our early underreporting estimates are based, may also affect top income shares. Nearly all states began some income tax withholding in the 1950s or 1960s, along with third-party reporting and intergovernmental agreements for coordinating audits. Troiano (2017) found that these changes caused large increases in reported top income shares. This implies higher pre-1970 high-income underreporting rates than the 1988 audit data. Accounting for half of the Troiano (2017) effect would increase our 1962 top one percent income share by 0.7 percentage points, suggesting a half a percentage point *decrease* for the after-tax share between 1962 and 2019.

How would including unreported income from offshore wealth affect top income shares? Saez and Zucman (2016) argued that unreported offshore wealth would increase top one percent wealth in 2013 by about $1.2 trillion. Assuming a 5-percent return and ownership by the same individuals in the top of the income distribution would increase top one percent pre-tax income shares by only one-third of a percentage point. In addition, reporting of foreign accounts and income to U.S. tax authorities has increased significantly with new information-sharing and enforcement efforts. This has likely resulted in higher reported top income shares in recent years but understated top income shares in earlier years (Auten and Splinter, 2021; Johannesen et al., 2023). It is also important to note that unreported offshore wealth is not a new phenomenon. For example, a 1981 Internal Revenue Service and U.S. Treasury report discussed the growing use of tax havens in the 1970s.[44]

In summary, sensitivity tests suggest that alternative assumptions can result in modestly higher or lower top income shares. Our findings about the levels of inequality and increases in top income shares appear relatively robust to the use of alternative assumptions.

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[43] Adding the extreme assumptions of either no economies of scale or full economies of scale for ranking, the range in top one percent shares is 7.0 to 9.4 percent in 2019. Our main estimate of 8.8 percent is near the high end of this range.

[44] This report estimated about $30 billion of income in tax havens in 1978, about 1.5 percent of national income (Internal Revenue Service and U.S. Treasury Department, 1981, p. 38). A 5-percent rate of return would imply about $1.8 trillion in tax-haven-based offshore wealth (2013 dollars). An even earlier response to offshore assets was the enactment of subpart F rules for controlled foreign corporations in 1962 (Hellerstein, 1963).

VI. Summary and Conclusions

Using administrative tax data in combination with the Survey of Consumer Finances and other data sources, this paper develops new estimates of the distribution of income in the U.S. since the 1960s. Our analysis examines levels and trends in all parts of the distribution in addition to top income shares. Our estimates for pre-tax income, based on distributing total national income, show that the top one percent share declined from 11.1 percent to 9.4 percent from 1962 to 1979 and then increased to 13.8 percent by 2019. Viewed over the full period, the top share increased by only 3 percentage points. While our pre-tax income measure includes labor and investment income, it provides an incomplete picture of economic resources available to individuals. A broader measure that includes Social Security benefits and other transfers lowers top one percent shares and results in a smaller increase. Our estimates for after-tax income indicate that the top one percent share increased only 1.4 percentage points since 1979 and only 0.2 percentage points since 1962. These improved income measures also have implications for lower-income groups. Instead of real per capita incomes of the bottom half of the distribution appearing unchanged since 1979, we find that after taxes and transfers they increased by two-thirds.

Using only market income on tax returns, Piketty and Saez (2003) argued that the top one percent share of income more than doubled since 1962. This analysis, however, did not include transfers and other income sources not reported on individual income tax returns, nor did it account for the effects of major tax reforms and changes in marriage rates. Thus, it gave a distorted view of income inequality levels and trends. Piketty, Saez, and Zucman (2018) reached less extreme conclusions after addressing some of these issues but relied on several problematic allocation assumptions for income not reported on tax returns. Our analysis shows that their conclusions are not robust to use of more data-driven allocations and correcting for changes in how income is reported in tax data.

The large share of income not reported in tax data and the challenges of accounting for major social and economic changes mean that there is considerable uncertainty associated with estimating income distributions over time. Our analysis highlights the importance of attention to details in using tax data, accounting for tax reforms, and including income not reported on tax returns. By emphasizing the sensitivity of top income share estimates to the assumptions used to allocate income not reported on tax returns, our analysis contributes to a better understanding of the evolution of inequality since the 1960s.

