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

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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 pretax 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 aftertax top income shares.

The idea that US 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

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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 (DB) to defined contribution (DC) plans. Periods of high inflation have distorted the measurement of income, and business cycles have had differential effects on income groups.

Compared with 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 nontaxable 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% 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.

Social Science Association. This research was conducted while Auten was an employee at the US Department of the Treasury. The findings, interpretations, and conclusions expressed in this paper are entirely those of the author and do not necessarily reflect the views or official positions of the US Department of the Treasury. Any taxpayer data used in this research were kept in a secured data repository, and all results have been reviewed to ensure that no confidential information is disclosed. For Splinter, this paper embodies work undertaken for the staff of the Joint Committee on Taxation, but as members of both parties and both houses of Congress comprise the Joint Committee on Taxation, this work should not be construed to represent the position of any member of the committee. The appendixes, all data series, and code used to produce these series are available at http://www.davidsplinter.com. This paper was edited by Greg Kaplan.

[1] Tax units include all individuals filing a tax return together or who would file together in the case of nonfilers. 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.

This paper presents new estimates of the levels and trends of US 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 pretax and aftertax 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 pretax 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.

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 on 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 based only on market income reported on individual tax returns, such as PS, implies that the top 1% share of fiscal income more than doubled from 9% to 19% 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

[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–World War II top income shares are overestimated when not correctly accounting for tax policy changes.

the number of high-income tax units in the top 1%. 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 pretax top 1% share of national income increased 4.4 percentage points (pp) between 1979 and 2019, about half the increase in fiscal income (see fig. 1).[3] For aftertax income, which includes transfers, our analysis shows that the top 1% share increased only 1.4 pp. Over the longer period since the early 1960s, our analysis shows that the top 1% pretax share increased 2.6 pp. For aftertax income, our top income shares are about the same as in the early 1960s.

Our results are more optimistic about the bottom half of the distribution. PSZ estimated that average real pretax incomes of the bottom 50% remained virtually unchanged between 1979 and 2019. In contrast, our analysis shows that real pretax incomes increased by more than one-third and real aftertax income increased by two-thirds for the bottom half of the distribution. While the bottom 50% pretax income share decreased by 5.1 pp, aftertax income shares decreased only 3.1 pp over this period. Thus, taxes and transfers offset 40% of the decline in the bottom 50% share of pretax income. These results highlight how lower-income groups benefited 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 1% pretax income share is 6 pp lower than the PSZ estimate for 2014, the last year in their original published paper. The largest differences are from allocating underreported business income (2.0 pp), accrued 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 before TRA86 and adds back net operating loss carryovers from previous years, which are not current-year income. Our approach also accounts for business losses when allocating underreported income because detailed Internal Revenue Service (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

[3] We also find significant increases in pretax income shares for the highest groups between 1979 and 2019: from 3.2% to 5.4% for the top 0.1% and from 1.1% to 2.3% for the top 0.01%. See fig. A1 in the online data (Auten and Splinter 2023).

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

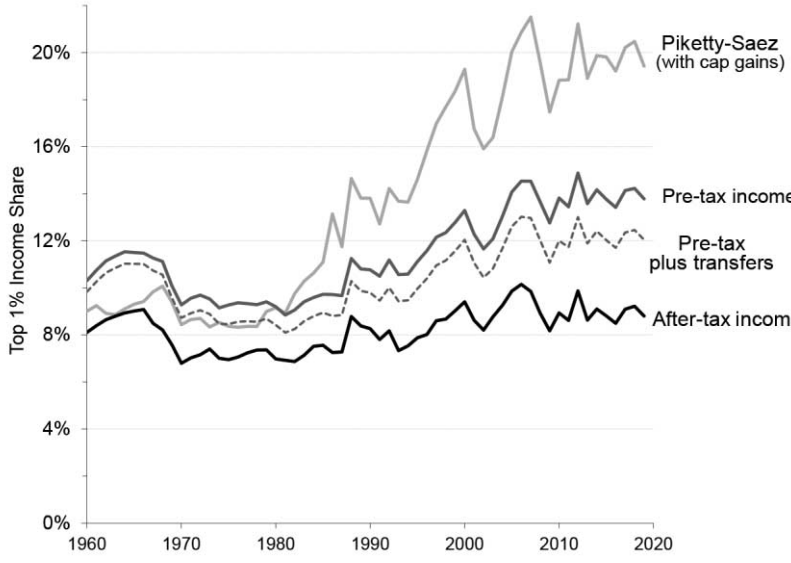

FIG. 1.—Top 1% income shares. Fiscal income includes capital gains with thresholds set without capital gains. Adjustments used to estimate pretax national income, pretax plus transfers income, and aftertax income are listed in tables 1 and 2 and described in detail in the online appendix. Annual values are shown in table A1. Source: authors' calculations and Piketty and Saez (2003 and updates) for fiscal income.

income, thereby overstating top income shares. Our retirement income allocation methodologies also produce quite different results. This is largely because PSZ treated nontaxable 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 results 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 nonresident 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 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

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

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 US 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 1% share of personal income in 2012 of 13%, identical to our estimate for pretax plus transfers income. Using Survey of Consumer Finances (SCF) data, Bricker et al. (2016b) found that the top 1% share increased 3 pp between 1988 and 2012, compared with our estimated increase of 4 pp. Using tax return and census data, the CBO (2022) estimated that the top 1% share of before-tax income increased from 9% to 16% between 1979 and 2019, compared with our pretax income share increase from 9% to 14% over this period. Using internal census data to overcome top-coding issues, Burkhauser, Larrimore, and Simon (2012) estimated that the top 1% pretax income share increased only 4 pp from 10% to 14% between 1967 and 2006, similar to our estimates of an increase from 11% to 15% over this period.

Our paper makes several important contributions to the US 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 previous 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 previous studies based on survey or earnings data that 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 CBO 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.

[6] In 2019, census total money income is about 64% of national income (when cash transfers are added) due to missing income sources and underreporting. SCF before-tax family income is about 70%. 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 previous estimates using administrative data. See the online data (Auten and Splinter 2023) for incomes by source: wages, dividends, etc.

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: *pretax income* that targets national income, *pretax income plus transfers* that includes government transfers, and *aftertax income* that includes government transfers and deducts federal, state, and local taxes.

Our pretax income measure follows the national income concept and therefore excludes transfer payments.[7] Pretax income plus transfers adds government transfers, which grew substantially from 5% to 16% of national income between 1960 and 2019 (see fig. 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 pretax income plus transfers, aftertax income is estimated by subtracting federal, state, and local taxes and adding government deficits and government consumption to equal national income.

The most significant tax reform in the period studied was TRA86, which lowered the top individual tax rate from 50% to 28% and broadened the tax base so as to be distributionally and revenue neutral. The base broadening was targeted at high-income taxpayers, including repealing the 60% exclusion of long-term capital gains and limiting deductions for losses on passive investments. Before TRA86, the top individual

[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 pretax income 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 aftertax 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, the Treasury's Office of Tax Analysis includes both cash and near-cash transfers (including Medicaid). The Joint Committee on Taxation and CBO include social insurance benefits but not means-tested transfers, which are not reported in tax data.

