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

**August 23, 2018**
**Draft version subject to change**

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**Abstract**

Using individual tax returns, Piketty and Saez (2003) concluded that the top one percent income share at least doubled since 1960. But these estimates are biased by tax base changes, missing income sources, and major social changes. Piketty, Saez, and Zucman (2018) addressed some of these issues by targeting the distribution of total national income. They concluded that the top one percent share increased by two-thirds since 1960 and doubled since 1980. However, broadening income beyond that reported on tax returns requires specific assumptions to distribute these additional income sources. This paper shows the effects of adjusting for technical tax issues and the sensitivity to alternative assumptions for distributing missing income sources. Our results suggest that recent top income shares are significantly lower and that there has been relatively little change since 1960, though a modest increase since 1980. The most important reason our results differ from Piketty, Saez, and Zucman (2018) is our allocation of underreported income according to detailed IRS audit studies rather than proportional to income reported on tax returns.

Our estimates show that despite a decrease in the top federal individual income tax rate from 91 to 39.6 percent between 1960 and 2015, base-broadening reforms and the decreased use of tax shelters caused effective tax rates of the top one percent to increase from 14 to 24 percent. Considering all taxes, effective tax rates of the top one percent increased while those of the bottom 90 percent fell, suggesting an increase in overall tax progressivity.

We thank Nathan Born, Austin Frerick, and Joseph Sullivan for helpful research assistance. We also thank Jon Bakija, Richard Burkhauser, Len Burman, Jim Cilke, Tim Dowd, Patrick Driessen, Harvey Galper, Ed Harris, Larry Katz, Wojciech Kopczuk, Jeff Larrimore, Jamie McGuire, Pam Moomau, Kevin Moore, Susan Nelson, Kevin Perese, George Plesko, James Poterba, John Sabelhaus, Emmanuel Saez, Joel Slemrod, Eugene Steuerle, Emil Sunley, Erick Zwick, Gabriel Zucman, four anonymous referees, and participants of the Tax Economists Forum, Office of Tax Analysis Research Conference, Columbia Tax Conference, NBER Research on Income and Wealth Conference, CBO Distributional Tax Analysis Conference, and National Tax Association and Allied Social Science Association annual conferences for helpful comments and discussions. An online appendix, all data series, and code used to produce these series are available at www.davidsplinter.com. Send comments to Gerald.Auten@treasury.gov and David.Splinter@jct.gov.

**Views and opinions expressed are those of the authors and do not necessarily represent official Treasury positions or policy. 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.**

Based on the results of studies using income tax data (Piketty and Saez, 2003; Piketty, Saez, and Zucman, 2018), the idea that income inequality has increased dramatically since the 1960s has become one of the most powerful narratives of our time. Broad acceptance of this view has induced 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 for compensation (Piketty, Saez, and Stantcheva, 2014). These concerns have fueled speculation that increasing inequality could lead to problems such as decreasing institutional accountability and economic efficiency and stagnating middle class wages due to shifts in relative bargaining power.

Such profound implications emphasize the importance of correctly measuring income inequality. Estimating income distributions over long time periods, however, presents major challenges. These include changing social conditions (marriage rates, household size and composition), changing demographics (age distribution), and changing economic conditions (inflation, business cycles). While tax data better represents top income groups,[1] its use presents additional challenges: tax rules and incentives for reporting change over time, many adults do not file tax returns, and important sources of income are not included in tax data.

This paper examines the extent to which estimates of the levels and trends of U.S. top income shares have been biased as a result of failure to adequately account for these challenges. First, we replicate the estimates of Piketty and Saez (2003) and provide improved measures of tax return market income (fiscal income). Next, we fully account for total national income with estimates of both pre-tax and after-tax income. We then discuss why our results differ from the national income approach of Piketty, Saez, and Zucman (2018) and implications for the distribution of economic growth and tax burdens.

The income reported on individual tax returns has changed over time, especially with major tax reforms. While Piketty and Saez (2003) estimate that the top one percent share increased from 9 to 20 percent between 1960 and 2015, about 40 percent of this increase occurred in the years just before and after the Tax Reform of 1986 (TRA86). This major reform lowered statutory tax rates and broadened the tax base, thereby substantially changing tax rules and the incentives for reporting income.[2] Several theories have been advanced for the sharp increase in measured top income shares following TRA86, including a new incentive to shift from C corporations to S corporations (Plesko, 1994; Slemrod, 1996; Carroll and Joulfaian, 1997) and behavioral responses to lower individual tax rates (Feldstein, 1995; Auten and Carroll, 1999). Another limitation is that tax return data misses important sources of income, including government transfer payments and non-taxable employer-provided benefits. These excluded sources have grown over time, such that market income on tax returns accounts for only about 60 percent of national income in recent years. Other issues include the effects of various technical tax rules affecting how income is reported on tax returns and declining marriage rates when using tax

[1] Atkinson, Piketty, and Saez (2011) discuss concerns with using survey data to measure top incomes, such as measurement error, in part from top-coding, and underreporting. Information reporting to the Internal Revenue Service (IRS) and the potential for audit mean that reporting rates in tax data are high for most income. Of course, some income is underreported due to non-compliance, especially for self-employment and small business income not subject to information reporting.

[2] The potential for TRA86 to affect measures of U.S. inequality was noted by Feenberg and Poterba (1993), Gordon and MacKie-Mason (1994), and MacKie-Mason and Gordon (1997). Although this paper only considers the period since 1960, Geloso et al. (2018) show that pre-WWII top income shares can be overestimated if not correctly accounting for tax policy changes.

units as the unit of observation.[3] Adjusting for these issues substantially reduces both the level and upward trend of top income shares.

Piketty, Saez, and Zucman (2018, hereafter PSZ) addressed some of these issues by targeting national income and changing the unit of observation from tax units to adult individuals. Despite considering an expanded income measure, they still concluded that the top one percent share doubled since 1980 and increased by about two-thirds since 1960. Figure 1 shows that we come to quite different conclusions. While PSZ estimate that pre-tax top one percent shares increased by 9.0 percentage points between 1979 and 2014 and by 7.6 percentage points since 1960, our estimates suggest that they increased by only 4.1 and 2.8 percentage points.[4] For after-tax income, PSZ estimate that top one percent shares increased by 6.5 percentage points between 1979 and 2014 and by 5.6 percentage points since 1960, while our estimates suggest that they increased by only 0.7 and 0.3 percentage points.

Over one-third of the difference in our 2014 top shares results from alternative approaches for allocating underreported income, primarily business income included in national income that should be reported on tax returns but is not. We allocate underreported income following IRS audit data, which is the basis for the amounts included in national income, whereas PSZ gross up positive amounts of reported income. About one-fifth of the 2014 difference is due to the allocation of retirement income. Another one-tenth is because PSZ do not account for specific changes to the tax base and who files tax returns resulting from TRA86. These differences, among others, result in quite different conclusions about the levels and trends of top income shares.

Our estimates also have important implications for estimated tax burdens. Despite the top statutory federal individual tax rate decreasing from 91 to 39.6 percent between 1960 and 2015, effective tax rates of the top one percent only increased from 14 to 24 percent. Considering all federal, state, and local taxes, effective tax rates of the top one percent increased from 37 to 43 percent. Except for a few years during the late-1990s economic expansion, top one percent tax burdens were at their highest levels in 2015.

We are not alone in finding lower levels and smaller increases in U.S. top income shares when using broad measures of income. Using Survey of Consumer Finance data, Bricker et al. (2016a) found that the top one percent share increased 3 percentage points from 15 to 18 percent between 1988 and 2012, compared to Piketty and Saez (2003, hereafter PS) estimates of a 6 percentage point increase from 15 to 21 percent. Using tax return and Census data, the Congressional Budget Office (2016) found that the top one percent share of before-tax income increased 6 percentage points from 9 to 15 percent between 1979 and 2013, compared to the PS estimate of a 10 percentage point increase from 9 to 19 percent. In comparison, our measure of pre-tax income increases by about 4 percentage points over this time period from 10 to 14 percent. Examining the longer period between 1967 and 2004 using internal Census data to overcome top-coding issues, Burkhauser et al. (2012) estimated that the top one percent share only increased 2

[3] A tax unit combines all individuals filing a tax return together or who would file together in the case of non-filers.
[4] Top income shares tend to have procyclical fluctuations and should be compared across expansionary years, such as 1960, 1979, and 2015. Comparing a recessionary year, such as 1980, to a later expansionary year tends to exaggerate top income share increases. Besides being a recessionary year, 1980 is problematic because some high-income taxpayers shifted income from 1980 to 1981 to benefit from proposed tax cuts.

percentage points from 10 to 12 percent.[5] By measuring consistent top income shares since 1960 using administrative tax data, rather than only for recent decades or using survey data, this study contributes to this emerging "consistent income inequality" literature.

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 presents the main results and some sensitivity analysis. Section VI provides a summary and conclusions.

## I. Measuring Top Income Shares with Consistent Definitions of Income

Using annual tax microdata, our starting point is PS fiscal income and sample definitions because these were seminal estimates that are still widely cited. Our first step is to estimate *corrected fiscal income* that adjusts for major tax law changes (primarily TRA86), sample issues, and changing family structures (declining marriage and increasing single-parent rates). To facilitate comparison with PSZ, we then sequentially develop measures that account for total national income: *pre-tax income* that excludes government transfers, and *after-tax income* that includes government transfers and deducts federal, state, and local taxes. We also develop a measure of *pre-tax/post-transfer income* that necessarily exceeds national income but is preferable for measuring effective tax rates.

TRA86 lowered individual tax rates and broadened the tax base. The base-broadening was targeted at high-income taxpayers, including deduction limitations for rental losses and losses on passive investments. The reform also motivated some corporations to switch from filing as C to S corporations and to start new businesses as passthrough entities (S corporations, partnerships, or sole proprietorships), causing more business income to be reported directly on individual tax returns.[6] Before TRA86, the top individual tax rate was higher than the top corporate tax rate (50 percent vs. 46 percent), allowing certain sheltering of income in C corporations with retained earnings. This incentive was even larger when the top individual rate was 70 percent in the 1970s and 91 percent before 1964. TRA86 lowered the top individual tax rate below the top corporate tax rate (28 vs. 34 percent), reducing the incentive to retain earnings inside of C corporations and creating strong incentives to organize businesses as passthrough entities.[7] When estimating consistent incomes, we directly account for limitations on deducting losses and indirectly account for the shift into passthrough entities by including corporate retained earnings.[8] This leads to important findings in the 1960s, when high individual income tax rates created strong incentives to shelter income inside corporations. Without these corrections, top income shares are understated before 1987.[9]

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[5] Our pre-tax estimates also increase 2 percentage points over this period, from 11 to 13 percent. Fixler et al. (2016) gross up Census data to NIPA personal income and estimate that between 1960 and 2012 the top five percent share only increased about 4 percentage points.

[6] While all passthrough income is reported on individual tax returns (hence the name passthrough), C corporation retained earnings are not. See the appendix for more detail on the responses to base-broadening changes in TRA86.

[7] This simple comparison ignores the double taxation of corporate income at the individual level. TRA86 also increased the maximum long-term capital gains tax rate from 20 to 28 percent, which may have further lowered the value of C corporations relative to passthrough businesses. Gordon and Slemrod (2000), Goolsbee (2004), and Auten, Splinter, and Nelson (2016) reviewed the effects of relative tax rates on business organization.

[8] Our adjustment for business losses indirectly also accounts for the liberalized depreciation enacted in 1981 and the tightening from later reforms.

[9] 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. Burkhauser, Hahn, and Wilkins (2015) showed that a 1985 Australian tax reform captured a larger share of capital gains and corporate profits on individual tax returns, thereby increasing measured top one percent income shares by about a sixth. Wolfson, Veall,

TRA86 also dramatically increased the number of dependent filers, which are incorrectly treated as separate low-income units if no adjustments are made.[10] To correct for this problem and make our sample consistent over time and between tax and Census data, dependent filers, other filers under age 20, and non-resident filers are removed from the sample and the number of non-filing tax units increased accordingly. Without this correction the number of non-filing tax units are under-counted and top income shares overstated, especially since 1987.

Declining marriage rates outside the top of the distribution also explain part of the increase in measured top income shares. This is because, holding all else equal, as the marriage rate in the bottom of the distribution decreases, more adults file separate returns and hence the total number of tax units increases. Thus, the number of tax units included in the top one percent also increases (Saez, 2004). Another related social change is the increase in the percentage of single-parent households. To address both changes, we take account of the two adults in married tax units, as well as dependents, and calculate income groups by the number of these individuals. That is, each percentile has an equal number of individuals rather than an equal number of tax units. Without this correction there are relatively too many individuals in the top one percent, which overstates top income shares in recent decades.

A number of sources of market income are not included on individual tax returns. To address this issue and fully account for national income, *pre-tax income* 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. In the aggregate, these excluded sources have averaged 36 percent of national income since 1960. Because of the declining importance of corporate retained earnings and taxes and the growing importance of employer-provided health benefits, these excluded sources have shifted away from the top of the distribution. Without these corrections top income shares are understated in the 1960s and overstated in recent decades.

An estimate of *pre-tax/after-transfer income* is obtained by adding government transfers to pre-tax income. As seen in Figure 2, government transfers grew from 5 to 14 percent of income between 1960 and 2015. Starting with this broad measure of income, taxes are subtracted and government deficits and consumption added to estimate *after-tax income*, which equals national income.

Different income definitions serve different goals. Our measure of pre-tax income includes income earned from labor and investments, excluding the effect of government taxation and spending, but totaling to national income. Pre-tax/after-transfer income is our broadest definition of income and the most appropriate for estimating effective tax rates and the distribution of tax

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and Brooks (2016) estimated that including retained earnings of private corporations increased the Canadian top one percent income share in 2011 by about a third. Alstadsæter et al. (2015) showed that an increase in the dividends tax rate caused a dramatic increase in corporate retained earnings in Norway. After the reform, tax return based top one percent income shares were underestimated by about a third. Atkinson (2007) estimated that during the 1950s and early 1960s, including retained company profits increased United Kingdom top one percent income shares (excluding capital gains) by about half.

[10] Auten, Gee, and Turner (2013) estimated that the number of dependent filers and filers younger than 20 years old increased from about 8 million in 1986 to 13 million by 1988. TRA86 eliminated the personal exemption for dependent filers, only allowing a single exemption on parent returns rather than on both dependent and parent returns, and reduced the amount of exempt investment income from $1,080 to $500.

burdens. This measure follows a long-standing public finance tradition of using this type of broad measure of income for this purpose (Pechman and Okner, 1974; Office of Tax Analysis, 1987). After-tax income deducts taxes and includes government transfers and other spending, therefore providing a closer measure to welfare inequality.

While targeting national income allows for a comparison with PSZ, it has a number of shortcomings, as discussed by Eisner (1989) and Stiglitz, Sen, and Fitoussi (2009). National income includes imputed rents for owner-occupied housing, but excludes comparable income from non-housing durable goods as well as other non-market household production. National income ignores inter- and intra-family transfers as well as government transfers. Zucman (2013) suggests that national income measures are distorted because they do not adequately account for offshore wealth in tax havens or transfers from illegal activities.[11] Also, national income values government consumption at cost even though many individuals may value it quite differently, especially in the case of school or military expenditures. These shortcomings can be particularly relevant in the context of analyzing income distributions.[12]

## II. Data

Our analysis uses annual samples of individual income tax returns from 1960 to 2015. Each cross-section sample consists of between 80 and 340 thousand tax returns, with oversampling of tax returns with high incomes. Public use individual income tax files are used for years before 1979. There are no public use files for 1961, 1963, and 1965. Beginning with 1979, we use internal IRS Statistics of Income (SOI) individual income tax samples and Social Security Administration data including dates of birth. Total non-filer income, excluded combat pay, and the distribution of employer-provided health insurance, are estimated using IRS administrative data, which includes the universe of tax returns and information returns.