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Appendix

Table A1: Top 1% Income Shares, 1960–2019

| Year	Fiscal income	Pre-tax Income	Pre-tax income plus transfers	After-tax Income
1960	9.0	10.3	9.8	8.1
1961	9.2	10.7	10.3	8.4
1962	8.9	11.1	10.6	8.6
1963	8.9	11.4	10.8	8.8
1964	9.1	11.5	11.0	8.9
1965	9.3	11.5	11.0	9.0
1966	9.4	11.5	11.0	9.1
1967	9.8	11.3	10.7	8.5
1968	10.1	11.1	10.6	8.2
1969	9.4	10.1	9.6	7.6
1970	8.4	9.3	8.7	6.8
1971	8.7	9.6	8.9	7.0
1972	8.7	9.7	9.0	7.2
1973	8.3	9.5	8.9	7.4
1974	8.5	9.2	8.5	7.0
1975	8.4	9.3	8.5	6.9
1976	8.3	9.4	8.6	7.1
1977	8.4	9.3	8.6	7.2
1978	8.4	9.3	8.6	7.4
1979	9.0	9.4	8.7	7.4
1980	9.2	9.2	8.4	7.0
1981	8.9	8.8	8.1	6.9
1982	9.8	9.1	8.3	6.9
1983	10.3	9.4	8.6	7.1
1984	10.6	9.6	8.8	7.5
1985	11.1	9.7	8.9	7.6
1986	13.1	9.7	8.8	7.3
1987	11.8	9.7	8.8	7.3
1988	14.7	11.2	10.3	8.8
1989	13.8	10.8	9.9	8.4
1990	13.8	10.8	9.8	8.3
1991	12.7	10.5	9.5	7.8
1992	14.2	11.2	10.0	8.2
1993	13.7	10.6	9.4	7.3
1994	13.6	10.6	9.5	7.5
1995	14.6	11.1	10.0	7.9
1996	15.8	11.6	10.4	8.0
1997	17.0	12.2	11.0	8.6
1998	17.7	12.4	11.2	8.7
1999	18.4	12.8	11.6	9.0
2000	19.3	13.3	12.0	9.4
2001	16.8	12.3	11.1	8.6
2002	15.9	11.7	10.4	8.2
2003	16.4	12.1	10.8	8.8
2004	18.1	13.0	11.7	9.3
2005	20.0	14.1	12.6	9.9
2006	20.9	14.5	13.0	10.1
2007	21.5	14.5	13.0	9.8
2008	19.6	13.7	12.0	8.9
2009	17.5	12.8	11.1	8.2
2010	18.8	13.8	12.0	8.9
2011	18.8	13.4	11.7	8.6
2012	21.2	14.9	13.0	9.9
2013	18.9	13.6	11.9	8.6
2014	19.9	14.2	12.4	9.1
2015	19.8	13.8	12.0	8.8
2016	19.2	13.4	11.7	8.5
2017	20.2	14.1	12.4	9.1
2018	20.5	14.2	12.5	9.2
2019	19.4	13.8	12.0	8.8