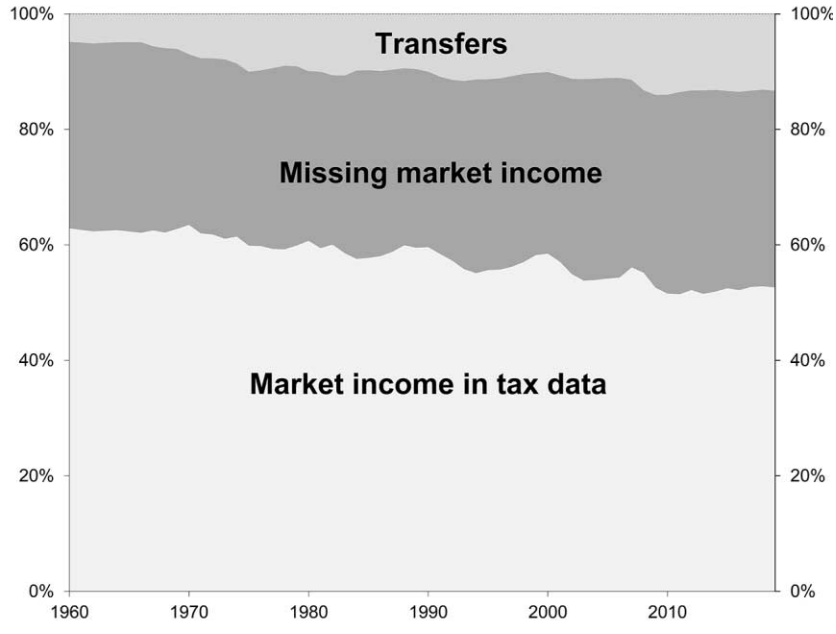

FIG. 2.—Income sources as a share of national income plus transfers. Specific adjustments to tax return income are listed in tables 1 and 2. Source: authors' calculations.

tax rate was higher than the top corporate tax rate (50% vs. 46%), 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% before 1964 and then 70% until 1981. TRA86 lowered the top individual tax rate below the top corporate tax rate (28% vs. 34%), creating strong incentives for some corporations to switch from C to S corporations and to start new businesses as pass-through entities (S corporations, partnerships, or sole proprietorships).[9] This resulted in more business income being reported directly on individual tax returns because pass-through 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 pass-through entities by including corporate retained earnings. This leads to important findings for the 1960s and 1970s, when high individual

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

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 2 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 nonresident filers from the sample and increase the number of nonfiling tax units accordingly. Without this correction, nonfiling tax units are undercounted and top income shares are overstated, especially since 1987.

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 1%. Another important social change is the increase in single-parent households. To address both issues, we follow the approach used by the CBO. 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 1%, 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 pretax 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 fig. 2). These excluded sources increased from an average of 34% of national income in the 1960s to 39% since 2000.[11] Because of the declining importance of corporate retained

[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 1% income share in 2011 by about one-third. Alstadsæter et al. (2016) 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 1% income shares were underestimated by about one-third. Atkinson (2007) estimated that during the 1950s and early 1960s, including retained company profits increased UK top 1% income shares (excluding capital gains) by about half.

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

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 1% share of capital income not included in fiscal income decreased from 4% to 2% of national income, due primarily to declining corporate retained earnings.[12] Meanwhile, the bottom 90% share of labor income not included in fiscal income increased from 4% to 12% 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 80,000 and 360,000 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 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 individual income tax samples and Social Security Administration data including dates of birth. For the 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 nonfilers, and excluded combat pay. We also use the SCF and the Census Bureau's March Current Population Survey (CPS) 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 US corporations—that is, unrepatriated foreign earnings.

[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% share of excluded capital income was unchanged at 12%. See fig. B16 (figs. B1–B20 are available in the online appendix).

III. Distributing US 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 nonresidents, estimate nonfiler 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 (sec. III.A). These adjustments result in *improved fiscal income*, a measure of tax-return income that is broader and more consistent over time. *Pretax income* consistent with national income is then obtained by adding income sources not included in tax data (sec. III.B). Government transfers are then added to obtain *pretax plus transfers income*, which is the broadest measure of pretax income and better reflects economic resources of retired taxpayers and others relying on transfers, as well as being preferable for estimating average tax rates (sec. III.C). Finally, the rest of government policy is accounted for by subtracting taxes and adding nontransfer spending and government deficits. This yields *aftertax income* and matches national income totals (sec. 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 1% income shares, are discussed in section IV.B. Differences with CBO 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 nonfiling tax units, fiscal income initially uses the PS assumption that nonfiler income is 20% 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 that our sample is consistent with the US census resident population aged 20 or older. Census data are the basis for the PS estimate of the total number of filing and nonfiling 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 nonfiler tax units. In addition, some filers aged 20 or older 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 more than 5 million additional tax returns, which if not removed would 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 nonresident filers, and 1.9 million married filing separate returns, altogether about 9% of all returns filed.

Nonfiler incomes are based on information returns filed by third parties, such as employers. Information returns have been used to estimate nonfiler 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 nonfiler income heterogeneity, we use information return data for resident individuals not observed on tax returns to estimate income for groups of nonfilers.[14] This approach avoids the common but

[13] Dependent filers aged 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% in 1960 to 40% by 2012 (National Center for Education Statistics 2018). Some elderly parents are also claimed as dependents.

[14] There are 56 nonfiler groups: two marriage, four age, and seven income groups. "Married" nonfiler tax units are created by matching nonfiling males and females living at the same address. Since information returns of nonfilers are available only since 1999, we use

incorrect assumption that all nonfilers have low incomes. Instead, it is consistent with the Treasury Inspector General for Tax Administration (2020) finding that some nonfilers have relatively high incomes.

Correcting the sample and basing nonfiler 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 nonfiler 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% of high-income business losses would have been nondeductible under the new law. The largest effects occur in 1984–86, just before the reform when this adjustment increases top income shares by 0.5 pp.[15]

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 SCF and the 1962 Survey of Financial Characteristics of Consumers. Including tax-exempt interest modestly increases top income shares (0.3 pp) 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

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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 nonfiler 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 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.

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 previous years are removed. State and local income tax refunds in fiscal income are removed because they are an adjustment for excess previous-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 payers 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 CBO (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 with 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]

Marriage rates on tax returns declined from 67% to 37% between 1960 and 2019. However, marriage rates have remained high among the top 1%, decreasing only from 90% to 85%. 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% of the increase in household income Gini coefficients between 1979 and 2007.

[16] Controlling for both the falling marriage rate and the 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% (see table CH-1 at http://www.census.gov/data/tables/time-series/demo/families/children.html).

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 CBO (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 used only 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 1% income shares 1.5 pp in 1960 and 2.9 pp in 2019 (see table 1).[18] Ranking by size-adjusted income moves some tax units with more individuals out of the top 1% and replaces them with more tax units with higher per-person income. This *increases* top 1% income shares by about 1 pp in earlier decades and 1.3 pp in 2019. The net effect of these two changes is a decrease in recent top 1% shares of 1.6 pp. Other studies have found similar effects on top 1% income shares from moving away from tax units as the unit of observation (Bricker et al. 2016a; 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 1% 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 effects similar to the PSZ approach of basing income groups on the number of adults and dividing the income of married tax units in half.

B. Pretax Income: Expansions

The next step in computing pretax 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

[17] This approach differs from income shares of individuals, which results in higher measured inequality due to unequal spousal earnings (Saez and Veall 2005). 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% of couples living together are unmarried (Lundberg, Pollak, and Stearns 2016). The rise in nonmarried couples means that 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).

TABLE 1
EFFECTS OF ADJUSTMENTS ON TOP 1% MARKET AND PRETAX 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	−.7	−.9	−1.9	−1.0	−1.4
Adjustments to fiscal income and income groups:										
Correct sample	8.3	8.1	9.2	12.6	17.3	*	*	*	−.2	−.8
Impose post-TRA86 loss limits	8.4	8.3	9.7			*	.2	.5		
Add tax-exempt interest	8.7	8.6	10.1	12.9	17.4	.3	.3	.4	.3	.1
Correct income definition	8.7	8.6	9.9	12.8	17.0	*	*	−.1	−.2	−.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 income	8.1	7.8	9.3	11.6	15.4	.9	.9	.8	.7	1.3
Improved fiscal income and total changes	**8.1**	**7.8**	**9.3**	**11.6**	**15.4**	**−.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	.2	.3	.3	.3	.2
C corporation retained earnings	10.6	9.9	10.7	12.3	16.3	2.3	1.8	1.0	.4	.7
C corporation taxes	11.4	10.2	10.8	12.3	16.4	.9	.3	.1	*	.1
Business property tax	11.6	10.4	10.9	12.4	16.6	.2	.2	.2	.1	.2
Inflation correction for interest	11.7	10.9	11.2	12.8	16.7	.1	.5	.3	.4	.1
Underreported income	11.4	10.7	11.1	12.6	16.3	−.2	−.2	−.2	−.2	−.4
Imputed rent	11.2	10.6	11.0	12.5	16.0	−.2	−.1	−.1	−.1	−.3
Employer payroll tax	11.0	10.2	10.5	11.9	15.5	−.2	−.4	−.5	−.5	−.5
Employer-paid benefits	10.9	9.9	10.1	11.4	14.6	−.1	−.3	−.4	−.5	−.9
Retirement account income	11.2	10.1	10.8	11.8	14.8	.3	.3	.6	.4	.2
Indirect taxes, nonprofits, etc.	10.3	9.4	9.7	10.8	13.8	−.8	−.7	−1.0	−1.0	−1.0
Pretax income and total changes	**10.3**	**9.4**	**9.7**	**10.8**	**13.8**	**1.3**	**.4**	**−1.4**	**−3.0**	**−5.6**

SOURCE.— Authors' calculations and Piketty and Saez (2003 and updates) for fiscal income with capital gains.