Our income measures include various sources that are not reported on income tax returns. Values for these sources, as well as target totals for income items that are only partially reported on tax returns, are from the Bureau of Economic Analysis National Income and Product Accounts (NIPA). Note that corporate retained earnings are defined as undistributed C corporation profits and calculated as profits with inventory value and capital consumption adjustments less taxes and net corporate dividends. These amounts include reinvested earnings of incorporated foreign affiliates of U.S. corporations, that is, unrepatriated foreign earnings.[13]

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

This section describes each of the adjustments made to the individual income tax data. Our analysis starts by replicating PS income excluding capital gains (i.e., fiscal income excluding capital gains). For filers, this equals adjusted gross income (AGI), plus statutory adjustments, less taxable Social Security and unemployment benefits and Schedule D capital gains. Using these filer incomes and following PS assumptions for non-filers, we replicate PS top income shares and use this as our starting point. *Corrected fiscal income* is developed as an intermediate step. This corrects the sample, adjusts for the effects of tax reform on tax shelter losses, adds tax-exempt interest, and makes a number of additions and corrections to various income components. Also, income groups are based on size-adjusted incomes and the number of

[11] In the sensitivity analysis, we show that our results are robust to the inclusion of income from offshore wealth.
[12] For income distribution estimates that do not target national income and are closer to the sum of personal income and retained earnings, see earlier versions of this paper, e.g., Auten and Splinter (2016).
[13] For more details, see www.bea.gov/national/pdf/chapter13.pdf.

individuals rather than tax unit income and the number of tax units. Then we estimate our main estimates that target national income: pre-tax and after-tax income. Tables 1 and 2 show the impact of each adjustment on top one percent income shares in selected years. Additional details are provided in Table A1, the online appendix, and the online data.

*III.A. Corrected Fiscal Income*

*1. Correct sample: Limit Returns to Adult Residents.* It is important to start by ensuring that the sample for our tax-based measures is consistent with the total number of tax units (including non-filers). The PS estimate of the total number of tax units, which we also target initially, is based on the U.S. Census resident population of married males and unmarried single individuals age 20 or older. However, some tax filers live abroad or are younger than 20 years old, most of whom are also claimed as dependents on tax returns. These filers are therefore not included in the Census numbers. In order to limit the sample of tax returns to adult residents, these returns are removed from the sample, thereby increasing the estimated number of non-filer tax units. In addition, some filers age 20 and over are claimed as dependents on other tax returns, primarily college students. Under the assumption that these filers are not independent economic units, they are also dropped from the sample.[14] The income of dependent filers is allocated among tax returns with dependent children. We allocate non-wage dependent income to these tax returns by capital income. 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 tax unit, but some married couples file two returns. These corrections have significant effects on the sample since 1987. For example, in 2015 there were 7.6 million filers under age 20, 0.9 million non-resident filers, 3.8 million dependent filers age 20 and over, and 1.5 million married filing separately returns, which in total accounted for over 9 percent of all returns filed.

*2. Impose Post-TRA86 Loss Limits.* The first income adjustment is to apply post-TRA86 limitations on deductions of losses for rent and other business income to years before the reform. For years prior to 1987, this makes a significant fraction of losses non-deductible, increasing the incomes of those taking advantage of tax shelters. This adjustment also helps correct for generous accelerated depreciation rules enacted in 1981 that increased the use of tax shelters, in particular for real estate, and the reported losses on tax returns.

*3. Add Tax-Exempt Interest.* The inclusion of tax-exempt interest modestly increases top income shares (0.3 percentage points) in the 1960s when holdings of tax-exempt securities were highly concentrated among the highest income taxpayers, but has a smaller effect (0.2 percentage points) in recent decades due to broader holdings of these securities.

*4. Correct Income Definition.* Tax-exempt combat pay, excluded income from dividends before 1987, and net operating loss carryovers from prior years are added to filer incomes. Gambling losses (up to the amount of gambling income) and taxable state and local income tax refunds are deducted.[15] Capital gains distributions listed separately from Schedule D and other ordinary

[14] Those age 19 or over who file as dependent filers must be full-time students, receive more than half of their support from taxpayers claiming an exemption for them, must generally be under age 24, and meet additional requirements. Thus, they are not comparable to fully independent tax units and typically have very low incomes. The potential to influence measured inequality trends is illustrated by the increase between 1960 and 2012 in school enrollment by those age 20 to 24 from 13 to 40 percent (National Center for Education Statistics, 2018). Some elderly parents are also claimed as dependents. A more detailed discussion is found in the online appendix.

[15] Reported net operating loss carryovers reflect prior year rather than current year income. This adjustment prevents counting the same loss multiple times and moves some taxpayers from the bottom centiles into the top one percent.

gains are also subtracted.[16] Individual Retirement Account (IRA) and similar retirement account contributions are also deducted.[17] These corrections provide a consistent exclusion of capital gains and retirement contributions from tax return based incomes. Each of these adjustments can result in large income changes for particular tax returns, substantially changing their rank in the income distribution and potentially affecting top income shares. This is important because PSZ make none of these corrections, other than including tax-exempt interest.

Non-filer income is estimated using the SOI Databank, an individual level panel containing every person with a taxpayer identification number who was born before 2010 and had not died by 1996. For filing years 2000 through 2010, we identify non-filers as individuals who did not file a tax return as of 2016, were age 20 through 99, and alive at the end of the year. An estimate of the fiscal income of non-filers is obtained using Forms W-2 (wages), 1099-R (pensions), 1099-DIV (dividends), and 1099-MISC (miscellaneous income). Summing income from these sources and dividing by the number of corrected non-filer tax units gives average non-filer income. Estimated non-filer income for this period averages about 20 percent of filer income, which is the same amount as PS and so no adjustment is made to non-filer incomes at this stage.[18] After including underreported income in a later step, non-filer pre-tax incomes increase to about 30 percent of average filer income.

*5. Set Groups by Number of Individuals and Rank by Size-Adjusted Income.* A measure more relevant to the distribution of economic welfare would base income groups on the total number of individuals (including primary and secondary taxpayers and dependents) and rank tax units using size-adjusted incomes, as in Congressional Budget Office (2016). Setting groups by the number of individuals helps control for the bias introduced from falling marriage rates as compared to groups set by tax units. Size-adjusting incomes accounts for the costs of supporting dependents and the economies of scale from shared resources.[19] For example, when a family shares a residence the incremental costs are likely to decline with each additional person.

Marriage rates among tax filers have fallen consistently from 67 to 39 percent between 1960 and 2015 (after removing filers younger than 20 years old, dependent filers, and non-residents).[20]

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Since gross gambling winnings are reported as other income but gambling losses (up to the amount of winnings) are an itemized deduction, failing to make this adjustment would overstate the economic income of these taxpayers. Taxable state and local income tax refunds are an adjustment for an over-deduction in the prior year rather than income.

[16] Our replication of PS suggests that their computations of market income net of capital gains only excluded Schedule D gains (line 13 on Form 1040 in recent years), but did not account for capital gains distributions or other gain or loss from Form 4797 for the sale of business property. Since various tax reforms changed the other gain amount from negative to positive over time and the character of some income from capital gain to ordinary income (see online appendix), failing to make this adjustment would overstate top income shares in recent decades as compared to the earlier decades.

[17] IRA contributions, including Keogh, SEP, SIMPLE and other qualified plan contributions, are parallel to excluded employee contributions to other defined contribution accounts, such as 401(k) plans.

[18] This is a conservative estimate because it excludes many sources of income that can be important for some non-filers. Among the most important excluded sources are income from sole proprietorships, partnerships, S corporations, fiduciaries, alimony, interest, and income from illegal sources.

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

[20] Growth in cohabitation explains some of this change. While there was relatively little cohabitation before 1970, more than 27 percent of couples currently living together are unmarried (Lundberg, Pollak, and Stearns, 2016). The rise in non-married couples means tax unit incomes may understate the economic welfare of many single or head of

However, marriage rates among the top one percent have remained consistently high in these years: 90 and 85 percent, respectively. Holding all else constant, declining marriage rates outside the top of the income distribution increase top income shares. For example, Larrimore (2014) estimated that declining marriage rates explain 23 percent of the increase in household income Gini coefficients between 1979 and 2007. To help control for these declining marriage rates, our analysis defines income groups based on the number of individuals, rather than the number of tax units. This means that each percentile includes the same number of individuals instead of the same number of tax units. About 40 percent of non-filer tax units are married and thus counted as two individuals for this adjustment.[21]

When ranking tax units, we account for size differences by dividing tax unit income by the square-root of the number of individuals in the unit. This equivalence scale is used by the Congressional Budget Office (2016) and similar to that used by the Census Bureau to estimate equivalence-adjusted income inequality (Cronin, DeFilippes, and Yin, 2012). The square-root of the number of individuals in the sharing unit is between the extremes of assigning the full household income to each individual (complete economies of scale) and per capita income (equal sharing but no economies of scale) and implicitly assumes equal sharing among all individuals in the household.[22] Note that size-adjusted incomes are only used to rank tax units and determine income groups in the income distribution. Total tax unit incomes are used to calculate income shares, such that they sum to national income after all adjustments.

Moving from income groups based on tax units to individuals ranked by size-adjusted incomes decreases top one percent income shares by 5 percent in the 1960s and by 10 percent in recent years (0.4 and 1.9 percentage points).[23] Other studies have found similar reductions in top one percent income shares when moving away from tax units as the unit of observation. Bricker et al. (2016b) estimated that in 2010 using families rather than tax units decreases the top one percent income share by 2.4 percentage points. Larrimore, Mortenson, and Splinter (2017) estimated that using households rather than tax units decreases the top one percent income share by 2.0 percentage points.

*III.B. Pre-Tax Income: Expansions*

The next step in computing pre-tax income is to add sources that are not captured on individual tax returns, including: (1) fiduciary retained income, (2) corporate retained earnings, (3) corporate taxes, (4) business property taxes, (5) the inflationary component of business interest

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household filers because the income of other members of the household is not included (Larrimore, Mortenson, and Splinter, 2017).

[21] In 2009, there were 28 million non-filing resident individuals age 20 or over. Subtracting the number of filing tax units (after the adjustments for dependent filers, etc.) from the predicted number of tax units yields an estimate of about 20 million non-filing tax units. This implies a non-filer tax unit marriage rate of about 40 percent. This assumption appears robust since 1960 (see online data). Adjustments to account for non-resident spouses and dependents claimed on domestic tax returns are described in the online appendix.

[22] This approach differs from actual individual income shares, which result in higher measured inequality due to unequal spousal incomes (Saez and Veall, 2004).

[23] Only grouping by individuals, and still ranking by tax unit income, decreases top one percent income shares in 1960 and 2015 by 1.6 and 2.7 percentage points. This larger effect in recent years was due to falling marriage rates outside the top of the distribution, with a small offset from changes in the distribution of dependents, which fell more among top one percent tax units (by 0.8 dependents) than for all tax units (by 0.6 dependents). Ranking by size-adjusted income pushes some tax units with more individuals out of the top one percent, allowing the entry of more tax units and income, raising top one percent income shares (grouped by the number of individuals) about one percentage point.

deductions and other inflation adjustments, (6) underreported income, (7) imputed rental income on housing (including property taxes), (8) the employer portion of payroll taxes, (9) employer-provided insurance costs, (10) retirement account income, and (11) other sources of national income, primarily sales taxes. Table 1 and Figure 3 show the impact of these adjustments on top one percent income shares. The effects of adding retained earnings and corporate taxes decrease over time as the share of business conducted by C corporations and corporate tax rates decrease. Meanwhile, the effects of payroll taxes and insurance increase over time.

*1. Fiduciary Retained Income*. Fiduciaries, which include estates and trusts, distribute much of their income each year and this distributed income is included on individual tax returns. Some fiduciary income, however, is retained and therefore missing from individual returns. Retained fiduciary income and income taxes are allocated to individual tax returns by taxable fiduciary income.

*2. Corporate Retained Earnings*. Pre-tax corporate profits are treated as income to capital owners regardless of whether profits are distributed, retained, or paid out in taxes. Corporate profits distributed as dividends are already included in taxable income. Since retained earnings are not reported on individual tax returns they must be allocated among various corporate owners: retirement accounts, non-profits/governments, and private individuals. With the growth of retirement savings, the retirement account share of corporate ownership increased dramatically from 4 to 50 percent between 1960 and 2015.[24] This portion of retained earnings is allocated by wages of filers for the share of corporate ownership by defined benefit (DB) plans and otherwise by the share of defined contribution (DC) account wealth, calculated using the Survey of Consumer Finances. The portion of retained earnings reflecting ownership by non-profit organizations and domestic governments, which increased from 5 to 7 percent, is allocated half per capita (equally across all individuals including dependents) and half by wages to account for both the redistribution and consumption spending of non-profits and governments.

The remaining retained earnings associated with non-retirement private ownership are allocated to individual tax returns. Three-quarters of retained earnings are allocated based on a tax filer's share of dividends and one-quarter based on their share of realized capital gains. Since our goal is to attribute retained earnings accrued in a given year to the owners of corporations, we favor using dividends received as the primary indicator of corporate ownership. The portion allocated to capital gains reflects the fact that some corporations do not pay dividends and a substantial portion of capital gains is from the sale of corporate stock. This imputation of retained corporate earnings should lead to similar income shares as multi-year realized corporate stock gains, which are excluded from national income.[25] The timing of capital gains can differ substantially from that of retained earnings, in some cases by decades, but over the long run they tend to equalize (Clarke and Kopczuk, 2016). Important exceptions are capital gains that are never realized due to the step up in basis at death and charitable donations of appreciated property.

*3. Corporate Taxes*. Pre-tax income includes taxes paid by businesses allocated based on assumptions of economic burden. A portion of corporate taxes are believed to be borne by labor

[24] Note that corporate passthrough entities (S corporations and REITs) are removed before estimating ownership shares because they have little or no undistributed profits. Our approach to attributing ownership of C corporations among these three groups closely follows that of Rosenthal and Austin (2016) and PSZ.

[25] Armour, Burkhauser, and Larrimore (2014) take the alternative approach of estimating annual accrued capital gains, which tend to be volatile.

because it lowers corporate investments and hence the marginal productivity of workers in the corporate sector.[26] There is a range of estimates of the share of the corporate tax borne by labor.[27] Following the assumptions used by Joint Committee on Taxation (2013) and Congressional Budget Office (2012), we allocate 25 percent of corporate taxes to wages. The rest is allocated to individual tax returns based on the ownership of interest-bearing assets and corporate capital. The fraction associated with bonds is allocated by taxable interest.[28] The fractions associated with retirement, private, and non-profit/government corporate ownership are allocated as for retained earnings (see above).

*4. Business Property Taxes.* Business property taxes are allocated to tax filers by business income (dividends, capital gains, interest, and passthrough income). The larger effect of business property taxes on top shares in 1960 is due to the substantial fraction allocated to individual corporate equity owners. This fraction declines as corporate ownership shifts to retirement accounts.