*Note*s: Annual values shown in Figure 1. Fiscal income includes capital gains (thresholds set without capital gains).
Sources: Authors' calculations and Piketty and Saez (2003 and updates).
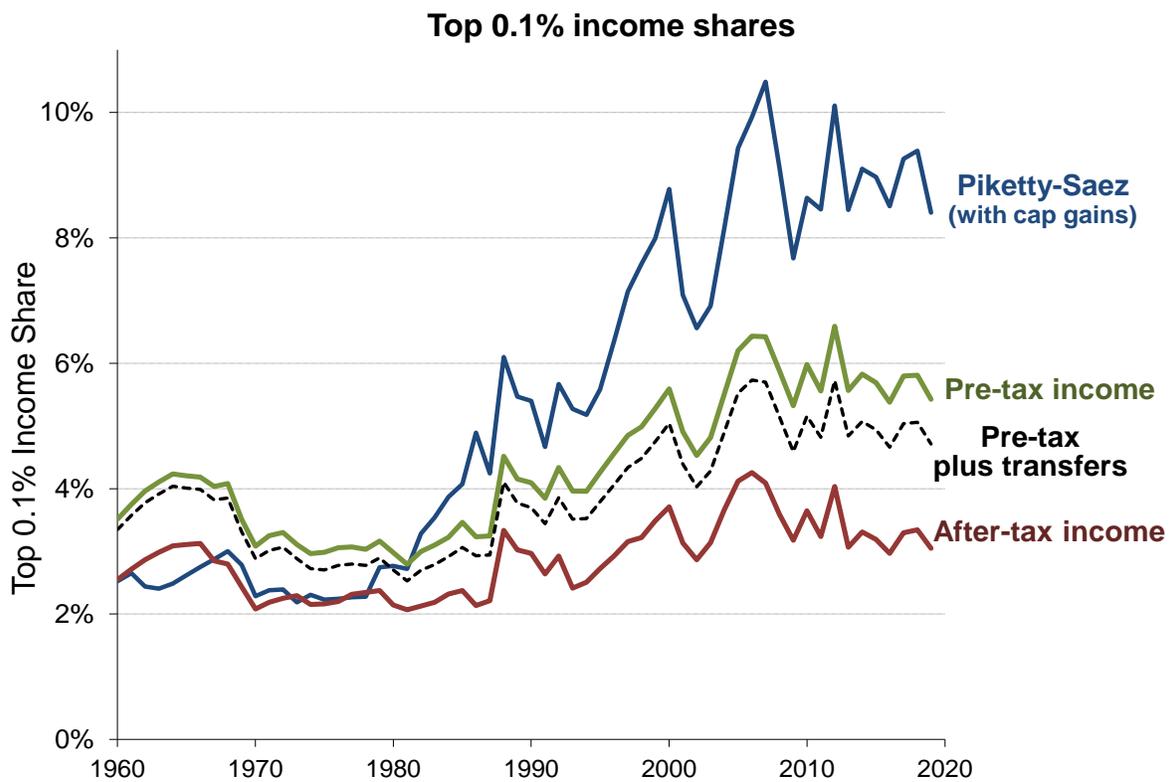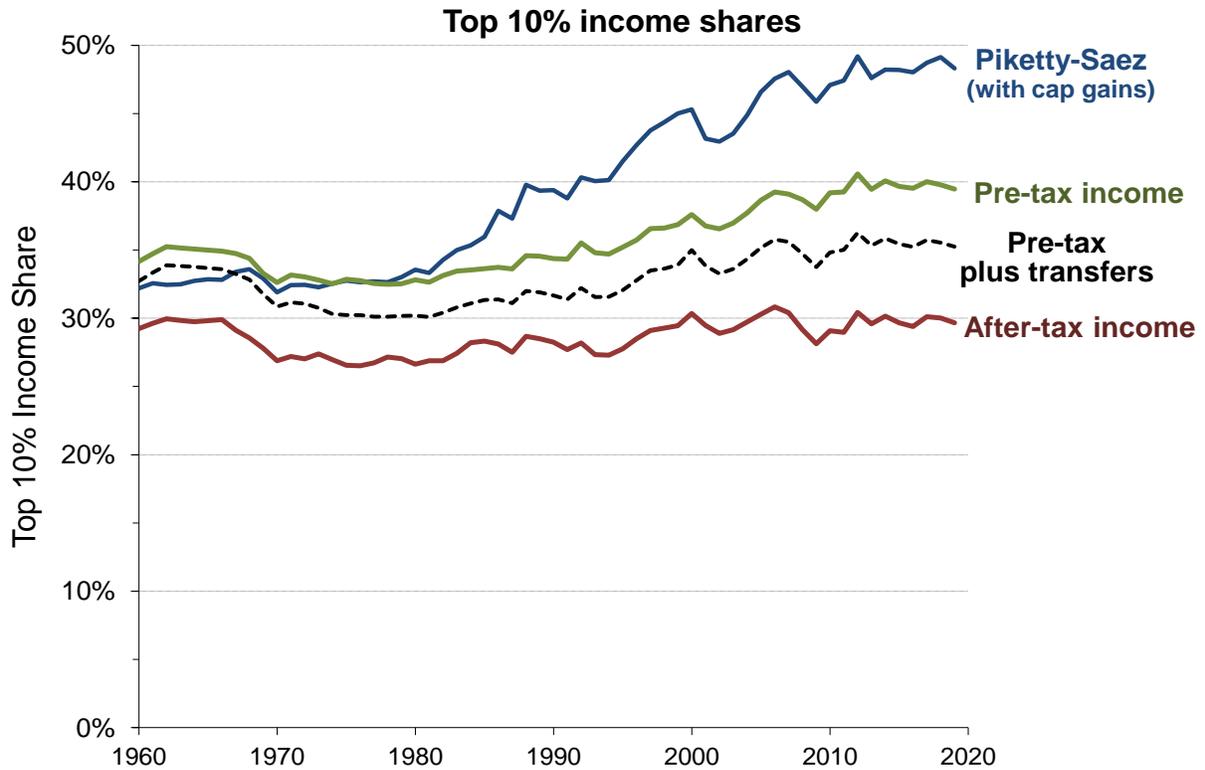
Figure A1: Top income shares: Top 10% (upper panel) and top 0.1% (lower panel)
Notes: Piketty and Saez series includes capital gains (thresholds set without capital gains).