NOTE.— Total changes are relative to fiscal income including capital gains (thresholds set without capital gains). Sample corrections remove nonadult, dependent, and nonresident filers and adjust the number of nonfilers accordingly. Imposing post-TRA86 loss limits makes many business losses nondeductible in earlier years. Among other changes, correcting the income definition adds back net operating losses that reflect economic activity in previous years. Basing income groups on the number of individuals means that 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 not on tax returns: fiduciary income retained in trusts and estates, corporate retained earnings (undistributed profits), corporate taxes that are part of pretax 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 pretax income, retirement account income missing from tax returns, and various taxes and income sources (nonprofits) included in national income but not in fiscal income. For a detailed description of adjustments, see the online appendix. An asterisk denotes changes of less than .05 pp.

of national income. Table 1 and figure 3 show the impact of these adjustments on top 1% 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 pass-through businesses. Meanwhile, the effects of employer-paid benefits and payroll taxes increase over time.

1. Retained Earnings of Corporations and Business Taxes

Pretax 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, nonprofits/governments, and private individuals.[19] We allocate corporate retained earnings from national accounts data, which exclude capital gains and include estimated corporate income underreporting (see definition in sec. II). This increases top 1% income shares about 2 pp in the 1960s, when C corporations accounted for a large share of business activity, but only about 0.5 pp in recent decades due to the shift to pass-through businesses and the growth of retirement assets that are more evenly distributed.

Retirement account ownership of corporate stock increased dramatically from 4% in 1960 to around 50% since 1985. These estimates are based on Federal Reserve Financial Accounts and include private and public pensions, individual retirement accounts (IRAs), and life insurance funds. This portion of retained earnings is allocated by earned income for the share of corporate ownership by DB plans and otherwise by the share of 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 SCF.[20] Our retirement account ownership shares are similar to those in the Federal Reserve's Distributional Financial Accounts—for example,

[19] Corporate pass-through entities (S corporations and real estate investment trusts) 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% 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 eight income and four age groups in the SCF. See the online appendix for details.

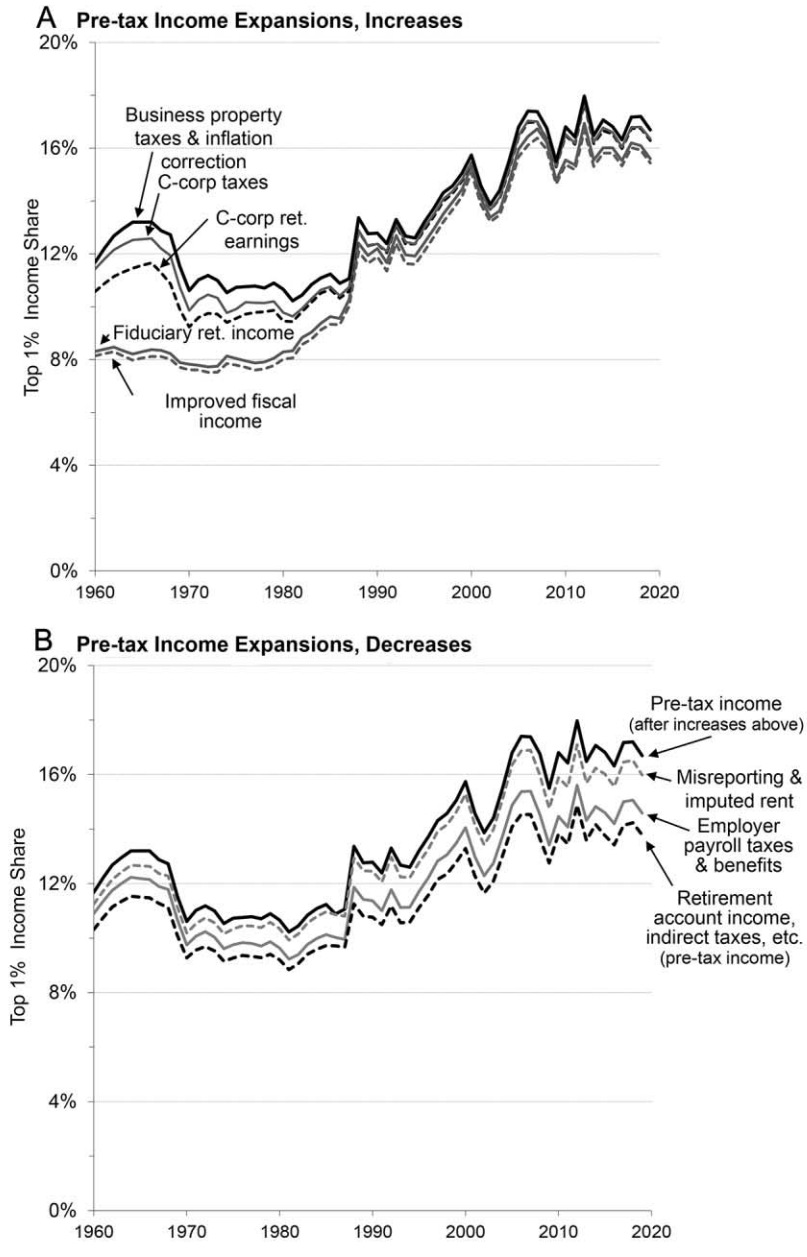

FIG. 3.—Top 1% income shares: pretax income expansions. Income expansions start with improved fiscal income, which is PS fiscal income excluding capital gains after sample corrections, imposing TRA86 loss limits, adding tax-exempt interest, grouping by the number of individuals, and other income corrections. See the main text and table 1 for a description of adjustments. Source: authors' calculations.

both have top 1% (ranked by income) shares of 7% in 1989 and 6% in 2018 (see table B2; tables B1–B9 and S1 are available online).[21] The portion of retained earnings reflecting ownership by nonprofit organizations and government, which ranges between 5% and 9%, is allocated half per capita and half by wages to account for both the redistribution and the consumption spending of nonprofits and governments.

The remaining retained earnings associated with nonretirement private ownership are allocated to individual tax returns. Three-quarters of these retained earnings are allocated based on a tax unit's share of dividends, and one-quarter is 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, Zidar, and Zwick 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]

Pretax national income includes taxes paid by businesses and is allocated based on assumptions about economic burden. Following Joint Committee on Taxation (2013) and CBO (2012), we allocate 25% 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 1% income share 0.9 pp 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 nonhousing capital ownership shares (e.g., corporate equity, retirement accounts, and pass-through equity) and

[21] See http://www.federalreserve.gov/releases/z1/dataviz/dfa/distribute/chart, where 1989 is the earliest year available and recent updates split DB and DC wealth shares, which can be recombined with a weighted average. Note that top wealth shares ranked by wealth are higher than when ranked by income.

[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 1% 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 United States, 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%. Following Joint Committee on Taxation (2013), we also allocate 5% of pass-through business income taxes to wages.

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

then allocated to tax filers as for corporate and retirement account ownership and by the absolute value of pass-through business income.

2. Employer-Provided Benefits and Payroll Taxes

Employer-provided insurance is nontaxable and an important addition to tax-based incomes. These benefits include health and life insurance and workers' compensation and increased from 1% to 5% 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 1% income share only marginally in the 1960s but by nearly 1 pp by the mid-2000s.