*5. Inflation Correction for Interest*. High inflation rates, most importantly in the 1970s and early 1980s, distort the measurement of income and deductions. Since inflation can affect real incomes differently across the income distribution, correcting for inflation moves towards a more consistent measure of income over time as well as across individuals with different types of income and assets. Inflation causes an overstatement of real interest income and an understatement of real business profits, which are net of deductible interest payments (Steuerle, 1985). In order to estimate incomes that are more consistent across years despite inflation rate fluctuations, we make three adjustments to interest flows. First, we decrease household net interest receipts by the fraction accounted for by inflation, estimated as the inflation rate divided by the Baa corporate bond yield. Second, we increase business income by the fraction of net interest payments accounted for by inflation. Third, we estimate the value of inflation on government interest payments as the difference between household interest decreases and business income increases, such that total income is unchanged by the inflation adjustment. Since lower real government interest payments likely decrease current or future taxes, we allocate this effect by federal and state income taxes. These inflation adjustments increase top one percent income shares by an average of 0.4 percentage points in the 1970s and early 1980s when inflation was high, but only 0.1 percentage points in other years.

*6. Underreported Income*. There are gaps between national income and tax-based incomes, even after our corrections up to this point. These gaps, which we refer to as underreported income, are largely due to estimates of tax evasion included in national income (see the online appendix for a detailed discussion). Since the 1970s, adding this missing income more than doubles sole proprietor and partnership net income. Our underreporting rates by income group are based on the IRS National Research Program (NRP) and Taxpayer Compliance Measurement Program (TCMP). These studies rely on detailed audits to estimate the overall extent of underreporting.

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[26] Other rationales include the argument that capital is more mobile than labor and the fact that executive bonuses (generally included in taxable wages) are commonly based on corporate profits. For additional discussion see the online appendix.

[27] In the U.S., Suárez Serrato and Zidar (2016) estimated that wages bear one-third of state corporate taxes and Liu and Altshuler (2013) estimated that the average wage share is between 60 and 80 percent. Using German data, Fuest, Peichl, and Siegloch (2017) estimated that wages bear 51 percent of corporate taxes.

[28] The Congressional Budget Office (2016), the Joint Committee on Taxation (2013), and the Office of Tax Analysis, U.S. Treasury Department (Cronin et al., 2013) all distribute the burden of the corporate tax in part by interest received by individuals.

The Bureau of Economic Analysis largely bases their NIPA estimates of misreported income included in national income on these studies (see online appendix for details).

While there is little published research on the distribution of underreported income, one exception is Johns and Slemrod (2010). They used the tax year 2001 NRP Individual Income Tax Reporting Compliance Study to estimate income shares with and without underreported income and find that top one percent income shares are essentially unchanged.[29] While the top one percent receives about 18 percent of reported AGI, it accounts for only about 5 percent of underreported income.[30] Since underreported income is concentrated in a subset of taxpayers, its inclusion moves some taxpayers into the top one percent while others drop out. This re-ranking effect explains why they observe that the 2001 top one percent share was unchanged when adding underreported income.

We allocate underreported income in three steps. First, underreported income is estimated as the difference between amounts already in pre-tax income and NIPA totals, separately estimated for wages and salaries, rental income, farm income, non-farm proprietor income, and S corporation net income. Second, 15 percent of underreported income is allocated to non-filers based on IRS tax gap estimates. Third, the remaining 85 percent of underreported income is allocated to filers based on Johns and Slemrod (2010) estimates of the shares of underreported income by reported AGI group or earlier audit studies. To account for underreported income going to those with negative AGIs and the larger prevalence of tax shelters before TRA86, we divide the bottom 90 percent allocation between those with and without negative AGIs. To those with negative AGIs, we allocate 17 percent of underreported income between 1987 and 1991 (based on estimates from the 1988 TCMP), and 10 percent in subsequent years (based on Johns and Slemrod results). Prior to the tax shelter limitations of TRA86, we expect a higher share of underreported income among tax returns reporting negative AGIs. In fact, the 1985 TCMP shows that 39 percent of underreported income was found among those with negative AGIs and we apply this percentage in years before 1987.

Within each AGI group, the amounts of underreported income are then allocated to specific tax returns. Underreported wages are allocated by reported wages within each AGI group. The same is done for underreported business income (including partnership, S corporation, sole proprietor, farm and rental income), but using the absolute value of combined business income to account for businesses that report losses. In order to incorporate a re-ranking effect, a subset of taxpayers is selected to receive underreported business income to target the 2001 estimated changes between reported and audit-based income shares.

*7. Imputed Rent (including property taxes).* Imputed rental income from owner-occupied housing is allocated in proportion to deductions for real estate taxes for the top ten percent and the rest of the NIPA total is allocated to the lower 90 percent. Note that these imputed rents are pre-tax and thus include property taxes. Non-housing rents from consumer durable goods, such as cars and washing machines are excluded from national income and hence not included. Including these other rents would likely reduce top income shares by a small amount.

[29] Gini coefficients are also relatively unchanged by adding underreported income in the TCMP data for various years between 1979 and 1988 (Bishop, Formby, and Lambert, 2000).

[30] Similarly, Auten and Gee (2009) found that underreported income as a fraction of reported income was highest in the bottom quintile and lowest in the top one percent in 1988.

*8. Employer Payroll Taxes*. Despite their statutory label, the full burden of employer payroll taxes is generally assumed to fall upon workers and arguably should be considered in their pre-tax economic income. These payroll taxes are estimated based on reported wages for filers. Missing amounts relative to NIPA totals, usually 5 to 10 percent, are due to non-filers and allocated to the bottom of the distribution.

*9. Employer Insurance*. Employer-provided insurance is non-taxable income and thus another important addition to tax-based incomes. Between 1960 and 2015, these benefits increased from 1 to 5 percent of income. Since the value of employer-provided health insurance makes up most of employer-provided insurance, but has only recently become available in tax data, the distribution of employer-provided insurance is based on health insurance amounts reported on 2015 Form W-2. Bureau of Labor Statistics data presented in Warshawsky (2016) suggest that the distribution of this benefit in top earnings groups was very similar in 1992 (see the online appendix).[31]

*10. Retirement Account Income*. The treatment of retirement savings and income presents difficult choices when thinking about inequality (Nelson, 1987). The basic options are to count retirement income when it accrues, when it is distributed, or both. Under the first option, contributions to retirement accounts are counted when the income is earned and investment income on retirement savings is counted as it accrues. This accrual approach implies that many retired people have very little income. This is especially important if an accrual approach is applied to Social Security retirement, as the 2015 benefits paid were over $800 billion, about equal to total private pension and IRA distributions ($639 and $214 billion, respectively). If retirement income is counted only when distributed, this provides better measures of the current incomes of retired people and their ability to consume, but relative to an accrual approach this shifts income from individuals' working years.[32] Some studies count retirement income both when accrued and when distributed, but this double counts retirement income.

There are a number of additional problems with counting retirement on an accrual rather than distribution basis. Using accrued retirement income distorts measures of effective income tax rates because retirement contributions and returns are not generally subject to individual income taxes in the year they accrue but instead taxed upon distribution. An accrual approach therefore biases downward estimated tax rates of top earners in recent years. In addition, measuring the accrual of defined benefits can be problematic due to non-linear vesting rules, underfunding of promised pensions, and uncertainty about future wages and lifespans. Moreover, defined benefit plans act like annuities—if you live another year you essentially "earn" the income that year. This suggests that a distribution basis may be a more appropriate treatment for this type of plan. In summary, compared to an accrual basis, a distribution basis of retirement income is more consistent with the timing of tax burdens, the functioning of retirement systems, and a current year welfare perspective. Therefore, we start with a distribution approach that includes taxable income from pensions, retirement account distributions, and annuities but excludes retirement account contributions and income to prevent double counting.

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[31] The amount spent on health insurance may differ from the value to the employee (Baicker and Chandra, 2006). Some healthy or financially constrained employees may value insurance less than the actual cost to the employer, while others may argue that the value exceeds the actual cost, in part because of the tax exclusion of this fringe benefit.

[32] The distribution approach to retirement income is used in most studies of income inequality, including PS.

Since the accumulation of retirement account income has outpaced distributions, the difference needs to be included to match national income. Dividend and interest income of retirement accounts, also referred to as inside buildup, is therefore added to pre-tax income. Note that corporate retained earnings and taxes have already been allocated to retirement account owners. The difference between current year retirement account contributions and taxable distributions is also added to conform to national income retirement totals. These adjustments are on an accrual basis, allocated by wages for the share of corporate ownership by DB plans and otherwise by the share of DC wealth. Overall, this results in a mixed distribution/accrual approach that fully accounts for retirement account income totals in national income.

*11. Remaining Indirect Taxes and Other Income*. Remaining indirect taxes, which are mostly sales tax, are allocated by disposable income (defined below) less savings.[33] Saving rates are significantly larger for higher income groups and come from the Surveys of Consumer Finance estimates presented in Dynan, Skinner, and Zeldes (2004). A small amount of business transfers and subsidies, surplus of government enterprises, and dividends and interest income of non-profits/governments are allocated as above (half per capita and half by wages). Transfers largely consist of donations, insurance payments, losses due to fraud and theft, deposit insurance premiums, fines and fees, lawsuit settlements, and excise taxes paid by non-profits. Subsidies are mostly federal payments for housing and agriculture. Finally, Federal Reserve payments to the U.S. Treasury, which have grown substantially since 2008 and are mostly interest on mortgage and Treasury securities, are allocated by mortgage interest deductions.

*III.C. Pre-Tax/After-Transfer Income*

Government cash and non-cash transfers are sequentially added to pre-tax income to estimate pre-tax/after-transfer income (Table 2).[34] First, Social Security and unemployment benefits reported on tax returns are added to income. The remaining NIPA Social Security and unemployment benefits are added to the income of the bottom 90 percent.[35] For earlier years, when these benefits were not reported on tax returns, 1980s distributions are used for allocation to income groups. Second, the NIPA value of other cash transfers is added to income of the bottom 90 percent. These cash transfers include federal supplemental security income and refundable tax credits (generally, earned income and additional child tax credits), as well as cash transfers from state and local governments. In addition, $83 billion in 2008 stimulus payments are allocated to qualifying tax filers. Third, the NIPA value of Medicare is added by assuming each income group receives a share proportional to the number of adults aged 65 or older. Finally, the NIPA value of remaining non-cash transfers, such as Medicaid and food stamps, is added to income of the bottom 90 percent. As shown in Table 2, the inclusion of transfers decreases top one percent income shares with a growing effect over time: 0.5 percentage points in 1960, 0.9 in 1979, and 1.9 in 2015.

*III.D. After-Tax Income*

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[33] The inclusion of these taxes in pre-tax income can be thought of as a shift from conventional tax-inclusive prices to tax-exclusive prices, essentially increasing real purchasing power.

[34] Pre-tax/after-transfer income does not net out taxes used to pay for these government transfers and therefore exceeds national income. This treatment is consistent with measures of before-tax income in Congressional Budget Office (2016), gross income in the Luxembourg Income Study, and transfer-inclusive income definitions used by the Census Bureau.

[35] Adding Social Security benefits strongly impacts non-filer incomes because about half of non-filing individuals are aged 65 and over. Assuming that 60 percent of these individuals are married, their tax unit income is about 10 percent of average filer income without Social Security benefits and 40 percent with them.

Taxes are subtracted from pre-tax/after-transfer income sequentially in order to show the effect of each tax on top one percent shares. To match national income, two final adjustments fully account for the government sector by including government deficits/surpluses and non-transfer government spending (Table 2).

*1. Federal Individual Income and Estate Taxes.* Several adjustments are made to federal individual income tax liability before it is subtracted. Foreign tax credits, which reflect foreign withholding taxes paid, are added back to federal income taxes. Refundable portions of tax credits are not accounted for here because they are already included in cash transfers in pre-tax income. Finally, self-employment taxes are included later with other payroll taxes.

The estate tax encourages planning over many years prior to the actual payment of the tax. Therefore, we assume that estate and gift taxes are borne by decedents with an equal probability over the decade before estate taxes are filed. Using population tax data, we estimate the fraction of estate tax paid by decedents in various income groups in each of these years. This approach accounts for year-to-year income variability among high-wealth individuals (see the online appendix). Relative to alternative approaches, such as the Piketty and Saez (2007) assumption that decedent income and wealth rankings are equivalent, our approach instead relies on the more complex relationships among income dynamics, wealth, and estate tax policy.

*2. State/Local Individual Income Taxes.* State and local income taxes and residential real estate taxes (discussed below) are allocated by deducted amounts. The difference between the amounts accounted for on tax returns with itemized deductions and NIPA totals are attributed to the bottom 90 percent of the distribution, which includes non-filers and almost all non-itemizers. Since the overwhelming majority of tax returns at the top of the distribution itemize deductions (including state income taxes and residential real estate taxes), this approach provides good measures for top income groups.[36]

*3. Corporate Taxes.* Corporate income taxes are those previously calculated for pre-tax income.

*4. Property Taxes.* Property taxes (both business and residential property taxes included with imputed rent) are those previously calculated for pre-tax income.

*5. Payroll Taxes.* Payroll taxes include employee and employer taxes, as well as self-employment taxes reported on tax returns. Employee payroll taxes are equal to previously calculated employer taxes except for years with special rates (1984, 2011, and 2012).[37]

*6. Sales and Other Taxes.* Sales and other taxes are allocated by disposable income (after-tax income at the stage above, after subtracting payroll taxes) less savings.

*7. Government Deficits/Surpluses.* Government deficits/surpluses are allocated by federal payroll and income taxes paid because almost all deficits are at the federal level.

*8. Government Consumption.* Government consumption includes spending valued at cost of military expenditures, schooling costs, and other non-transfer government spending. Prante and

[36] Between 1960 and 2015, generally at least 95 percent of the top one percent itemized deductions.
[37] The revenues from the 0.9 percent Additional Medicare Tax, which began in 2013, are included in federal income taxes.

Chamberlain (2007) discussed issues with allocating government consumption and argue for an equal per household allocation. The Congressional Budget Office (2013) fully allocated government consumption either per capita or by market income, suggesting that both rely on problematic assumptions. We allocate government consumption half per capita and half by after-tax income. This accounts for a mixture of per capita or evenly distributed spending (for example, the pure public good component of police and military spending) and that higher income individuals may derive more benefits from some government spending (for example, public university spending). The incidence of this spending is quite uncertain and deserves further study, but we think that allocating half per capita is more reasonable than the PSZ allocation of none per capita.

## IV. Results

This section summarizes our basic findings and compares our top income share estimates to PS and PSZ. Next, it discusses implications for computations of the distribution of economic growth and effective tax rates.

### *IV.A. Moving from PS Fiscal Income to National Income Measures*

First, we compare our income measures to PS fiscal income. Using our measures of income that are more consistent over time and capture sources not included in tax-based measures has a dramatic effect on top income shares. These results and comparisons are shown in Figure 4 as well as Tables 1 and 2. Since the addition of retained earnings can be viewed as reflecting capital gains accruing inside of C corporations, our income measures are compared to PS fiscal income including capital gains.

For 1960, our estimate of the top one percent share of pre-tax income is 11.4 percent, 2.4 percentage points higher than the PS income estimate of 9.0 percent. The most important factor in this higher share is the addition of pre-tax C corporation income (including corporate retained earnings and taxes) in place of realized capital gains. This reflects the sheltering of income inside corporations to avoid high individual income tax rates.

For 2015, our pre-tax income share is 14.2 percent, while the PS income share is 20.3 percent. The most important factors in this difference are controlling for the decrease in the marriage rate of lower income tax units (1.9 percentage points), replacing realized capital gains with pre-tax C corporation income (1.1 percentage points), including employer-provided insurance (0.8 percentage points), and including the employer share of payroll taxes (0.6 percentage points).