Sources: Authors' calculations and Piketty and Saez (2003 and updates).
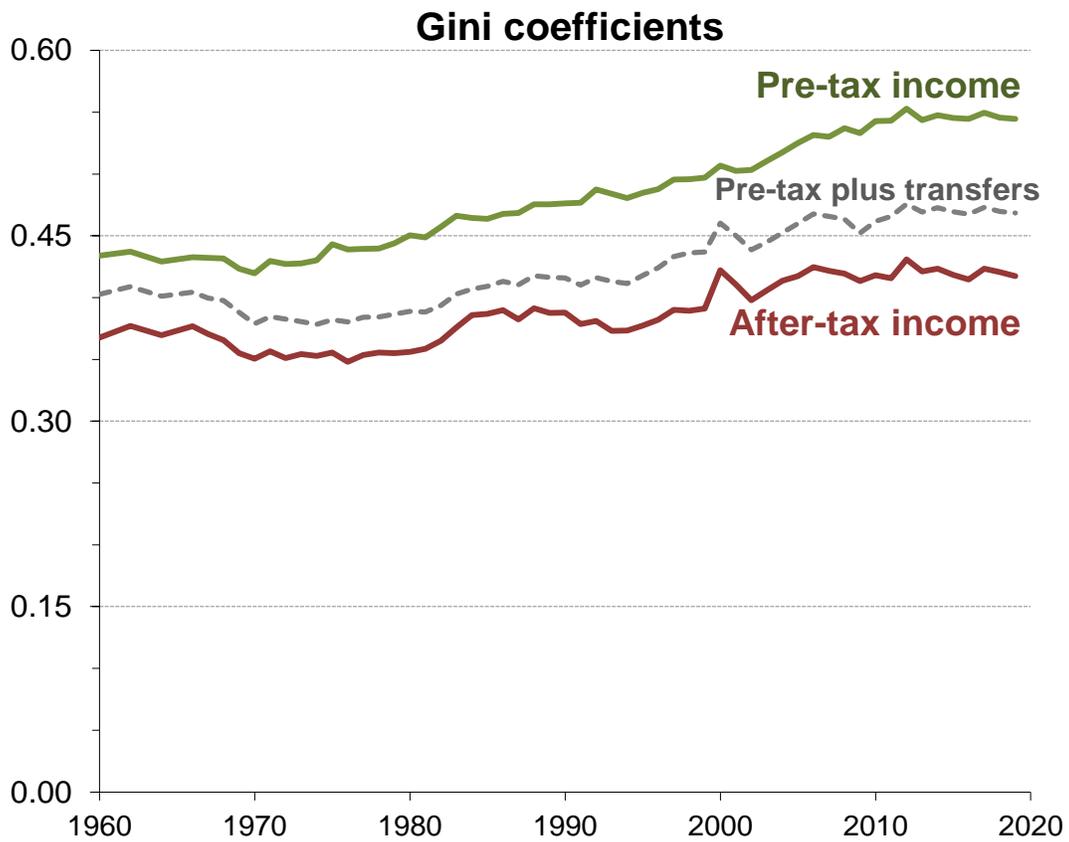
Figure A2: Gini coefficients

*Note*s: Adjustments used to estimate pre-tax, pre-tax plus transfers, and after-tax (after taxes and transfers) income are listed in Tables 1 and 2. Bottom quintile excludes negative incomes.
Sources: Authors' calculations.