The full burden of employer payroll taxes is generally assumed to fall on workers and considered part of their pretax economic income. Payroll taxes are estimated based on wages reported on tax returns for filers and on Form W-2 for nonfilers up to the taxable maximum thresholds (e.g., $132,900 in 2019). Including payroll taxes paid by employers reduces top 1% income shares 0.5 pp 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 personal consumption expenditures (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 1% income shares by an average of 0.4 pp in the 1970s and 1980s when inflation was high but only 0.2 pp 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 6 periods from 1988 through 2013. To capture the heterogeneity of misreporting across filers, the ratio of detected misreporting to reported income is provided for 10 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 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 include only filers, 5% is allocated to nonfilers. 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 1% shares of pretax income an average of only 0.25 pp between 1960 and 2019. For aftertax income, adding underreported income increases the top 1% share one-tenth of a percentage point before 2000 and one-third of a percentage point since (see fig. 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 1% income shares by 0.2–0.3 pp. Imputed rental income from owner-occupied housing is primarily allocated in proportion to deductions for real estate taxes. Since NIPA imputed rent is before tax, it includes property taxes. Imputed rent disproportionately increases middle incomes, lowering top 1% income shares an average of 0.2 pp. 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 nonprofits and governments are allocated half per capita and half by wages.

C. Pretax 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 noncash transfers: pretax income plus transfers (table 2). To provide a sense of relative magnitudes in 2019: Social Security benefits were $1.03 trillion, unemployment benefits were $30 billion, other cash transfers were $400 billion, Medicare benefits net of premiums were $820 billion, and Medicaid benefits were $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 five million returns in the 1990s and more than one million returns in recent years. The 1985 distribution is used for allocating benefits in previous years because it is the first year SSA-1099 forms are available. For filers, unemployment insurance benefits are the amounts reported

TABLE 2
EFFECTS OF TRANSFERS, TAXES, AND GOVERNMENT SPENDING ON TOP 1% INCOME SHARES

	Top 1% Income Shares					Top 1% Share Changes				
Adjustments	1960	1979	1985	1989	2019	1960	1979	1985	1989	2019
Pretax income	10.3	9.4	9.7	10.8	13.8					
Pretax income plus transfers, add transfers:										
Social Security benefits	10.1	9.1	9.4	10.4	13.1	−.2	−.3	−.3	−.4	−.7
Unemployment benefits	10.0	9.1	9.4	10.4	13.1	−.1	*	*	*	*
Other cash transfers	9.9	8.9	9.2	10.2	12.9	−.2	−.1	−.1	−.1	−.2
Medicare		8.8	9.1	10.1	12.5		−.1	−.1	−.2	−.4
Other noncash transfers	9.8	8.7	8.9	9.9	12.0	*	−.2	−.2	−.2	−.5
Pretax income plus transfers and total changes	**9.8**	**8.7**	**8.9**	**9.9**	**12.0**	**−.5**	**−.7**	**−.8**	**−.9**	**−1.7**
Aftertax income, remove taxes:										
Federal individual income and estate tax	8.9	7.8	7.9	8.6	10.0	−1.0	−.9	−1.1	−1.2	−2.1
State/local individual income tax	8.8	7.7	7.7	8.4	9.5	−.1	−.1	−.2	−.2	−.5
Corporate income tax	8.0	7.3	7.6	8.3	9.4	−.7	−.3	−.1	−.1	−.1
Property tax	7.8	7.2	7.5	8.3	9.2	−.2	−.1	−.1	−.1	−.2
Payroll tax	8.1	7.6	8.0	8.8	9.5	.3	.4	.5	.5	.4
Sales and other taxes	8.4	7.8	8.2	9.0	9.7	.2	.2	.2	.2	.2
Aftertax income, add rest of government sector:										
Government deficit/surplus	8.7	7.9	8.1	9.0	9.4	.4	.1	*	*	−.4
Government consumption	8.1	7.4	7.6	8.4	8.8	−.6	−.6	−.6	−.7	−.5
Aftertax income and total changes	**8.1**	**7.4**	**7.6**	**8.4**	**8.8**	**−1.7**	**−1.3**	**−1.4**	**−1.5**	**−3.2**
Total changes: pretax to aftertax						**−2.2**	**−2.0**	**−2.2**	**−2.4**	**−5.0**

SOURCE.—Authors' calculations.

NOTE.—Tax totals are based on NIPA amounts. Fuel and utility taxes are not included. See the online appendix for a detailed description of adjustments. An asterisk denotes changes between –.05 and .05 pp.

since 1981 and imputed in earlier years. As discussed above, nonfiler 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 1989–2016 distributions from the Census Bureau's March CPS estimated by Larrimore et al. (2021). For this allocation, tax units are divided into 10 demographic groups based on the 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 100 income percentiles by improved market income plus Social Security benefits. Medicare benefits less premiums are allocated proportionally to filers and nonfilers aged 65 and older, except for high-wage filers likely receiving insurance through their employers. Finally, the NIPA value of remaining noncash transfers, such as Medicaid and food stamps, is allocated

like other cash transfers using CPS data. Following the national accounts, noncash transfers are valued at cost.

As shown in table 2, the inclusion of transfers decreases top 1% income shares with increasing effects over time: 0.5 pp in 1960, 0.7 pp in 1979, and 1.7 pp in 2019. Similarly, Bricker et al. (2016a) and CBO (2022) both estimate that including transfers reduced the 2010 top 1% share by more than 2 pp.

D. Aftertax Income

Taxes are subtracted from pretax income plus transfers sequentially to show the effect of each tax on top 1% shares. Overall, taxes are progressive and have become more progressive over time. Federal income taxes reduce top 1% income shares about 1 pp in earlier decades but more than 2 pp 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 nonfilers. 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 before 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 10 years before 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 Cronin (1999) and Joulfaian (2001), who found a higher correlation between wealth at death and income 5 years before 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% in early decades and 90% in recent decades).[25] Corporate income taxes and property taxes are those previously used in calculating pretax 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 3 years with special rates (1984, 2011, and 2012). Sales and other taxes are allocated by disposable income (aftertax income before 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 nontransfer programs. Prante and Chamberlain (2007) argued for an equal per-household allocation. The CBO (2013) considered the effects of allocating government consumption either all per capita or all by market income, suggesting that both rely on problematic assumptions. Reynolds and Smolensky (1977, 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 a 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 aftertax income.[26]

IV. Results

This section provides a summary of 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 CBO expanded income. While the focus is on top 1% income shares, we also find that increases in income shares for the top 10% and top 0.1% are smaller than PS and PSZ for pretax income and that their shares of aftertax income are little changed (fig. A1). This section also

[25] Between 1960 and 2017, generally at least 95% of the top 1% itemized deductions. The 2017 distribution is applied in more recent 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 nonitemizers 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 1% shares 0.75 pp.

discusses the effects of taxes and transfers on the distribution of aftertax 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 1% shares in 1960 and 2019. In 1960, our sample and income corrections reduce the top 1% income share of fiscal income from 9.0% to 8.1% for improved fiscal income. Income expansions to match the definition of national income increase this share to 10.3% (table 1; fig. 3). The most important factor that increases the 1960 share is adding pretax 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 before TRA86. For 2019, while the top 1% fiscal income share is 19.4%, our pretax income share is nearly one-third lower at 13.8%. The most important factors in this 5.6 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).

Pretax plus transfer income includes government transfers, the largest of which is Social Security benefits. Relative to pretax 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 1% income share is 9.8%, only 0.5 pp lower than the pretax national income share because transfers were relatively small. In 2019, the top share is reduced by almost 2 pp from 13.8% to 12.0% (see table 2). This difference suggests that about half of the increase in top market income shares was offset by increasing amounts of transfers.

Aftertax income accounts for taxes and government spending. Progressive taxes, discussed more below, further decreased top 1% income shares—by 1.5 pp in 1960 and by 2.3 pp in 2019. Aftertax top 1% income shares fluctuate with the business cycle but remained relatively unchanged over the last six decades. The estimated increase in the top 1% aftertax income share since 1962 is a modest 0.2 pp.