Our measure of pre-tax/after-transfer income includes government transfers, the largest of which is Social Security benefits. In 1960, the top one percent pre-tax/after-transfer income share was only slightly lower than our pre-tax income share (10.9 vs. 11.4 percent) because government transfers were relatively small. In 2015, the share was about two percentage points lower (12.3 vs. 14.2 percent). Using the 2010 Survey of Consumer Finances, Bricker et al. (2016b) similarly estimate that including transfers decreased the top one percent share by 2.3 percentage points. Congressional Budget Office (2016) supplemental data suggest that including transfers decreased 2010 top one percent income shares by 2.4 percentage points.

For after-tax our income, top one percent shares fluctuate with the business cycle, but were nearly flat over the last five decades. The estimated increase in the top one percent after-tax income share since 1960 is negligible compared to the PS estimate (0.3 vs. 11.3 percentage

points). The overall difference in the top share increase of 11.0 percentage points is accounted for as follows: 2.8 percentage points from using C corporation retained earnings in place of realized capital gains, 1.5 percentage points from including corporate taxes and business property taxes, 1.4 percentage points from including government transfers, 1.2 percentage points from including underreported income, 1.1 percentage points from setting income groups by individuals and size-adjusted incomes, 1.0 percentage point from accounting for taxes and government surplus/deficits and consumption, 0.9 percentage point from correcting filer demographics and income definitions, and 0.9 percentage point from including employer paid payroll taxes and insurance.

While only top one percent income shares are discussed here, increases in income shares for the top 10 percent and top 0.1 percent are also much smaller for pre-tax and after-tax incomes (Figure A1).

*IV.B. Comparison with PSZ Estimates*

There are numerous differences in the approach we and PSZ take to distribute national income across the U.S. population. These result in large differences in our estimated increases in top one percent shares. As seen in Figure 1 and summarized in Table 3, between 1960 and 2014 (the latest year estimated by PSZ), the PSZ pre-tax top one percent share increases by 7.6 percentage points (12.6 to 20.2 percent), while our share increases by 2.8 percentage points (11.4 to 14.3 percent). The PSZ after-tax share increases 5.6 percentage points (10.0 to 15.7), while our after-tax top share increases by 0.3 percentage points (8.5 to 8.8 percent).

Our estimated changes in top income shares were similar to PSZ in earlier decades but then diverge. From 1960 to 1979, the PSZ share decreases 1.4 percentage points (12.6 to 11.2 percent) and our pre-tax top one percent income share decreases by 1.3 percentage points (11.4 to 10.1 percent). This similarity is because during these decades most of the income excluded from tax returns was from retained earnings and our approaches for allocating this income have similar distributional effects. From 1979 to 2015, however, the PSZ increase was 9.0 percentage points (11.2 to 20.2 percent), while our increase was only 4.3 percentage points (10.1 to 14.3 percent).[38] For after-tax income, there are additional differences in our estimates. From 1960 to 1979, the PSZ after-tax top one percent income share decreases 0.9 percentage point (10.0 to 9.1 percent) and our share decreases by only 0.3 percentage point (8.5 to 8.2 percent). From 1979 to 2015, the PSZ share increases by 6.5 percentage points (9.1 to 15.7 percent), as compared to our estimated increase of only 0.7 percentage point (8.2 to 8.8 percent).

To understand the relative impact of our different approaches, Table 4 presents estimates of how the top one percent income share changes when moving between our approach and PSZ's. In 2014, our top one percent pre-tax income share is 14.3 percent, or 5.8 percentage points below the PSZ estimate of 20.2 percent. When this large pre-tax difference is already taken into account, our top one percent after-tax income share is one additional percentage point lower than the PSZ estimate.[39]

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[38] While reduced in magnitude, there is still a jump in the top one percent share between 1986 and 1988. This remaining jump is partly due to shifting of some income from 1986 to 1987 and a larger amount of shifting from 1987 to 1988 when taxpayers had a full year to plan how to take advantage of the decrease in the top individual tax rate from 50 percent to 38.5 percent and then 28 percent. In addition, some base-broadening provisions were phased in over several years.

[39] In 1962 and 1979, PSZ pre-tax top one percent shares are only about one percentage point larger than ours and the after-tax differences are negligible (see online appendix).

For pre-tax incomes, we consider twelve separate differences in our approaches, which are discussed in the online appendix. Most of these differences explain a fraction of the larger PSZ estimate. The effects on top one percent income shares can be summarized as follows: nearly four-tenths from differences in allocating underreported income (top line of Table 4), two-tenths from the treatment of retirement income, one-tenth from other taxes being allocated by our measure of disposable income less savings versus PSZ factor income less savings (which ignore effects from taxes, transfers, and retirement income), one-tenth from our various corrections to tax return based income and the sample (next two lines in the table), one-tenth from differences in non-retirement pre-tax corporate income including corporate tax differences, and about one-tenth from other differences (final six lines for pre-tax income). Note that the PSZ pre-tax income definition includes social insurance benefits and deducts social insurance taxes. In comparison, our pre-tax income excludes these transfers and retains these taxes to be more consistent with pre-tax national income concepts. As seen in Table 4, this difference has little effect on the top one percent share.

About four-tenths of the difference in pre-tax top one percent shares, or two percentage points, is due to PSZ attributing much more underreported income to top earners than suggested by the IRS audit data. Most of this results from PSZ distributing underreported passthrough income by positive reported passthrough income.[40] In 2014, this implies distributing about 50 percent of underreported income to the top one percent. But, audit data suggests that only about 15 percent should go to the final top one percent after re-ranking. This difference in the allocation of underreported passthrough income explains 1.4 percentage points of the gap.[41] In response to our critique, PSZ explained that they allocate more underreported income to the top of the distribution because of lower-quality audits of complex partnerships. The PSZ approach, however, effectively removes income from lower in the distribution that was estimated from audits and transfers that income to the top. A more correct approach to deal with income unaccounted for by audits would be to estimate how much additional income they believe is underreported, with the additional amount added to national income.

After accounting for the differences in our pre-tax income estimates compared to PSZ, there is only one percentage point of remaining difference between our after-tax top one percent income shares for 2014. The largest effect is 1.2 percentage points due to PSZ allocating all of government consumption by after-tax income and none per capita. This assumption ignores the redistributive and public goods aspects of government consumption captured by our half per capita allocation. Another half a percentage point is due to the allocation of government deficits. These two effects, which lower our top share estimates relative to PSZ, are partially offset by differences in the distribution of corporate and other taxes (essentially undoing their pre-tax differences).

*IV.C. Distribution of Economic Growth*

Correcting income measures may also have implications for understanding computations of the distribution of U.S. economic growth over time. As shown in Table 5, the approach of PS (online

[40] When distributing underreported income, PSZ truncate business income at zero. This ignores the substantial share of underreported business income found on tax returns with reported business losses. It is important to note that our more careful and consistent treatment of business losses plays an important role in explaining our differences in several places.

[41] [(50%-15%) • $0.6 trillion in underreported non-wage income] / $15.2 trillion national income = 1.4%

updates) using unadjusted tax return based incomes implies that about three-quarters (73%) of the increase in fiscal income between 1979 and 2014 went to the top one percent of tax units. PSZ estimates suggests that they received one-third (36%) and one-quarter (27%) of the pre- and after-tax increases. In comparison, our estimates imply that only one-quarter (23%) of the increase in pre-tax income went to the top one percent and one-tenth (8%) for after-tax income. Using this cross-sectional approach, our income measures thus suggest that economic growth has been shared more equally than implied by market income as reported on tax returns or as estimated by PSZ.[42]

It is important to note that such cross-sectional computations of the distribution of economic growth convey the impression that it is the same people at the top of the income distribution over time. The beneficiaries of economic growth, however, *cannot* be determined by comparing two cross-sections because the members of income groups change over time. More than one-third of 1979 adults filing tax returns died by 2014 and were replaced by a larger cohort of new adults and immigrants moving into the 2014 sample. This new cohort of adults earned more than half of AGI in 2014. In addition, income mobility studies show that it is not the same people at the top across years and that the incomes of the majority of those in top income groups in a given year decline in later years. For example, Kopczuk, Saez, and Song (2010) estimated that about 40 percent of individuals in the top one percent of wages drop out after five years. Auten, Gee, and Turner (2013) found that at least one-third of tax units in the top one percent of incomes drop out after one year and more than two-thirds after five years. Auten and Gee (2009) found that median incomes of those in the top one percent decreased over 30 percent after ten years.

Considering income dynamics of specific people provides a very different perspective. The PSZ cross-sectional approach implies pre-tax real average annual growth rates since 1980 of less than 0 percent for the bottom quintile, 0.5 percent for the median, and 6 percent for the top 0.01 percent. The Auten and Gee (2009) panel approach for 1996 to 2005 shows real median annual growth rates of 19 percent for those starting in the bottom quintile, 4 percent for the median, and -2 percent for the top 0.01 percent.[43] Thus a panel approach shows that those starting at the top of the distribution experience income declines, the opposite of cross-sectional comparisons. Thus, most of those at the top in a particular year earn little, if any, of the economic growth in following years. Instead, incomes of those in the lowest income groups increase by the largest percentages in following years, suggesting that economic growth is shared more equally throughout the income distribution if one tracks the incomes of individuals over time rather than comparing cross-sections in different years.

*IV.D. Tax Burdens*

The top statutory federal individual income tax rate has fallen dramatically from 91 to 39.6 percent between 1960 and 2015. But top tax rates present only a limited picture of the true tax burden of the top one percent. Before TRA86, high-income taxpayers could take advantage of various tax shelters and only a small fraction of taxpayers were actually subject to the top tax rates. Since TRA86, many high-income tax shelters have been closed or made uneconomic by lower rates and the top rates apply to many more taxpayers. Meanwhile, the bottom 90 percent

[42] Between 1979 and 2014, average real income of the bottom 90 percent increased only 3% for PS fiscal income and 27% for PSZ pre-tax national income. For our estimates, it increased 52% for pre-tax income and 65% for after-tax income.

[43] These losses are not explained only by the mean reversion of capital gains. Considering only earnings, Splinter, Diamond, and Bryant (2009) estimated that between the business cycle peaks of 1999 and 2007, the average annual change of tax units starting in the top 0.01 percent was -9 percent.

has benefitted from increased tax credits and receives a larger share of income from tax-preferred and tax-exempt sources. These considerations suggest that it would be useful to examine overall tax burdens using a consistent measure of broad income. Figure 5 shows total federal, state, and local tax burdens as a percent of pre-tax/after-transfer income—i.e., the average effective tax rate—and the distribution of this burden by type of tax for the top one percent (upper figure) and the bottom 90 percent of individuals (bottom figure). Payroll taxes are excluded at this point and considered later along with social insurance benefits.

Total tax burdens (excluding payroll taxes) of the top one percent ranged from 29 to 43 percent over this period, averaging 35 percent and with no clear trend. Indeed, the average tax burden was 37 percent in 1960 and 41 percent in 2015.[44] While a constant tax burden with falling statutory tax rates may seem surprising, it is consistent with earlier analyses of tax burdens in the 1960s.[45] Despite the persistence of the overall tax burden for the top one percent, the type of taxes paid has changed substantially. In 1960, about one-third of their taxes were from federal individual income taxes, one-third from corporate income taxes, and one-third from state and local taxes. In 2015, about two-thirds were from federal individual income taxes.[46] Corporate and property taxes decreased substantially as a percent of income, while state and local income taxes increased for the top one percent.

The variation in average effective tax rates of the top one percent over this period is primarily due to factors affecting federal individual income tax liabilities. First, top incomes are highly procyclical, pushing a larger fraction of their incomes into higher tax brackets during expansions and lower brackets during recessions. Second, top statutory tax rates have changed frequently. Especially prominent are the 1968–1970 Vietnam War surtax and the top rate increase in 1993. Third, the individual income tax includes capital gains taxes, even though pre-tax income replaces realized capital gains with corporate retained earnings. The spike in 1986 in taxes paid by the top one percent was due to the unlocking of unrealized gains before capital gains tax rates increased with TRA86.

Our estimated top one percent tax burdens for the 1960s are lower than measures based on unadjusted tax return based income, such as Piketty and Saez (2007). For example, they estimated an average top one percent federal income tax rate for 1960 of 24 percent, compared to our estimate of 14 percent. Our lower effective rate is due to including retained corporate earnings in place of realized capital gains, as well as other sources excluded from tax return incomes. In more recent years there is much less difference in our estimates. For 2004, we both estimate an effective federal individual tax rate of about 21 percent. This obscures two offsetting differences. The inclusion of various untaxed income sources lowers our rate, while grouping by the number of individuals increases our rate. Since the marriage rate is much higher for the top one percent, grouping by the number of individuals means that the top one percent includes fewer tax units and consequently higher average incomes and tax burdens.

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[44] If payroll taxes are included, total tax burdens of the top one percent ranged from 30 to 46 percent, averaging 36 percent and with values of 37 percent in 1960 and 43 percent in 2015.

[45] For the top one percent in 1966, Okner (1975) estimated that total federal, state, and local taxes ranged from 32 to 39 percent of his measure of adjusted family income using a broad range of incidence assumptions. Our estimate of about 36 percent for 1966 falls in the middle of this range. This 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, p. 219) for similar policies in the 1930s.

[46] In 2013, the average federal individual income tax rate of the top one percent increased about 4 percentage points due to the increase in the top rate and the adoption of two new surtaxes (Auten, Splinter, and Nelson, 2016).

Figure 5 suggests that taxes reduce inequality more in recent decades than in 1960. While taxes for the top one percent fluctuated around 35 percent of income with no clear trend, taxes for the bottom of the distribution decreased from 18 to 14 percent of income.[47] The decreasing tax burden for the bottom 90 percent was primarily due to falling federal individual income taxes, especially from the growth in tax credits (Splinter, forthcoming). This suggests that the increase in overall tax progressivity was driven by to federal individual income tax changes.

Payroll taxes and the associated Social Security benefits and disability insurance (i.e., old age, survivor, and disability insurance, or OASDI), Medicare, and unemployment insurance are also important factors affecting the distribution of income. These social insurance transfers are dependent on having paid payroll taxes, and in the case of Social Security, increase with the amount of taxes paid. While payroll taxes appear regressive relative to annual income, the transfer side of these programs is progressive.[48] This asymmetry means that in order to more fully understand the distributional effects of these programs, the incidence of payroll taxes and social insurance transfers should be considered jointly.

Figure 6 shows that before the mid-1980s, payroll taxes were about equal to social insurance benefits as a percent of income for both the bottom 90 and top one percent.[49] Since then, payroll tax rates leveled off for the bottom 90 percent while their benefits continued increasing. Meanwhile, payroll taxes for the top one percent jumped in 1994 with the uncapping of the 2.9 percent Medicare tax while their benefits remained roughly constant as a percent of income since 1988. These changes increased the overall progressivity of the combined tax and benefits of social insurance policies.

The estimates in Figure 6 do not include the post-1983 income taxes on Social Security benefits of higher income taxpayers that goes into the Social Security Trust Fund. In addition, these exclude the earned income tax credit, which was intended in part to encourage work by offsetting the cost of payroll taxes. The effects of these two provisions were accounted for earlier in the analysis. If they were included here, we would see an even larger increase in the system's progressivity.

## V. Sensitivity Analysis

The main results presented above rely on a number of choices about the incidence of corporate taxes, the distribution of retained earnings, and the measurement of income groups. This section presents sensitivity tests of alternative assumptions and a discussion of offshore wealth. These sensitivity tests suggest that while alternative assumptions can result in modestly higher or lower top income shares and changes in these shares over time, they are within half a percentage point of our main results (Table 6).