It is also important to consider the bottom half of the income distribution. Figure 4*A* shows that the pretax income shares of the bottom 50% decreased 5 pp since 1962. The decrease was 4 pp after accounting for transfers and only 3 pp after taxes and transfers. Figure 4*B* shows that real per capita pretax incomes of the bottom half of the distribution increased 135% since 1962. Real aftertax incomes nearly tripled (increased 193%). Since 1979, real per capita pretax incomes increased 40% and

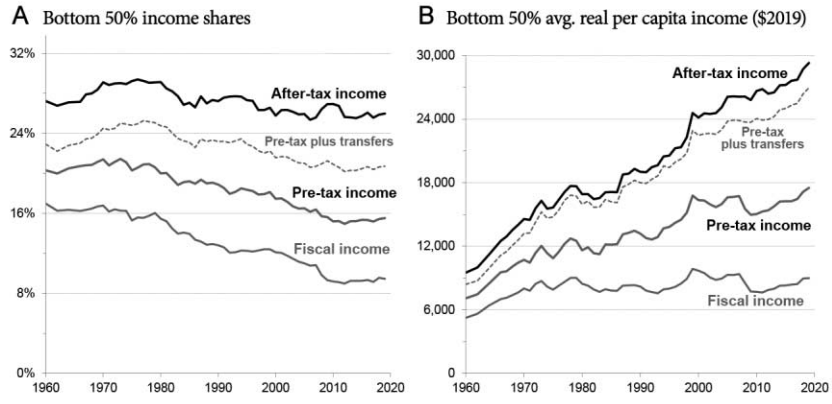

FIG. 4.—Bottom 50% income shares and average per capita real incomes. Fiscal income excludes capital gains. Real incomes are indexed by the PCE. Source: authors' calculations.

aftertax incomes increased 66%. Similarly, CBO (2022) found that real per capita incomes after taxes and including transfers of the bottom two quintiles increased 61% from 1979 to 2019.

A more comprehensive view shows that taxes and transfers have kept most income shares relatively unchanged. Figure 5*A* 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 pp 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 pp since 1962 but increased 0.4 pp after accounting for taxes and transfers. In other words, increasing transfers and tax progressivity offset increases in top income shares of pretax income.

Also important is what happened to real incomes across the distribution. As shown in figure 5*B*, 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 pretax 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 1% earned 22% of the increase in pretax income and 11% of the increase in aftertax

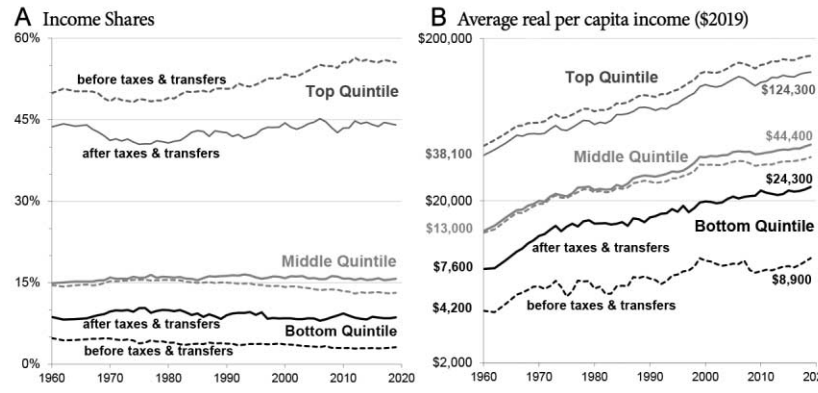

FIG. 5.—Income shares and per capita real incomes by quintile. Adjustments used to estimate pretax (before taxes and transfers), pretax plus transfers, and aftertax (after taxes and transfers) income are listed in tables 1 and 2. Real incomes are indexed by the PCE and on a log scale. Amounts shown are for 1960 and 2019 rounded to the nearest $100. For the bottom quintile, negative incomes are set to zero. Source: authors' calculations.

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 1% each year, panel data show that only about 40% remained there for the subsequent 3 years and even fewer were there the previous 3 years (Auten, Gee, and Turner 2013). In addition, mobility 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 there only 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 1946–64) reached their peak share of the top 1% around 2009, which corresponds with the peak years of the top 1% share of pretax income (Auten, Gee, and Turner 2013). This large cohort drives the strong correlation of 0.87 between the share of peak-income-aged adults (aged 48–57) and the top 1% share of pretax income (fig. B20). Thus, for various reasons,

[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.

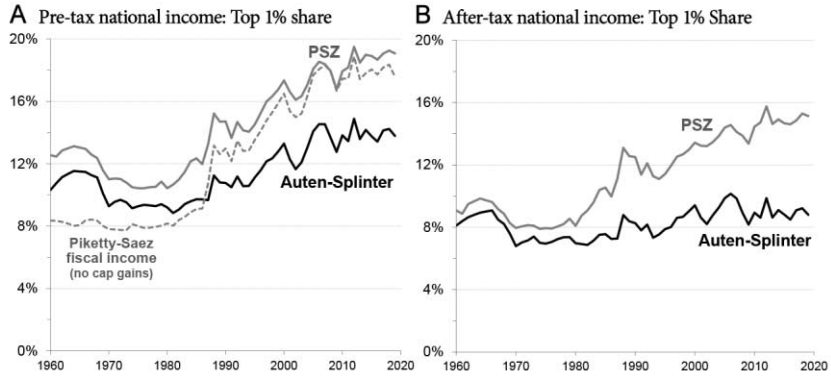

FIG. 6.—Top 1% shares of national income: comparison with PSZ. Adjustments used to estimate Auten-Splinter pretax and aftertax income are listed in tables 1 and 2 and described in detail in the online appendix. Piketty-Saez series excludes capital gains to make more comparable to national income. Source: authors' calculations, Piketty and Saez (2003 with updates), and Piketty, Saez, and Zucman (2018, updated series as of October 2021; PSZ).

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 pretax 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 effects similar 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

[28] While this section compares our analysis with 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 1% income shares by about 1 pp in recent years. Figure 6 shows that revised PSZ national income top 1% shares remained at levels similar to PS fiscal income since 1988, despite many differences that imply lower national income top shares.

TABLE 3
COMPARISON OF TOP 1% INCOME SHARES AND CHANGES

	1962	1979	2014	1962–79 Change	1979–2014 Change	1962–2014 Change
Piketty-Saez-Zucman:						
Pretax	12.6	11.2	20.2	−1.4	9.0	7.6
Aftertax	10.1	9.1	15.7	−.9	6.5	5.6
Auten-Splinter:						
Pretax	11.1	9.4	14.2	−1.7	4.8	3.0
Pretax plus transfers	10.6	8.7	12.4	−2.0	3.7	1.8
Aftertax	8.6	7.4	9.1	−1.3	1.7	.5

SOURCE.—Authors' calculations and Piketty, Saez, and Zucman (2018).

NOTE.—Adjustments used to estimate various definitions of income are shown in tables 1 and 2 and described in detail in the online appendix.

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).

While PSZ top 1% shares are consistently more than 1 pp higher in earlier decades, our estimated changes in top 1% income shares are similar. As shown in table 3, from 1962 to 1979, the original PSZ pretax 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.

Since 1979, however, our conclusions about the levels and trends in top income shares are quite different, due primarily to differences in how to allocate national income components not on tax returns. PSZ estimated that the top 1% share of pretax income increased by 9.0 pp (from 11.2% to 20.2%) from 1979 to 2014, while our analysis shows 4.8 pp (from 9.4% to 14.2%). Part of this difference is due to our adjustments for TRA86.[30] For aftertax income, the PSZ share increased 6.5 pp compared with our estimate of only 1.7 pp (from 7.4% to 9.1%). Over the full period

[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 that the full correct amount is included.