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[47] Including refundable tax credits here, rather than with transfers, would decrease 2015 bottom 90 percent tax rates an additional percentage point to 13 percent.

[48] The OASDI tax base is capped and Medicare (i.e, HI) taxes were also capped before 1994. Below these caps, earnings are taxed proportionally. Social Security benefits are paid relative to average earnings using a progressive formula, under which 90 percent of initial average earnings translate into benefits but less than a third of average annual earnings over about $50,000 in 2018. Accounting for differences in longevity would attenuate the system's progressivity from a lifetime perspective.

[49] Two exceptions were periods in the early 1970s and early 1980s when Social Security acted as an automatic stabilizer during severe recessionary periods, raising incomes for the bottom 90 percent.

The incidence of the corporate income tax has long been a controversial tax policy issue and researchers have drawn different conclusions. As discussed earlier, our analysis distributes 25 percent of the corporate tax burden by wages and 75 percent by corporate capital and interest-bearing assets. Using this approach, the top one percent shares of pre-tax income increased from 11.4 to 14.2 percent between 1960 and 2015, an increase of 2.8 percentage points. Alternatively, distributing half of the corporate tax by wages (as suggested by recent studies) and half by corporate capital and interest-bearing assets results in lower top one percent pre-tax income shares of 11.1 and 14.1 percent, but a larger increase of 3.0 percentage points. Distributing all by corporate capital and interest-bearing assets results in higher top one percent pre-tax income shares of 11.8 and an unchanged 14.2 percent, and a smaller increase of 2.5 percentage points. Distributing the corporate tax to all forms of non-housing capital, including passthrough capital (similar to PSZ), raises top one percent pre-tax income shares by only 0.2 percentage points in these years, resulting in an unchanged increase of 2.8 percentage points.[50]

Corporate retained earnings can also be allocated in different ways. Rather than allocating 25 percent by capital gains and 75 percent by dividends, we examine distributing 50 percent by capital gains and 50 percent by dividends. Table 6 shows that this approach decreases the levels of top one percent after-tax income shares by only 0.1 percentage points.

In order to present an estimate of income closer to welfare, we base income groups on the number of individuals and rank by size-adjusted incomes. This controls for both the bias resulting from the decline in marriage rates and the bias from increasing proportions of single-parent households. Rather than setting income groups by the number of individuals, they could be set by the number of households as in Larrimore, Mortenson, and Splinter (2017), the number of tax units as in PS, or the number of adults as in PSZ. Consider the effect of setting pre-tax income groups by the number of adults. First, ranking adults by tax unit income isolates the effect of falling marriage rates. This leaves the 1960 share unchanged but decreases the 2015 share. Second, consider ranking adults by equal-split incomes, as in PSZ. This slightly increases the 1960 share but leaves the 2015 share unchanged. Finally, consider the effects of ranking adults by unequal-split wages (and equal-split non-wage income), where married filer wages are split according to IRS data by AGI group. This substantially increases top one percent shares in 1960, when spousal wages were more unequal and there were fewer two-earner couples, and results in a small *decrease* in top one percent after-tax income shares.[51]

How might the inclusion of income from unreported offshore wealth affect top income shares? Using distributions of positive trust income, Saez and Zucman (2016) estimate that offshore wealth would increase top one percent wealth in 2012 by about $550 billion. Assuming that this wealth earns a 5 percent return and is owned by the same individuals in the top of the income

[50] Distributing the corporate tax to all non-housing capital, including non-C corporation capital would imply an infinite elasticity of substitution between different forms of business organization or a long-run equilibrium. While there was some immediate switching from existing C corporations to S corporation status following TRA86, most of the shift into the passthrough sector occurred gradually from more new businesses forming as S corporations or partnerships, as discussed in the appendix and Auten, Splinter, and Nelson (2016). This suggests significant frictions between the C corporate sector and other forms of business, especially for larger corporations whose shares are publicly traded.

[51] Note that the equal-split approach assumes equal sharing of income but no economies of scale. It also doesn't take into account dependents for either their effects on income per person or in determining thresholds for each income group. PSZ also estimate income shares with unequal-split wages, which increases their after-tax estimate of the top one percent share in 1960 by about one percentage point.

distribution, it would increase our top one percent pre-tax income shares by only about 0.2 percentage points.[52]

While our approach does not allow us to break out the bottom 50 percent of the income distribution to allow sensitivity tests, a number of methodological differences suggest that PSZ under-estimate the income of this group. First, our analysis adds back net operating loss carryovers from prior years. These returns of typically wealthy individuals often have negative AGIs and are therefore in the bottom of the PSZ distribution. Our income measures change many incomes from negative to positive values, moving such returns well up in the income distribution, even to the top one percent. PSZ do not make this adjustment, and as a result, these negative reported incomes reduce their estimated income for the bottom 50 percent. Second, as discussed previously, the ratio of unreported income to reported income declines as reported income rises. The PSZ allocation of underreported income in proportion to reported income also tends to understate income of the bottom 50 percent. Third, our analysis includes alimony income when received and subtracts alimony paid. PSZ do not make these adjustments, reducing the income of alimony recipients in the bottom 50 percent. Finally, PSZ explain that they assign incomes of zero or very low amounts to the institutionalized population (about 4 million in 2010). In addition to individuals in jail or prison (2.3 million in 2010), this includes a growing number of middle- and upper-income individuals in retirement homes that likely file income tax returns. Their assumption is likely to understate incomes in the bottom 50 percent since some individuals will be counted twice (as filers and as part of this population with a zero income). While each of these issues these may have small effects, they raise concerns about the sensitivity of estimates for the bottom 50 percent.

Additional factors could further reduce our estimated top income shares. First, all of the studies considered here apply a constant 20-year-old threshold for independent tax units, but the trend of children starting school at later ages results in later completion of college and later entry into the labor force (Deming and Dynarski, 2008). While we partially address this change by removing dependent filers of any age, a more comprehensive exclusion of college students would further decrease our estimates of top income shares in recent years. Second, we allocate government consumption half per capita and half by taxes paid, which may understate the per capita allocation. Increasing the per capita share to three-quarters reduces the 2015 after-tax top one percent share by a third of a percentage point. Third, while our estimates account for alimony received and paid, they do not account for child support. For example, Census data show that in 2013 over 4 million custodial parents received average child support of about $5,300 (U.S. Census Bureau, 2016). Among custodial mothers below the poverty level, child support payments averaged about half of their total income including child support. These and other private transfers generally reallocate income from higher to lower income adults and therefore tend to decrease top income shares. Fourth, we assume that non-filers account for 15 percent of underreported income, but view as this as a conservative assumption and they may actually account for a larger share of underreported income. There may of course be other factors working in the opposite direction, but these considerations underline some of the uncertainties about income distribution estimates. As additional data become available, for example about underreported income, these estimates could be improved.

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[52] Johannesen et al. (2018) found an average nominal rate of return after 2008 of only 3 percent on recently reported offshore wealth and Zucman (2013) estimated average yield on offshore securities in 2008 of 3.5 percent, implying a real rate of return of only about 1 percent. IRS efforts to identify untaxed offshore income are on-going, which means that estimates at the present time are uncertain.

In summary, sensitivity tests suggest that while alternative assumptions can result in modestly higher or lower top income shares, our results appear robust. Our findings of lower levels of inequality and small increases in top income shares since 1960 change little from the main results.

## VI. Summary and Conclusions

Using tax return data, Piketty and Saez (2003) argued that the top one percent income share more than doubled compared to 1960. This analysis, however, did not account for the effects of major tax reforms, income sources not reported on individual income tax returns, or changes in marriage rates, which resulted in a distorted view of income inequality levels and trends. Piketty, Saez, and Zucman (2018) reached similar conclusions after addressing some of these issues by allocating total national income and measuring income groups by the numbers of adults. But other issues were left unaddressed and our analysis shows that their conclusions are highly sensitive to certain allocation assumptions. Alternative assumptions that we believe are more appropriate lead to quite different results, especially in recent decades.

Using administrative U.S. tax data, this paper develops measures of pre-tax and after-tax income that target total national income to examine levels and trends in top income shares from 1960 to 2015. Our measure of pre-tax top one percent income shares increased by less than 3 percentage points. While pre-tax income measures how individuals are compensated for their labor and investments, it provides an incomplete picture of the overall resources available across the income distribution. Our measure of after-tax top one percent income shares, which includes government transfers, increased less than half a percentage point since 1960. Even during the more recent period since 1979, we estimate that it increased less than one percentage point.

Our results highlight the importance of accounting for tax reforms and including income not reported on tax returns. The most important factors in our differences from Piketty and Saez (2003) are accounting for C corporation retained earnings, corporate and business property taxes, employer payroll taxes and insurance, and changing family structures. Our results also highlight the sensitivity of top income share estimates to the assumptions used to allocate income not reported on tax returns. For example, the most important difference with Piketty, Saez, and Zucman (2018) arises from the allocation of underreported income. In addition, we account for numerous changes in how income is reported on tax returns over time due to reforms.

Our results suggest an alternative narrative about top income shares: changes in the top one percent income shares over the last half century are likely to have been relatively modest.

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

| | Top 1% income shares | | | | | Top 1% share changes | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Adjustments** | **1960** | **1979** | **1985** | **1989** | **2015** | **1960** | **1979** | **1985** | **1989** | **2015** |
| Piketty-Saez fiscal income (with CGs) | 9.0 | 9.0 | 11.1 | 13.8 | 20.3 | ---- | ---- | ---- | ---- | ---- |
| Piketty-Saez fiscal income (no CGs) | 8.3 | 8.1 | 9.2 | 12.8 | 18.6 | -0.7 | -0.9 | -1.9 | -1.0 | -1.7 |
| *Adjustments to PS fiscal income & income groups* | | | | | | | | | | |
| Correct sample | 8.3 | 8.0 | 9.2 | 12.6 | 18.2 | * | -0.1 | -0.1 | -0.3 | -0.4 |
| Impose post-TRA86 loss limits | 8.4 | 8.2 | 9.7 | ---- | ---- | * | 0.2 | 0.5 | ---- | ---- |
| Add tax-exempt interest | 8.7 | 8.6 | 10.1 | 12.9 | 18.3 | 0.3 | 0.3 | 0.4 | 0.1 | -0.2 |
| Correct income definition | 8.7 | 8.5 | 9.9 | 12.7 | 17.8 | 0.0 | * | -0.1 | -0.2 | -0.5 |
| Set groups by #indivs/sz-adj. inc. | 7.9 | 7.6 | 9.2 | 11.7 | 16.0 | -0.8 | -0.9 | -0.7 | -1.0 | -1.9 |
| **Corrected fiscal income & total chg.** | **7.9** | **7.6** | **9.2** | **11.7** | **16.0** | **-1.1** | **-1.4** | **-1.9** | **-2.1** | **-4.4** |
| *Expansions to PS fiscal income* | | | | | | | | | | |
| Fiduciary retained income | 8.1 | 7.9 | 9.5 | 12.0 | 16.1 | 0.2 | 0.3 | 0.3 | 0.3 | 0.2 |
| C-corp retained earnings | 10.4 | 9.7 | 10.5 | 12.4 | 16.8 | 2.4 | 1.8 | 1.0 | 0.4 | 0.6 |
| C-corp taxes | 11.8 | 10.1 | 10.6 | 12.5 | 17.0 | 1.4 | 0.4 | 0.1 | 0.1 | 0.2 |
| Business property tax | 12.4 | 10.3 | 10.7 | 12.6 | 17.2 | 0.6 | 0.2 | 0.2 | 0.2 | 0.3 |
| Inflation correction for interest | 12.5 | 10.8 | 11.1 | 13.1 | 17.2 | 0.1 | 0.6 | 0.3 | 0.4 | * |
| Underreported income | 13.1 | 11.9 | 11.8 | 13.2 | 16.6 | 0.6 | 1.0 | 0.7 | * | -0.6 |
| Imputed rent | 12.7 | 11.7 | 11.7 | 13.0 | 16.2 | -0.4 | -0.2 | -0.1 | -0.2 | -0.4 |
| Employer payroll tax | 12.5 | 11.2 | 11.2 | 12.4 | 15.7 | -0.3 | -0.5 | -0.5 | -0.6 | -0.6 |
| Employer insurance | 12.3 | 10.8 | 10.8 | 11.9 | 14.9 | -0.2 | -0.4 | -0.4 | -0.5 | -0.8 |
| Retirement account income | 12.4 | 11.0 | 11.0 | 12.2 | 15.3 | 0.1 | 0.2 | 0.3 | 0.3 | 0.4 |
| Indirect taxes, non-profits, etc. | 11.4 | 10.1 | 10.0 | 11.2 | 14.2 | -1.0 | -0.9 | -1.1 | -1.0 | -1.1 |
| **Pre-tax income & total changes** | **11.4** | **10.1** | **10.0** | **11.2** | **14.2** | **2.4** | **1.1** | **-1.1** | **-2.6** | **-6.1** |

*Notes:* Total changes are relative to the Piketty and Saez series with capital gains (thresholds set without capital gains). See Table A1 and the online appendix for detailed description of adjustments. * denotes changes between -0.05 and 0.05 percentage points.
*Sources:* Authors' calculations and Piketty and Saez (2003 and updates).

**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** | **2015** | **1960** | **1979** | **1985** | **1989** | **2015** |
| **Pre-tax income** | 11.4 | 10.1 | 10.0 | 11.2 | 14.2 | ---- | ---- | ---- | ---- | ---- |
| *Pre-tax/after-transfer Income, Add transfers* | | | | | | | | | | |
| Social Security benefits | 11.2 | 9.7 | 9.5 | 10.7 | 13.5 | -0.2 | -0.4 | -0.4 | -0.5 | -0.7 |
| Unemployment benefits | 11.1 | 9.6 | 9.5 | 10.7 | 13.5 | -0.1 | * | * | * | * |
| Other cash transfers | 10.9 | 9.5 | 9.4 | 10.6 | 13.2 | -0.2 | -0.1 | -0.1 | -0.1 | -0.2 |
| Medicare | ---- | 9.4 | 9.3 | 10.4 | 12.8 | ---- | -0.1 | -0.1 | -0.2 | -0.4 |
| Other non-cash transfers | 10.9 | 9.2 | 9.1 | 10.2 | 12.3 | * | -0.2 | -0.2 | -0.2 | -0.5 |
| **Pre-tax/after-transfer income & total changes** | **10.9** | **9.2** | **9.1** | **10.2** | **12.3** | **-0.5** | **-0.8** | **-0.9** | **-1.0** | **-1.9** |
| *After-tax Income, Remove taxes* | | | | | | | | | | |
| Federal indiv. income & estate tax | 10.2 | 8.5 | 8.1 | 9.0 | 10.2 | -0.8 | -0.7 | -1.0 | -1.2 | -2.1 |
| State/Local indiv. income tax | 10.1 | 8.4 | 7.9 | 8.7 | 9.8 | -0.1 | -0.1 | -0.2 | -0.3 | -0.5 |
| Corporate income tax | 8.9 | 8.1 | 7.8 | 8.6 | 9.5 | -1.2 | -0.3 | -0.1 | -0.1 | -0.2 |
| Property tax | 8.4 | 8.0 | 7.8 | 8.5 | 9.3 | -0.5 | -0.1 | -0.1 | -0.1 | -0.2 |
| Payroll tax | 8.7 | 8.6 | 8.3 | 9.1 | 9.8 | 0.3 | 0.5 | 0.5 | 0.6 | 0.5 |
| Sales and other taxes | 9.0 | 8.9 | 8.5 | 9.3 | 9.9 | 0.3 | 0.3 | 0.2 | 0.2 | 0.1 |
| *After-tax Income, Add rest of government sector* | | | | | | | | | | |
| Government deficit/surplus | 9.7 | 9.2 | 8.5 | 9.5 | 9.3 | 0.7 | 0.3 | 0.0 | 0.2 | -0.6 |
| Government consumption | 8.5 | 8.2 | 7.8 | 8.5 | 8.8 | -1.2 | -1.0 | -0.7 | -1.0 | -0.4 |
| **After-tax income & total changes** | **8.5** | **8.2** | **7.8** | **8.5** | **8.8** | **-2.9** | **-1.9** | **-2.2** | **-2.7** | **-5.3** |

*Notes:* Total changes are relative to pre-tax income. Tax totals are based on NIPA amounts. Fuel and utility taxes are not included. See Table A1 and online appendix for detailed description of adjustments.
*Source:* Authors' calculations.