[30] While reduced in magnitude, readers will notice that there is still a jump in our top 1% share between 1986 and 1988. This remaining jump is due partly 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% to 38.5% and then 28%. 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 online appendix and Auten, Splinter, and Nelson 2016).

from 1962 to 2014, the PSZ pretax top 1% share increases by 7.6 pp, while our estimate is a 3.0 pp increase. For aftertax 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 1% share for each difference independently so that the results are not affected by the order of changes. In 2014, our top 1% pretax income share is 14.2%, 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 due primarily 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% of underreported business income to the top 1%. However, audit data suggest that only about 15% should go to the final top 1% after reranking. The PSZ approach effectively removes underreported income found lower in the distribution and allocates it to the top.[31]

Differences in allocating private retirement income explain about 1 pp of the difference in pretax top 1% shares. Our 2014 retirement income is about half from taxable distributions (of which the top 1% receives about 2%) and half from inside buildup, which we allocate by retirement account assets (the top 1% receives about 7%). Overall, the top 1% receives about 6% of total retirement income. This is similar to the Federal Reserve's Distributional Financial Accounts estimate of the top 1% having about 6%–7% of pension entitlements since 2008.[32] In comparison, PSZ online data indicate that they allocated more than twice this share to the top 1%. The high PSZ share is due largely to their use of nontaxable as well as taxable IRA distributions and pension income reported on tax

[31] A simplified computation explains the 2-pp gap in top 1% shares from differences in underreported income: 2% = [(50% – 15%) × $0.8 trillion in business income reporting gaps] / $15.2 trillion national income.

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

TABLE 4
Decomposition of Differences in Estimated Top 1% Income Shares

Auten-Splinter (AS) Approach	PSZ Approach	Percentage Point Level Difference			Percentage Point Difference in Changes	
		1962	1979	2014	1979–2014	1962–2014
Pretax income:						
Underreported income by IRS audit data	Underreporting by positive reported income	.4	1.3	2.0	.7	1.6
Include distributed and other retirement income	Retirement allocation includes some rollovers	−.2	−.2	1.0	1.2	1.2
Other taxes by disposable income less savings	Other taxes by factor income less savings	.2	.2	.7	.5	.4
Nonretirement pretax corporate income	PSZ nonretirement pretax corporate income	.5	.3	.7	.4	.1
Various corrections to tax income definition	Use unimproved tax return market income	*	−.1	.4	.5	.4
Imputed rent by property tax deductions	Imputed rent by housing wealth estimates	.3	.2	.3	*	−.1
Limit returns to nondependent US residents	No adjustment	−.3	−.3	*	.4	.4
Groups by individuals/size-adjusted incomes	Groups by adults/equal-split married incomes	*	.1	.1	*	.1
Nonprofits/government income half per capita	Nonprofits/government income all by income	*	*	.1	*	*
Inflation correction	No correction	−.1	−.5	−.1	.4	*
Social insurance benefits/deficit excluded	Social insurance benefits included, taxes deducted	*	*	−.2	−.1	−.2
Subtotal: pretax differences (PSZ less AS) and totals		**1.4**	**1.7**	**6.0**	**4.3**	**4.6**
Aftertax income:						
Government consumption allocated half per capita	Government consumption allocated by aftertax income	.8	.6	1.3	.7	.6
Non–Social Security deficits by federal income taxes	Half by government transfers, half taxes	−.2	*	.4	.4	.6
Estate tax by previous decade decedent income	Estate tax by wealth distribution	−.3	−.2	*	.2	.3
Government transfers as described in main text	PSZ distribution of government transfers	*	*	−.1	−.1	−.1
Corporate taxes by wages/corporate ownership	Corporate taxes by capital ownership	−.2	−.2	−.2	*	−.1
Other taxes by disposable income less savings	Other taxes by factor income less savings	*	*	−.3	−.3	−.3
Subtotal: aftertax differences (PSZ less AS) and totals		*	*	**.5**	**.5**	**.5**
Total aftertax differences (PSZ less AS)		**1.4**	**1.7**	**6.6**	**4.8**	**5.1**

Source.—Authors' calculations and Piketty, Saez, and Zucman (2018).

Note.—AS approach is described in the main 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 1% income shares of going from AS to PSZ and PSZ to AS assumptions (for details, see the online data in Auten and Splinter 2023). Note also that the total aftertax difference is after netting out the pretax differences. An asterisk denotes changes between –.05 and .05.

returns to allocate "investment income payable to pension funds"—that is, inside buildup. While some pension and IRA distributions can be nontaxable, almost all of the largest nontaxable 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 that too much (10%) of nontaxable amounts are income (see the online appendix for additional discussion).

The PSZ estimate of the top 1% share of aftertax income is much higher than ours (15.7% vs. 9.1%) in 2014, but most of this difference is explained by pretax differences. After accounting for pretax differences, the remaining net difference is only 0.5 pp. This small net difference is the result of several offsetting factors. The PSZ top 1% share is 1.3 pp higher due to allocating all government consumption by aftertax income, thereby ignoring the redistributive and public goods aspects of government consumption captured by our half per capita allocation. Another 0.4 pp 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.

C. Comparison with CBO Estimates

The CBO (2022) also produces widely cited estimates of top income shares using tax data. While our estimates are similar in 1979, the CBO's top 1% before-tax income share was about 2 pp higher than ours in 2019. Much of the difference is from the CBO ignoring retirement account ownership

[33] In addition, when traditional IRAs are converted to Roth IRAs, previous nondeductible contributions to IRAs are treated as basis and thus reported as nontaxable 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, e.g., 79% 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, 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.

when allocating corporate taxes and the CBO excluding the institutionalized population, imputed rents on owner-occupied housing, and the employee portion of employer-sponsored insurance (Auten and Splinter 2019). Large differences in some years are due to the CBO's use of realized capital gains rather than retained earnings.[35] Both the CBO's and our estimates suggest that including transfers and deducting taxes reduces top 1% shares by about 3 pp 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% between 1960 and 2019. But top tax rates provide only a limited picture of the true tax burden of the top 1%. In the 1960s, only a tiny fraction of taxpayers actually paid the top tax rates (fewer than 500 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% 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% has benefited 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 1%, 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 pretax income plus transfers measure.[36] The progressive pattern in figure 7 resembles that for federal income taxes burden estimates by the CBO, the Joint Committee on Taxation, the Treasury's Office of Tax Analysis, Piketty and Saez (2007), and the Tax Policy Center (Splinter 2020). Average tax rates of the top half of 1% and the top 0.01% 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

[35] Typical holding periods for long-term gains are 5–8 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 fig. B16). Auerbach, Kotlikoff, and Koehler (2023) addressed this limitation by moving from current-year to lifetime net tax estimates.