**Table 3: Comparison of top 1% income share increases**

| | **1960** | **1979** | **2014** | **1979–2014 Change** | **1960–2014 Change** |
|---|---|---|---|---|---|
| **PSZ pre-tax income** | 12.6 | 11.2 | 20.2 | 9.0 | 7.6 |
| **AS pre-tax income** | 11.4 | 10.1 | 14.3 | 4.1 | 2.9 |
| **PSZ after-tax income** | 10.0 | 9.1 | 15.7 | 6.5 | 5.6 |
| **AS after-tax income** | 8.5 | 8.2 | 8.8 | 0.7 | 0.3 |

*Notes*: Adjustments used to estimate various definitions of income are listed in Tables 1, 2, and A1 and described in detail in the online appendix.
*Sources:* Authors' calculations and Piketty, Saez, and Zucman (2018).

**Table 4: Decomposition of top one percent income shares by approaches, 2014**

| Auten-Splinter approach | PSZ approach | Percentage point difference | Percent of total difference |
|---|---|---|---|
| *Pre-tax income* | | | |
| Underreported income by IRS audit data | Underreported income by reported income | 2.2 | 38 |
| Include distributed & other retirement income | PSZ private retirement distribution | 1.1 | 19 |
| Other taxes by disposable income less savings | Other taxes by factor income less savings | 0.6 | 11 |
| Various corrections to tax income definition | Use uncorrected tax return market income | 0.4 | 8 |
| Limit returns to adult residents | No adjustment | 0.2 | 3 |
| Non-retirement pre-tax corporate income | PSZ non-retirement pre-tax corp. income | 0.6 | 10 |
| Imputed rent by property tax deductions | Imputed rent by housing wealth estimates | 0.3 | 5 |
| Groups by individuals/size-adjusted incomes | Groups by adults/equal-split married inc. | 0.2 | 4 |
| Federal Reserve payments by mortgage interest | Fed. Res. payments by income | 0.1 | 2 |
| Non-profits/govt. income half per capita | Non-profits/govt. income all by income | 0.1 | 2 |
| Social insurance benefits/deficit excluded | Social insur. ben./def. incl., taxes deducted | * | ^ |
| Inflation correction | No correction | -0.1 | -1 |
| **Pre-tax difference (PSZ less AS) & total percent difference** | | **5.8** | **100** |
| *After-tax income* | | | |
| Govt. consumption allocated half per capita | Govt. consumption all by after-tax income | 1.2 | 140 |
| Non-SS deficits by federal income taxes | Half by government transfers, half taxes | 0.5 | 59 |
| Government transfers as described in text | PSZ transfers distribution | -0.1 | -6 |
| Estate tax by prior decade decedent income | Estate tax by wealth distribution | * | -5 |
| Corporate taxes by wages and corp. ownership | Corporate taxes by capital ownership | -0.3 | -36 |
| Other taxes by disposable income less savings | Other taxes by factor income less savings | -0.4 | -52 |
| **After-tax difference (PSZ less AS) & total percent difference** | | **1.0** | **100** |

*Notes*: Auten-Splinter approach is described in text and in detail in the online appendix. Percentage point differences are from changing each assumption independently (as opposed to stacking changes) and therefore do not sum to the PSZ less AS difference. Results are the average changes in top one percent income shares of going from each AS to PSZ and PSZ to AS assumption (see online data for details). The total after-tax difference nets out the pre-tax difference. * denotes changes between -0.05 and 0.05. ^ denotes changes between -0.5 and 0.5 percent.
*Sources:* Authors' calculations and Piketty, Saez, and Zucman (2018).

**Table 5: Cross-sectional computations of total income increase earned by top 1%**

| | PS fiscal income | PSZ pre-tax | Auten-Splinter pre-tax | PSZ after-tax | Auten-Splinter after-tax |
|---|---|---|---|---|---|
| 1960-2014 | 38% | 26% | 16% | 20% | 7% |
| 1979-2014 | 73% | 36% | 23% | 27% | 8% |

*Notes*: These computations follow the approach of Piketty and Saez (online updates) and Piketty, Saez and Zucman (2018), which computes shares of income increases by comparing two cross-sectional distributions. Such computations do not produce meaningful results because there are different individuals in income groups every year due to income mobility and other changes in the sample composition due to aging into the sample or dying. PS fiscal income includes capital gains.
*Sources:* Authors' calculations, Piketty and Saez (online updates), and Piketty, Saez, and Zucman (2018).

**Table 6: Sensitivity analysis, changes in top 1% income shares**

| Alternative Allocation Assumptions | 1960 | 2015 | 1960–2015 Change |
|---|---|---|---|
| **Corporate tax burden alternatives (pre-tax income)** | | | |
| 25% wages/75% corporate capital (baseline) | 11.4 | 14.2 | 2.8 |
| 50% wages/50% corporate capital | 11.1 | 14.1 | 3.0 |
| 0% wages/100% corporate capital | 11.6 | 14.4 | 2.8 |
| **Corporate retained earnings (after-tax income)** | | | |
| individuals: 25% capital gains/75% dividends (baseline) | 8.5 | 8.8 | 0.3 |
| individuals: 50% capital gains/50% dividends | 8.4 | 8.7 | 0.3 |
| **Centile groups and ranking (after-tax income)** | | | |
| groups by # individuals, rank by size-adj. income (baseline) | 8.5 | 8.8 | 0.3 |
| groups by # adults, rank by tax unit income | 8.5 | 8.6 | 0.1 |
| groups by # adults, rank by equal-split inc. (PSZ) | 8.7 | 8.8 | 0.1 |
| groups by # adults, rank by unequal-split income | 9.0 | 9.0 | -0.1 |

*Notes*: Baseline assumptions are described in text and in detail in the online appendix. Assumptions for sensitivity analysis are described in the text.
*Sources:* Authors' calculations and Piketty, Saez, and Zucman (2018).

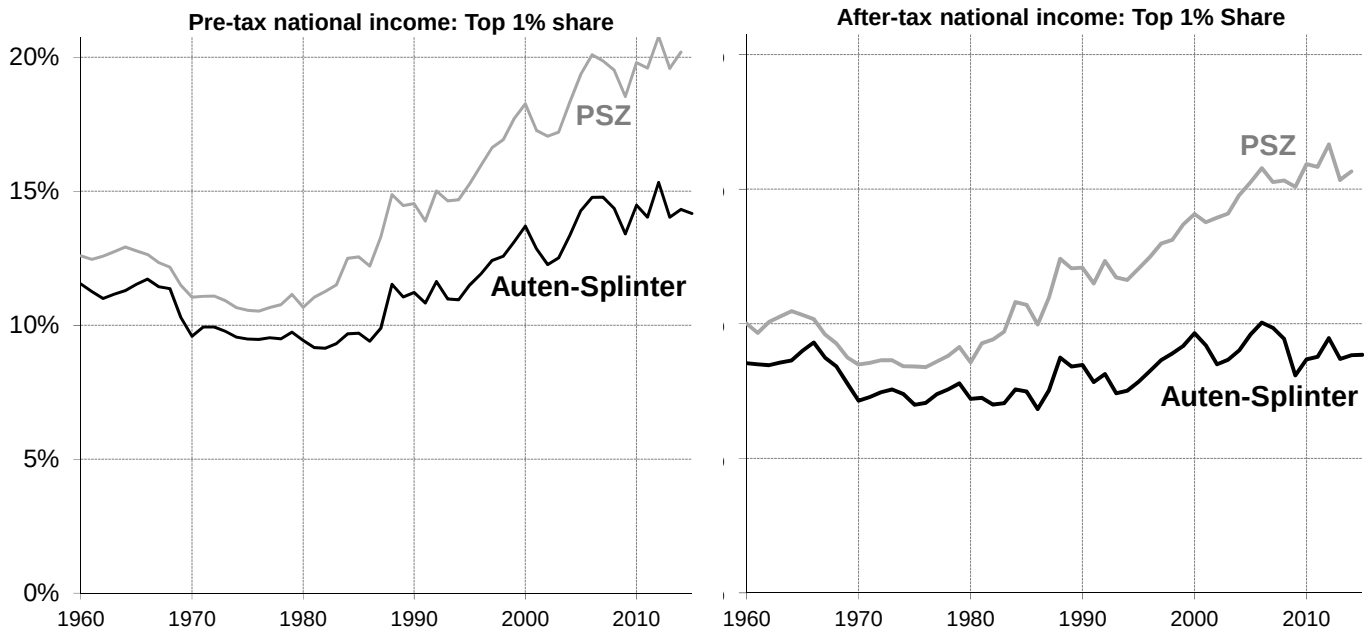


**Figure 1: Total income as a share of NIPA income**

*Notes*: Adjustments used to estimate Auten-Splinter pre-tax and after-tax income are listed in Tables 1, 2, and A1 and described in detail in the online appendix.
*Sources:* Authors' calculations, and Piketty, Saez, and Zucman (2018, PSZ in figure).

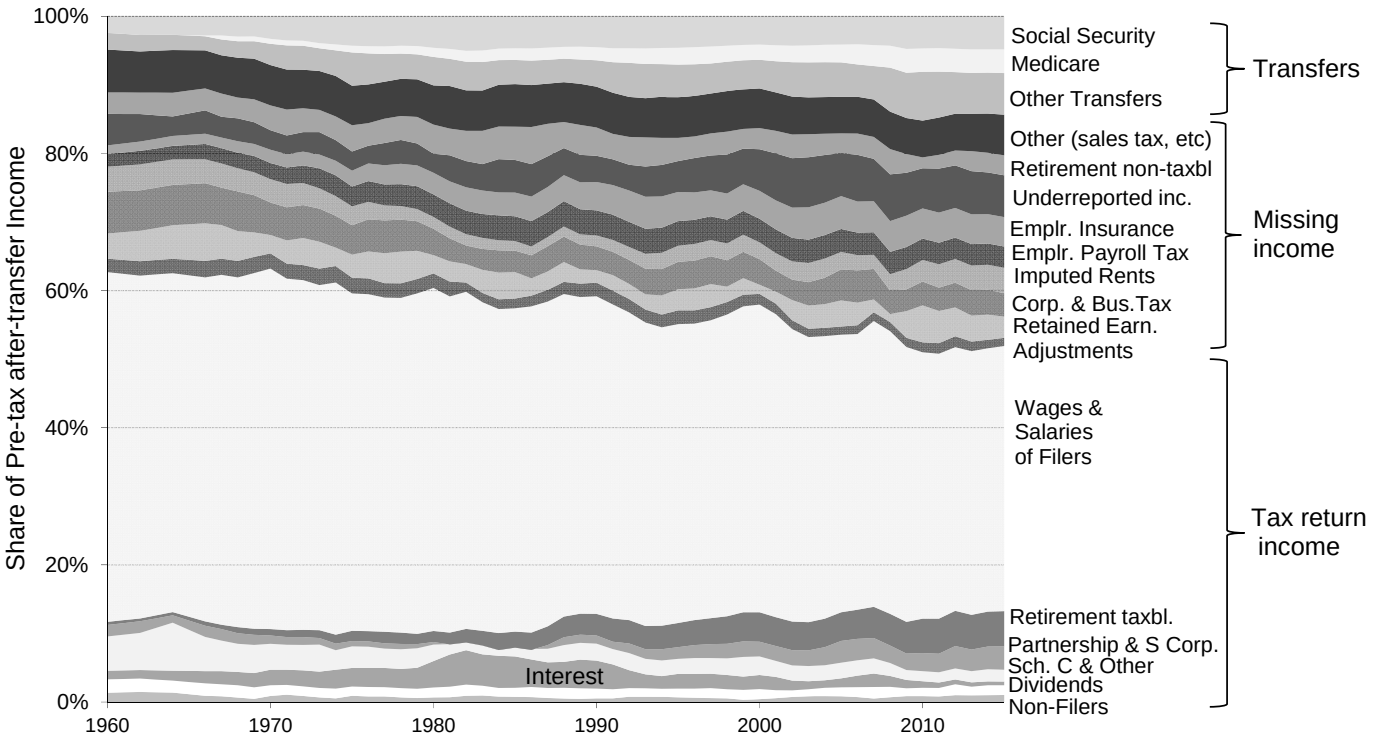


**Figure 2: Income sources as a share of pre-tax/after-transfer income**

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

*Sources:* Authors' calculations.

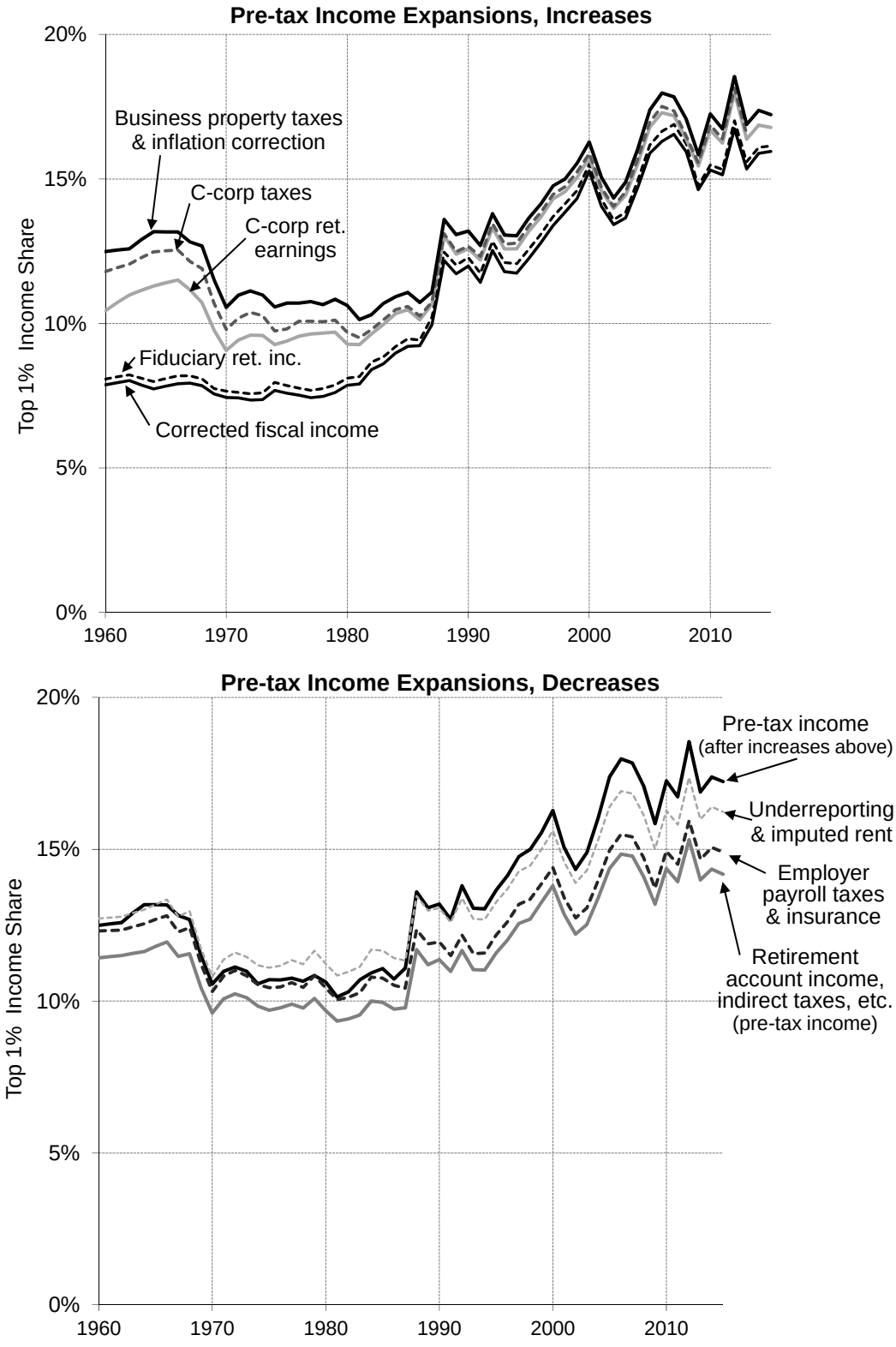


**Figure 3: Top 1% income shares: Pre-tax income expansions**

*Notes:* See text and Table 1 for description of adjustments.
*Sources:* Authors' calculations.