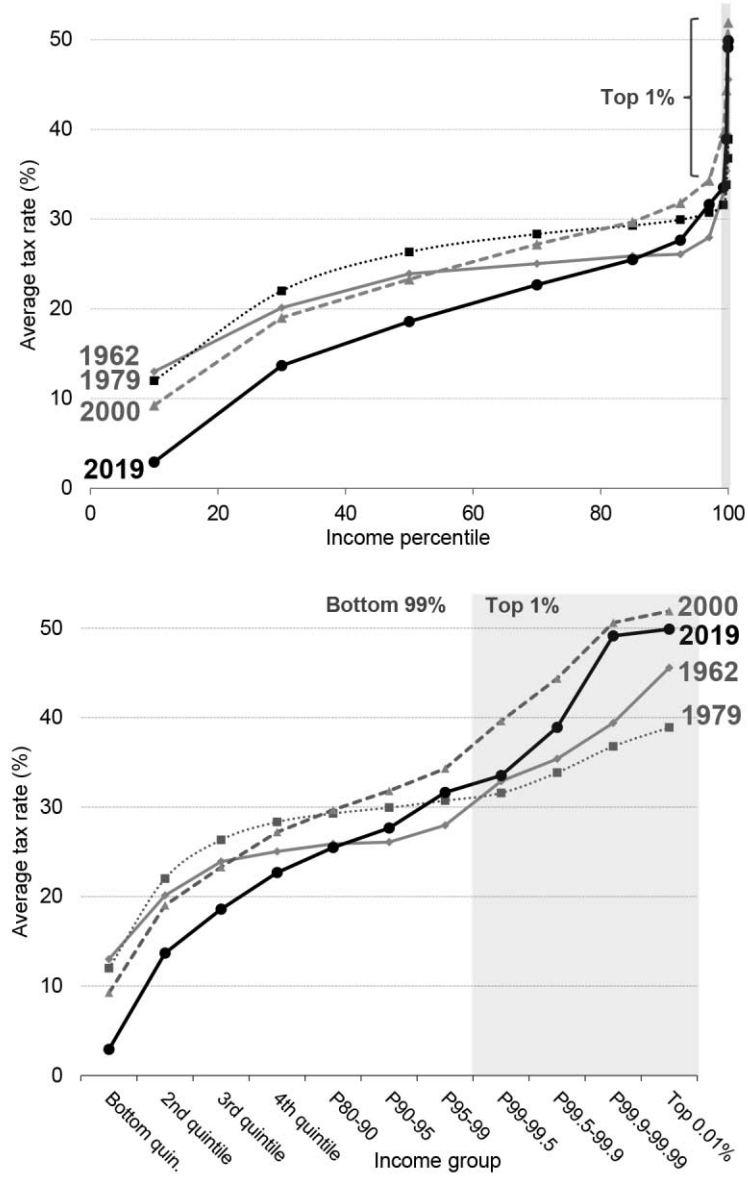

FIG. 7.—Tax progressivity increased over time. Average tax rates are taxes (federal, state, and local taxes, including payroll taxes) divided by the pretax income plus transfers measure. The upper panel shows income groups proportionally along the *x*-axis, with the top quintile split into four groups: 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 (nonproportional) range in gray. The year 1962 is the first nonrecession year available, and other years are business-cycle peaks. Source: authors' calculations.

quintile), resulting in increased overall tax progressivity.[37] CBO and income tax data indicate that this was due primarily 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 1% ranged from 32% to 46% between 1960 and 2019, averaging 38% with little trend (see fig. B14). Recently, top tax burdens were modestly higher: 42% in 2019 compared with 38% 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 1%, the type of taxes paid has changed substantially. In 1960, about one-third of their taxes were from federal individual income taxes, one-third were from corporate income taxes, and one-third were 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 1%.

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 pretax 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% 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% in the following economic

[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 0.10 to 0.37 between 1985 and 2019 (see fig. B18).

[38] These results also highlight that the US tax system is more progressive than in European countries, which rely more on regressive value-added and payroll taxes. As a result, while top 1% shares of pretax income are higher in the United States than in Europe, shares of aftertax income are both estimated to be 9% in 2017 (based on our US estimates and European estimates from Blanchet, Chancel, and Gethin 2022).

[39] For the top 1% in 1966, Okner (1975) estimated that total federal, state, and local taxes ranged from 32% to 39% of his measure of adjusted family income using a broad range of incidence assumptions. Our estimate of 35% 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, 218–19) for similar policies in the 1930s.

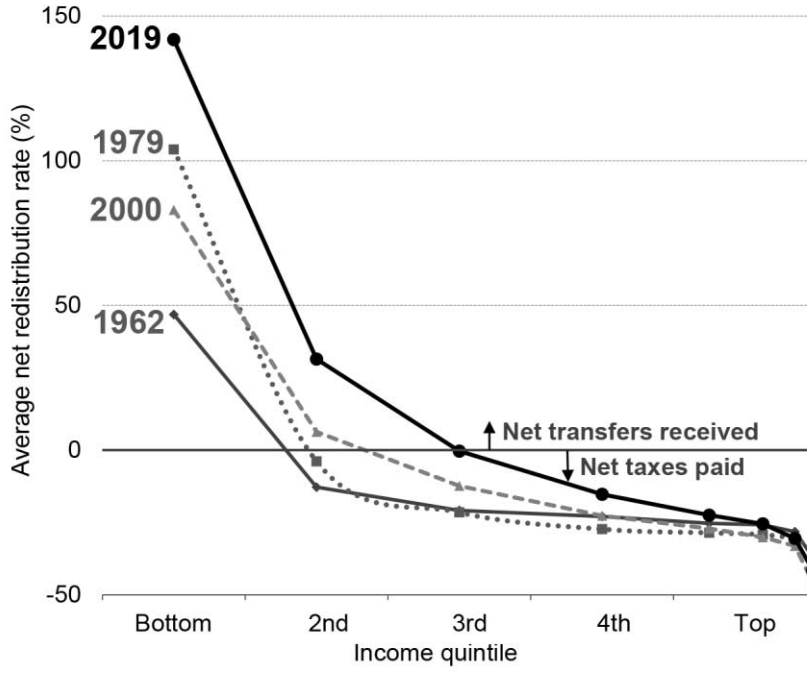

FIG. 8.—Redistribution increased over time. Average net redistribution rates are cash and noncash transfers (excluding government consumption) less all taxes (federal, state, and local taxes, including payroll taxes) divided by pretax income of each income group. The top quintile is divided into four groups: P80–90, P90–95, P95–99, and the top 1%. Source: authors' calculations.

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]

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

[40] CBO data would imply a much larger bottom-quintile redistribution rate. This is due to our broader pretax income definition (Splinter 2020).

[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 0.11 to 0.18, indicating greater redistribution (see fig. B19).

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 (pretax 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 (aftertax income):					
Individuals: 75% dividends/25% capital gains (baseline)	8.6	7.4	8.8	1.4	.2
Individuals: 50% dividends/50% capital gains	8.6	7.3	8.7	1.4	.1
Individuals: 100% dividends/0% capital gains	8.9	7.6	9.0	1.4	.1
Economies of scale for ranking (aftertax income):					
Partial: square-root, equivalence elasticity = .5 (baseline)	8.6	7.4	8.8	1.4	.2
No economies of scale: equivalence elasticity = 1	9.1	7.7	8.9	1.2	−.2
Full economies of scale: equivalence elasticity = 0	7.4	6.5	7.9	1.4	.5
Costs of earning income (aftertax income):					
Employee/investment expenses, no adjustment (baseline)	8.6	7.4	8.8	1.4	.2
Deduct employee/investment expenses	8.5	7.3	8.8	1.5	.2
Multiple changes (aftertax income):					
Changes increasing 2019 top share	8.7	7.5	9.3	1.8	.6
Baseline	8.6	7.4	8.8	1.4	.2
Changes decreasing 2019 top share	7.8	6.6	7.5	.9	−.3

SOURCE.—Authors' calculations.

NOTE.—Baseline assumptions are described in the main text and in detail in the online appendix. Assumptions for sensitivity analysis are described in the main text.

that while alternative assumptions can result in modestly higher or lower top income shares, they are generally within about 1 pp 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% of the corporate tax burden by wages and 75% by corporate capital and interest-bearing assets. Using this approach, the top 1% shares of pretax income increased by 2.6 pp (from 11.1% to 13.8%) 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 pp (from 10.8% to 13.7%). Distributing only by corporate capital and interest-bearing assets results in a higher top 1% pretax income share in 1962 and a smaller increase of 2.3 pp (from 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% by dividends and 25% by capital gains, distributing 50% by dividends and 50% by capital gains slightly decreases top 1% aftertax 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 one) implied by the PSZ equal-split approach increases top 1% income shares by 0.5 and 0.1 pp in 1962 and 2019 relative to our baseline estimates. Assuming full economies of scale (elasticity of zero) for ranking would reduce top 1% shares by 1.2 and 0.9 pp in these years. Our baseline estimates are thus between these two extreme assumptions.

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 1% shares in 2019 but would increase the bottom half share of the distribution by 0.1 pp 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 aftertax top shares are including no government deficits/surplus and allocating nonretirement retained earnings by 100% dividends and 0% capital gains. Changes that would *decrease* 2019 aftertax top shares are size adjusting income for ranking using households rather than tax units (see Auten and Splinter 2019), allocating nonretirement retained earnings by 50% dividends and 50% capital gains, and allocating

[42] Distributing the corporate tax to all nonhousing 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 pass-through form occurred gradually from most new businesses forming as S corporations or partnerships. See the online appendix and Auten, Splinter, and Nelson (2016).

government consumption 75% per capita and 25% by income. Using these two sets of assumptions, the 2019 top 1% aftertax share ranges between 7.5% and 9.3%, more than 1 pp below and 0.5 pp above our main estimate of 8.8%.[43]

Tax compliance changes before 1988, the earliest audit data on which our 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 1% income share by 0.7 pp, suggesting a 0.5 pp *decrease* for the aftertax 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 1% wealth in 2013 by about $1.2 trillion. Assuming a 5% return and ownership by the same individuals in the top of the income distribution would increase top 1% pretax income shares by only one-third of a percentage point. In addition, reporting of foreign accounts and income to US 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 IRS and US 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.

VI. Summary and Conclusions

Using administrative tax data in combination with the SCF and other data sources, this paper develops new estimates of the distribution of income

[43] Adding the extreme assumptions of either no economies of scale or full economies of scale for ranking, the range in top 1% shares is 7.0%–9.4% in 2019. Our main estimate of 8.8% 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% of national income (Gordon 1981, 38). A 5% rate of return would imply about $1.8 trillion in tax-haven-based offshore wealth (in 2013 dollars). An even earlier response to offshore assets was the enactment of subpart F rules for controlled foreign corporations in 1962 (Hellerstein 1963).

in the United States since the 1960s. Our analysis examines levels and trends in all parts of the distribution in addition to top income shares. Our estimates for pretax income, based on distributing total national income, show that the top 1% share declined from 11.1% to 9.4% from 1962 to 1979 and then increased to 13.8% by 2019. Viewed over the full period, the top share increased by only 3 pp. While our pretax 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 1% shares and results in a smaller increase. Our estimates for aftertax income indicate that the top 1% share increased only 1.4 pp since 1979 and only 0.2 pp 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. Furthermore, since 1962 average real per capita aftertax incomes more than tripled for the bottom, middle, and top income quintiles.

Using only market income on tax returns, Piketty and Saez (2003) argued that the top 1% share of income more than doubled since 1962. However, this analysis 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.

Data Availability

Code, a detailed spreadsheet, and information about the confidential tax data used in this article can be found in the Harvard Dataverse, https://doi.org/10.7910/DVN/NZ8YIT (Auten and Splinter 2023).

Appendix

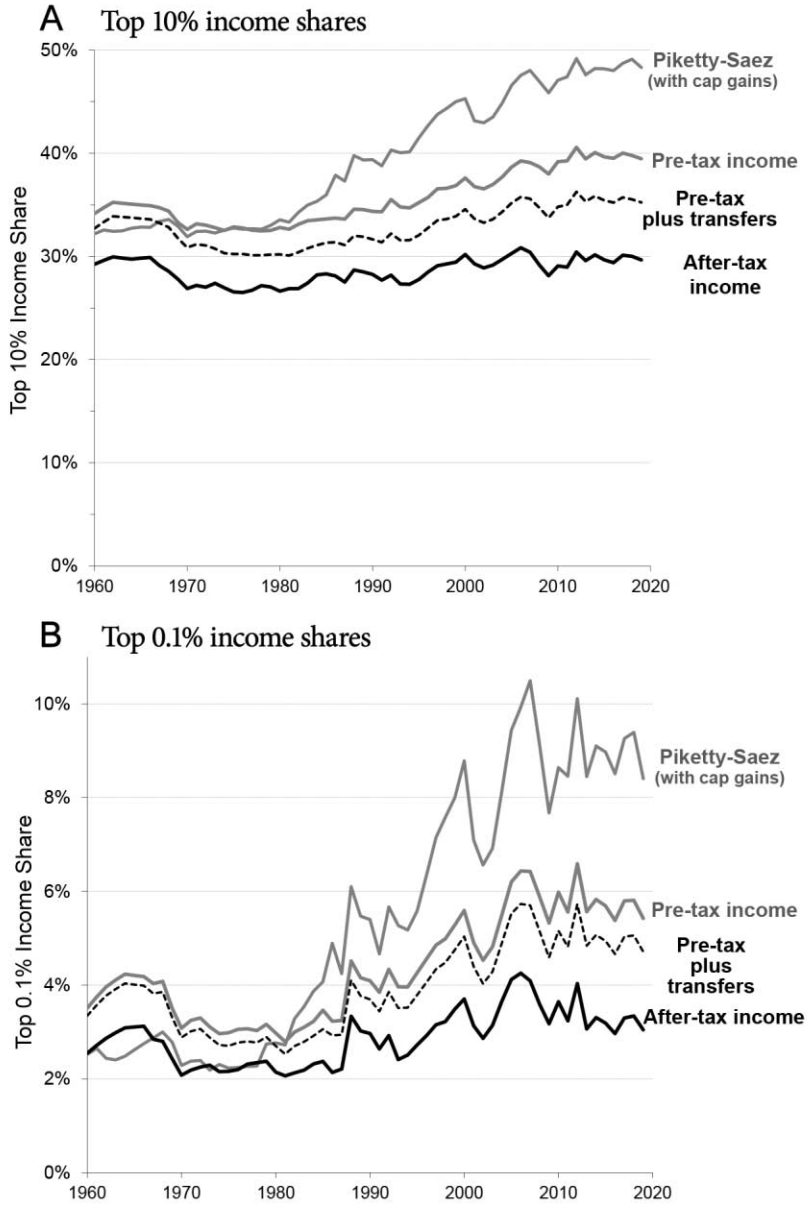

FIG. A1.—Top income shares: top 10% (*A*) and top 0.1% (*B*). Piketty and Saez series includes capital gains (thresholds set without capital gains). Source: authors' calculations and Piketty and Saez (2003 and updates).

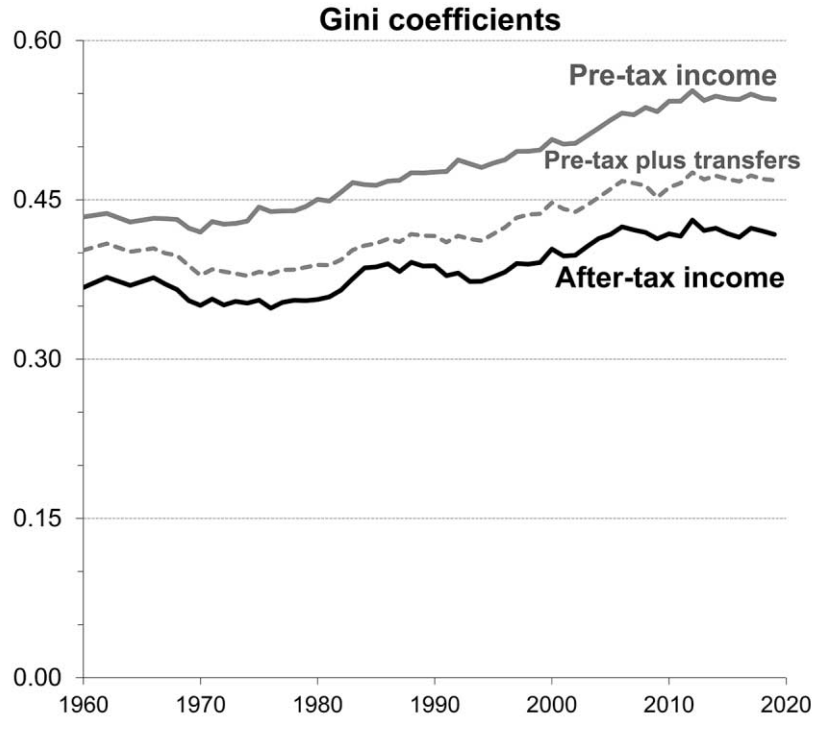

FIG. A2.—Gini coefficients. Adjustments used to estimate pretax, pretax plus transfers, and aftertax (after taxes and transfers) income are listed in tables 1 and 2. Size-adjusted incomes are used for ranking and main income measure. Bottom quintile excludes negative incomes. Source: authors' calculations.

TABLE A1
TOP 1% INCOME SHARES, 1960–2019

Year	Fiscal Income	Pretax Income	Pretax Income Plus Transfers	Aftertax 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

TABLE A1 (*Continued*)

Year	Fiscal Income	Pretax Income	Pretax Income Plus Transfers	Aftertax Income
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

SOURCE.—Authors' calculations and Piketty and Saez (2003 and updates).

NOTE.—Annual values are shown in fig. 1. Fiscal income includes capital gains (thresholds set without capital gains).

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