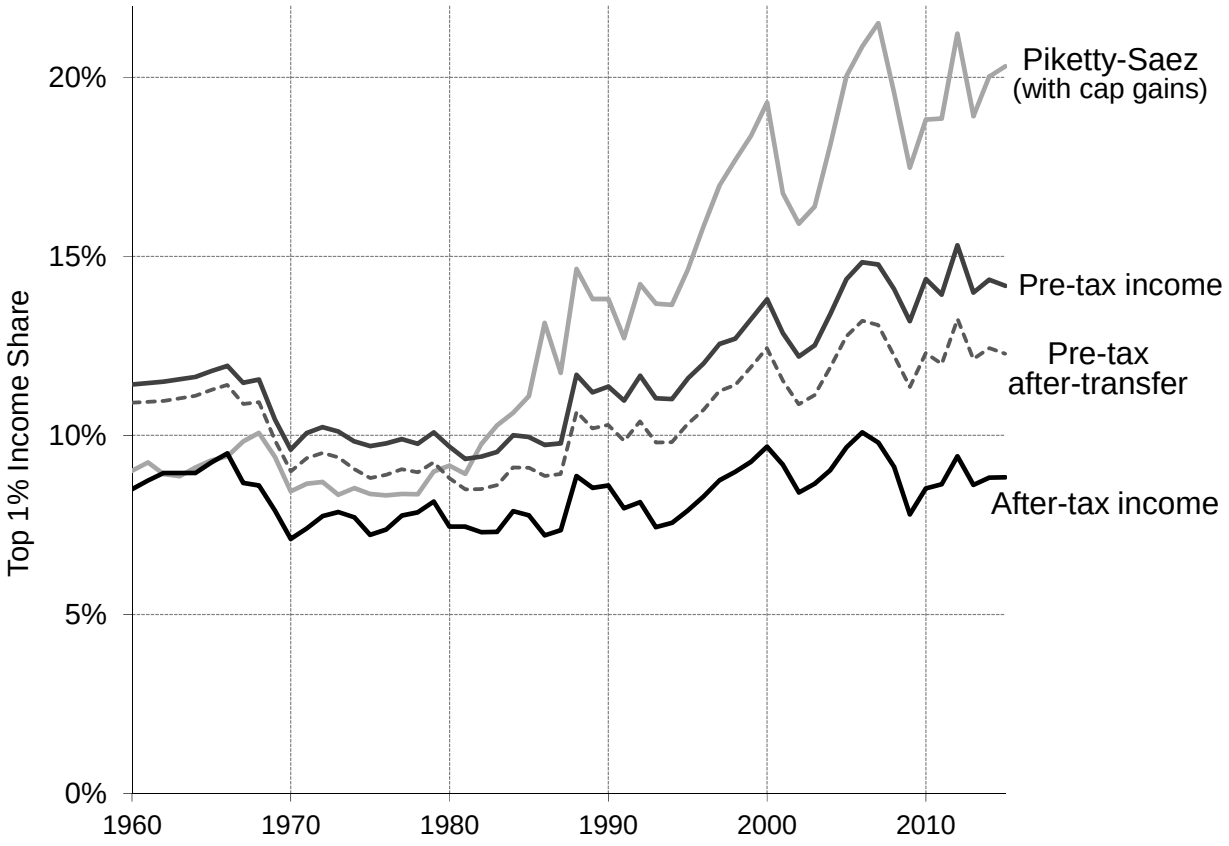


**Figure 4: Comparison of top 1% income shares**

*Notes*: Piketty and Saez series includes capital gains (thresholds set without capital gains). Adjustments used to estimate pre-tax, pre-tax/after-transfer, and after-tax income are listed in Tables 1, 2, and A1 and described in detail in the online appendix.

*Sources:* Authors' calculations and Piketty and Saez (2003 and updates).

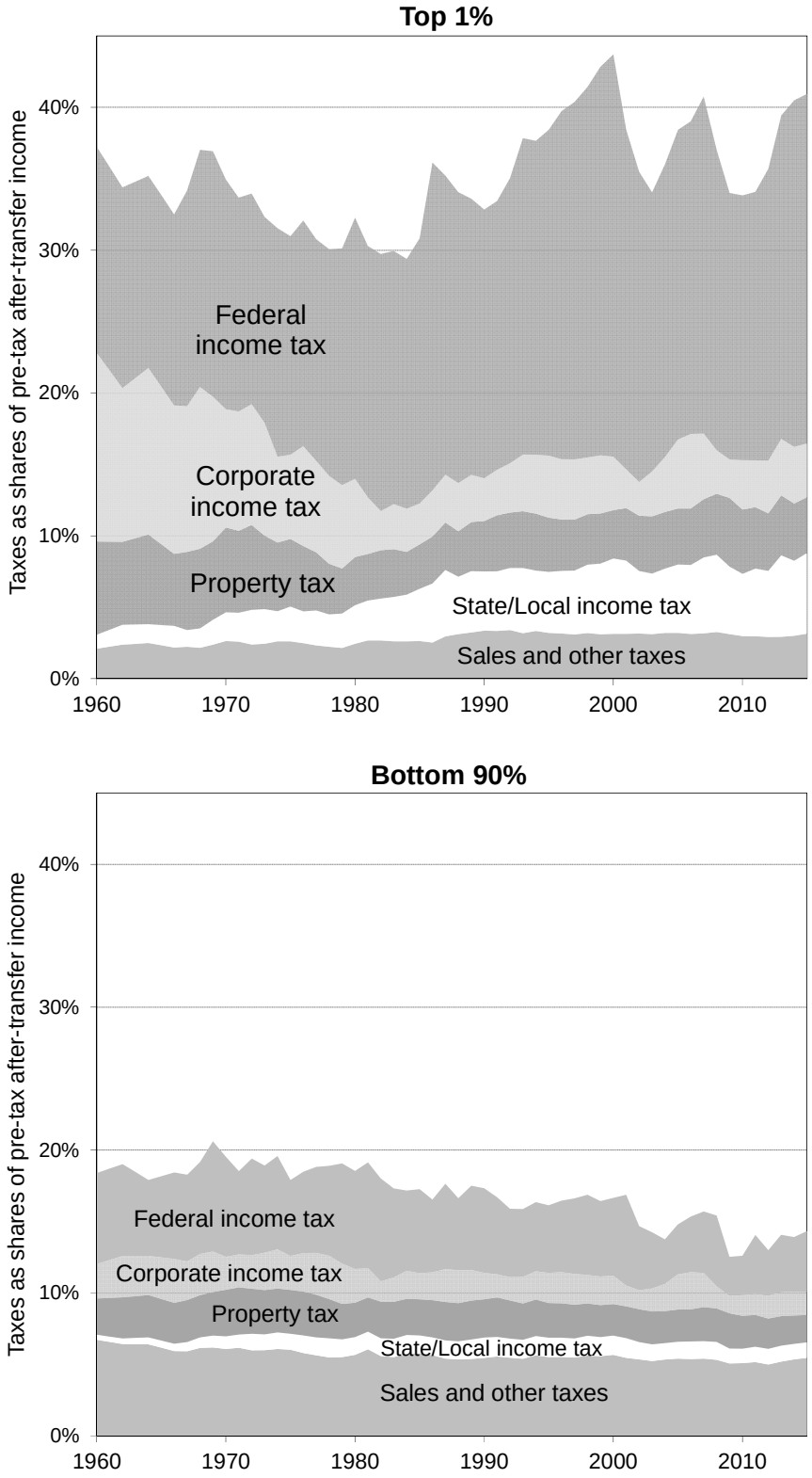


**Figure 5: Taxes as shares of pre-tax income**

*Notes*: Payroll taxes are examined in Figure 6 in connection with transfer payments. Refundable tax credits are included in government transfers and excluded from income taxes.
*Sources:* Authors' calculations.

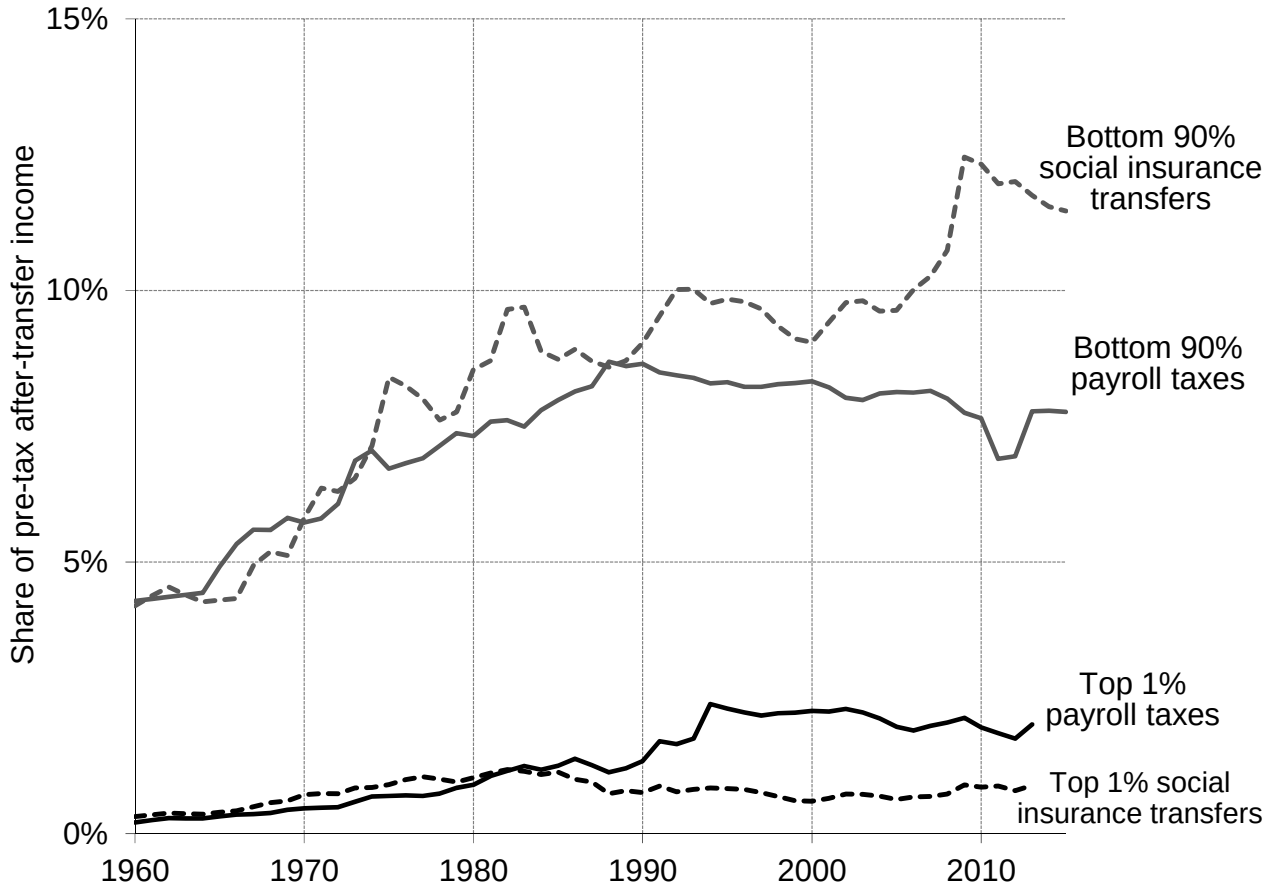


**Figure 6: Payroll and social insurance as a share of pre-tax income**

*Notes*: Social insurance transfers includes benefits from Social Security, Medicare, and disability and unemployment insurance. Surtaxes beginning in 2013 are included with income taxes rather than payroll taxes.

*Sources:* Authors' calculations.

# Appendix

## Table A1: Descriptions of adjustments to income and tax units

| Adjustments | Years | Adjustment Method |
|---|---|---|
| **Pre-tax Income** | | |
| *Corrected fiscal income* | | |
| Remove filers <20 years old | All Years | Remove tax filers not in Census age 20+ population |
| Remove other dependent filers | 1987–present | Primarily college students age 20-23, fewer before 1987 |
| Remove non-resident filers & MFS fix | All Years | Remove if claim foreign earned income exclusion (all years) or not residing in the U.S. (since 1979). Increase non-filers by half of MFS returns. |
| Impose post-TRA86 loss limits | 1960–1986 | Limit pre-1986 business losses based on post-TRA86 rules |
| Add tax-exempt interest | All Years | On returns since 1987, allocate 1960-1987 based on SCF shares |
| Include excluded dividends | 1960–1986 | $100/200 exclusion ended with Tax Reform Act of 1986 |
| Add tax-exempt combat pay | 1995–present | Use information returns and interpolate for missing years |
| Net out gambling losses | 1972–present | From tax returns. Before 1991, misc. deductions up to other income (includes gambling income) |
| Remove capital gains distributions not on Schedule D | 1971–present | From 1040 amounts not on Schedule D. Not separate in 1997 and 1998 and before 1971. |
| Remove IRA contributions | 1975–present | Remove amount reported on return, new provision since 1975 |
| Remove tax refunds adjustment | 1971–present | Adjustment for previously deducted state and local tax refunds, not on 1040 before 1971 |
| Remove net operating losses | 1960–present | Before 1989, equals 80 percent of other income losses |
| Set groups by #indivs/sz-adj. inc. | All Years | Set income groups by #individuals and rank by size-adjusted income |
| *Expansions* | | |
| Add fiduciary retained income | All Years | Allocate by taxable fiduciary income (use 1966 shares in prior years) |
| Add C-corp retained earnings | All Years | Allocate household portion 3/4 by dividends, & 1/4 by capital gains, retirement portion by wages by DB ownership and otherwise by DC wealth, non-profit/govt. portion half per capita and half by wages. |
| Add corporate income tax | All Years | Allocate household portion of C-corp ownership 3/4 by capital (as above) & 1/4 by wages on tax returns, bond share by taxable interest, and retirement and non-profit/govt. portions as with retained earnings. |
| Add business property tax | All Years | Allocate as corporate tax (no wages) but include passthrough ownership |
| Inflation effect on interest | All Years | Increase business income, decrease household interest receipts and government interest payments (allocate by income taxes paid) |
| Add underreported income | All Years | Allocate by distribution in Johns and Slemrod (2010) Table 3 |
| Add imputed rent | All Years | Includes real estate taxes. Allocated based on real estate taxes deducted. |
| Add employer payroll tax | All Years | Calculated based on reported wages or non-filer income |
| Add employer-provided insurance | All Years | Allocate NIPA health/life/workers comp. insurance by 2014 Form W-2 distribution |
| Add retirement account income | All Years | Allocate interest and dividend inc. to tax returns as retained earnings |
| Add indirect taxes, non-profits, etc. | All Years | Allocate indirect taxes (mostly sales tax) by disposable income less savings, transfers/subsidies/govt. income by half per capita and half wages, and Federal Reserve payments by mortgage interest payments. |
| **Pre-tax/after-transfer Income** | | |
| Add Social Security benefits | All Years | Include reported benefits, use 1985 distribution in prior years |
| Add unemployment benefits | All Years | Include reported benefits, use 1981 distribution for prior years |
| Add other cash transfers | All Years | Veterans benefits, SSI, refundable tax credits, wkrs. comp., state/local social insurance, family assist., temp. disab., etc. |
| Add Medicare | 1965–present | Allocate by fraction of age 65+ adults, use 1979 distrib. prior years |
| Add other non-cash transfers | All Years | SNAP, state/local medical care, general assistance, energy assist., etc. |
| **After-tax Income** | | |

| | | |
|---|---|---|
| Remove federal indiv. inc. & estate tax | All Years | Estate tax allocated by decedent prior-decade income groups. |
| Remove state/local indiv. inc. tax | All Years | Based on tax deductions, unallocated amount to bottom 90% |
| Remove corporate income tax | All Years | As calculated above |
| Remove property tax | All Years | Allocate business portion as above & housing portion by deductions |
| Remove payroll tax | All Years | Employee tax equal employer FICA tax, except in 1981, 2011 and 2012 |
| Remove sales and other taxes | All Years | Allocate to filers by after-tax income less savings |
| Add government deficit/surpluses | All Years | Allocate by federal income and payroll taxes |
| Add government consumption | All Years | Allocate half per capita and half by after-tax income |

*Notes*: Unallocated amounts of transfer payments are allocated to income groups below the top 10 percent.

**Effects of the Tax Reform of 1986 on reported income**

Many provisions of TRA86 affected income reported on individual income tax returns and thus affected measured top income shares. Table A2 shows the revenue estimates of key base-broadening provisions that were expected to increase revenues by more than $20 billion in 1990 when the effects of most provisions were fully phased in. A large share of the base-broadening was targeted at the top of the income distribution and at their tax shelters. The Treasury model used for the 1986 tax reform estimated that 69 percent of the base-broadening effect for partnership and rental income was from the top one percent or the bottom income group that was dominated by taxpayers with negative AGIs due to tax shelter losses and the fact that only 40 percent of capital gains were included in AGI (Nunns, 1987). At the top tax rate of 28 percent that likely applied to almost all of this base-broadening, the $20 billion of base-broadening revenue would result from about $70 billion of increased taxable income, or about one-third of the observed 1985–1990 increase in top one percent fiscal incomes.

The effects of TRA86 on top one percent income shares can be seen using cross-section tax return data to examine the base-broadening reforms and a 1985–1993 panel of tax returns to show the effect of business entity shifting. Table A3 shows that the top one percent fiscal income share increased over 50 percent between 1986 and 1988, from 7.8 to 12.8 percent. Half of this increase came from wages, some of which may reflect shifting of wages forward to 1987 or 1988. S corporation net income accounted for 0.8 percentage points of the change and partnership net income for 0.5 percentage points. Since active S corporation owners report about half of their income as distributions and half as wages (Smith et al., 2017), a significant fraction of the increase in wages is likely due to increases in S corporation income that followed from TRA86.

Some of the base-broadening changes that affect total income can be observed directly from information on individual income tax returns. These include non-deductible rental losses, non-deductible passive losses, the extension of at risk rules to the activity of holding property (these further limit deductible losses), and the elimination of the dividend exclusion. These partial base-broadening changes account for almost one-tenth of the increase in top one percent income shares between 1986 and 1988 (0.4 percentage points). Note that the effects of many base-broadening changes, such as changes in depreciation, are hidden in the net changes of partnership and sole proprietorship income.

Additional insight comes from following high-income taxpayers over time. Using a panel of a stratified sample of about 13,000 individual income tax returns from 1985 to 1990, Table A4 shows changes in top one percent incomes relative to 1985 and 1986 average incomes. In 1988, the changes in passthrough entity income as reported on individual tax returns account for 25.2 percent of the increase in top one percent income. Taxpayers whose first S corporation was after TRA86 may have converted C corporations into S corporations. Such new S corporations accounted for about an equal portion of the income increase as pre-existing S corporations. This suggests an important but limited role for the conversion of C corporations to S corporations in the increase of top one percent shares in 1987 and 1988. Partnership income from taxpayers with partnerships prior to TRA86 accounted for more of the increase in income than new partnerships (8.4 vs. 2.6 percent). Almost all of the change in net income for taxpayers with pre-existing partnership income was accounted for by partnerships with net losses in 1985 and 1986. This suggests that much of this change in partnership income reflected the tax shelter limitation effects of TRA86.

**Table A2: Revenue estimates of base-broadening provisions in the Tax Reform Act of 1986 that affect total fiscal income (fiscal year effects in millions of dollars)**

| | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|
| **Total income on tax return (total effects)** | **4,454** | **11,427** | **14,562** | **18,683** |
| Cap employee contributions to 401k, 403b | 310 | 628 | 691 | 809 |
| Pension: repeal 3-year basis recovery | 1,096 | 1,763 | 2,001 | 2,015 |
| Pension: raise age limits, reduce DBs | 315 | 869 | 960 | 1,097 |
| Adjustments to sec. 404 limits | 17 | 42 | 45 | 49 |
| Non-discrimination benefit rules | 0 | 72 | 128 | 140 |
| Reduce foreign earned income exclusion | 24 | 34 | 45 | 56 |
| Unearned income of children under 14 (part) | 60 | 195 | 226 | 249 |
| Repeal unemployment compensation exclusion | 230 | 764 | 749 | 723 |
| Limit exclusion of scholarships/fellowships | 8 | 64 | 130 | 160 |
| Limit deduction for meals, travel, etc. (Sch. C) | 513 | 937 | 1,112 | 1,291 |
| Limit on passive losses | 1,166 | 4,488 | 7,479 | 10,932 |
| At-risk rules on real estate | 46 | 192 | 343 | 483 |
| Repeal dividend exclusion ($100/$200) | 212 | 573 | 580 | 605 |
| Recognition of gain/loss in liq. distributions | -1 | -13 | -32 | -44 |
| Purchase price allocation | -2 | 2 | 9 | 13 |
| RIC end of year distributions timing/excise tax | 484 | 866 | 163 | 180 |
| Installment sales | 12 | 42 | 31 | 32 |
| Taxation of prizes and awards | -21 | -59 | -63 | -66 |
| SEP plans | -15 | -32 | -35 | -41 |
| **Depreciation effects on tax returns (total effects)** | **-115** | **352** | **1,486** | **2,954** |
| Depreciation, expensing (individual portion) | -502 | -584 | 498 | 1,980 |
| Amortization of trademarks and trade names | 1 | 4 | 8 | 14 |
| Agricultural expensing and prepayment | 45 | 55 | 33 | 36 |
| Oil, gas, and geological depletion | 20 | 49 | 45 | 45 |
| Simplify LIFO for small business | -11 | -18 | -28 | -44 |
| Capitalize inventory, construction, and dev. | 146 | 479 | 583 | 639 |
| Farmer pre-productive period expenses | 56 | 161 | 144 | 121 |
| Long-term contracts | 98 | 109 | 103 | 62 |
| Repeal reserve for bad debt | 32 | 97 | 100 | 101 |
| **Total of all provisions (nominal)** | **4,339** | **11,779** | **16,048** | **21,637** |

*Notes*: The revenue changes to depreciation rules are for the individual portion (not corporate changes) and therefore affect total income on tax returns (fiscal income) by changing the net amounts of partnership, S corporation and sole proprietorship income. Negative amounts for depreciation for the first few years reflect increases in the limits for expensing under section 179, which is quickly more than offset by the reductions in depreciation deductions.
*Sources:* Authors' calculations and Joint Committee on Taxation.

## Table A3: Changes in top 1% fiscal income shares after TRA86 (cross-section analysis)

| | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|
| **Top 1% income share** | **7.8** | **10.4** | **12.8** | **12.4** | **12.8** |
| **Change from 1986: Total** | | **2.6** | **5.1** | **4.6** | **5.0** |
| Wages | | 1.6 | 2.5 | 2.1 | 2.4 |
| S corporation, net | | 0.4 | 0.8 | 0.7 | 0.7 |
| Partnership, net | | 0.3 | 0.5 | 0.5 | 0.5 |
| Self-employment, net | | 0.2 | 0.4 | 0.3 | 0.4 |
| Base changes, partial | | 0.3 | 0.4 | 0.5 | 0.4 |
| Other | | -0.2 | 0.5 | 0.5 | 0.5 |

*Notes:* Income excludes capital gains, but top one percent thresholds are based on tax return income including capital gains and the number of tax returns (non-filers are not considered). Self-employment income is Schedule C income. Base changes include rental loss limits, disallowed rental and passive losses and at-risk rules and elimination of the dividend exclusion.
*Sources:* IRS and authors' calculations.

## Table A4: Increase in top 1% fiscal incomes due to TRA86 changes (panel analysis)

| | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|
| Total income increase ($billions) | 110.6 | 200.0 | 193.7 | 240.4 |
| **Percent of income increase due to listed TRA86 changes (%)** | | | | |
| New S corporations | 0.2 | 7.6 | 4.9 | 7.5 |
| Existing S corporations | 8.0 | 6.6 | 5.4 | 5.5 |
| New partnerships | 6.4 | 2.6 | 1.6 | 0.9 |
| Existing partnerships | 7.4 | 8.4 | 10.4 | 8.3 |
| **Total** | **22.0** | **25.2** | **22.3** | **22.2** |

*Notes:* Income increase is the nominal change in fiscal income excluding capital gains from the 1985–86 average. New S corporation and partnership income is for taxpayers not reporting income from these sources in 1985 or 1986. Top one percent thresholds are based on tax return income including capital gains and the number of tax returns (non-filers are excluded).
*Sources:* Authors' calculations using the 1985 base year individual tax return panel.

## Table A5: Top Income Shares, 1960–2015

| | Pre-tax income | | Pre-tax/after-transfer income | | After-tax income | |
|---|---|---|---|---|---|---|
| Year | Top 1% | Top 0.1% | Top 1% | Top 0.1% | Top 1% | Top 0.1% |
| 1960 | 11.4 | 4.3 | 10.9 | 4.1 | 8.5 | 3.0 |
| 1961 | 11.5 | 4.3 | 10.9 | 4.1 | 8.7 | 3.2 |
| 1962 | 11.5 | 4.4 | 11.0 | 4.2 | 9.0 | 3.4 |
| 1963 | 11.6 | 4.5 | 11.0 | 4.3 | 9.0 | 3.4 |
| 1964 | 11.6 | 4.5 | 11.1 | 4.3 | 8.9 | 3.4 |
| 1965 | 11.8 | 4.6 | 11.3 | 4.3 | 9.2 | 3.4 |
| 1966 | 11.9 | 4.6 | 11.4 | 4.4 | 9.5 | 3.5 |
| 1967 | 11.5 | 4.2 | 10.9 | 4.0 | 8.7 | 3.0 |
| 1968 | 11.6 | 4.4 | 10.9 | 4.2 | 8.6 | 3.2 |
| 1969 | 10.4 | 3.9 | 9.9 | 3.6 | 7.9 | 2.8 |
| 1970 | 9.6 | 3.4 | 9.0 | 3.2 | 7.1 | 2.4 |
| 1971 | 10.1 | 3.7 | 9.4 | 3.4 | 7.4 | 2.6 |
| 1972 | 10.2 | 3.7 | 9.5 | 3.4 | 7.7 | 2.7 |
| 1973 | 10.1 | 3.6 | 9.4 | 3.3 | 7.9 | 2.7 |
| 1974 | 9.8 | 3.4 | 9.1 | 3.1 | 7.7 | 2.6 |
| 1975 | 9.7 | 3.3 | 8.8 | 3.0 | 7.2 | 2.4 |
| 1976 | 9.8 | 3.4 | 8.9 | 3.1 | 7.4 | 2.5 |
| 1977 | 9.9 | 3.5 | 9.1 | 3.1 | 7.8 | 2.7 |
| 1978 | 9.8 | 3.4 | 9.0 | 3.1 | 7.9 | 2.7 |
| 1979 | 10.1 | 3.6 | 9.2 | 3.3 | 8.2 | 2.9 |
| 1980 | 9.7 | 3.3 | 8.8 | 3.0 | 7.5 | 2.5 |
| 1981 | 9.3 | 3.2 | 8.5 | 2.9 | 7.5 | 2.5 |
| 1982 | 9.4 | 3.3 | 8.5 | 3.0 | 7.3 | 2.5 |
| 1983 | 9.5 | 3.4 | 8.6 | 3.0 | 7.3 | 2.5 |
| 1984 | 10.0 | 3.6 | 9.1 | 3.3 | 7.9 | 2.8 |
| 1985 | 10.0 | 3.7 | 9.1 | 3.4 | 7.8 | 2.8 |
| 1986 | 9.7 | 3.5 | 8.9 | 3.2 | 7.2 | 2.6 |
| 1987 | 9.8 | 3.5 | 8.9 | 3.2 | 7.4 | 2.5 |
| 1988 | 11.7 | 4.8 | 10.7 | 4.4 | 8.9 | 3.5 |
| 1989 | 11.2 | 4.4 | 10.2 | 4.0 | 8.5 | 3.2 |
| 1990 | 11.4 | 4.4 | 10.3 | 4.0 | 8.6 | 3.2 |
| 1991 | 11.0 | 4.2 | 9.8 | 3.7 | 8.0 | 2.9 |
| 1992 | 11.7 | 4.6 | 10.4 | 4.1 | 8.1 | 3.0 |
| 1993 | 11.0 | 4.2 | 9.8 | 3.7 | 7.4 | 2.6 |
| 1994 | 11.0 | 4.2 | 9.8 | 3.7 | 7.6 | 2.6 |
| 1995 | 11.6 | 4.5 | 10.3 | 4.0 | 7.9 | 2.8 |
| 1996 | 12.0 | 4.7 | 10.7 | 4.2 | 8.3 | 3.0 |
| 1997 | 12.6 | 5.1 | 11.2 | 4.5 | 8.7 | 3.3 |
| 1998 | 12.7 | 5.2 | 11.4 | 4.7 | 9.0 | 3.4 |
| 1999 | 13.3 | 5.5 | 11.9 | 4.9 | 9.3 | 3.6 |
| 2000 | 13.8 | 5.9 | 12.4 | 5.2 | 9.7 | 3.8 |
| 2001 | 12.9 | 5.2 | 11.5 | 4.6 | 9.2 | 3.4 |
| 2002 | 12.2 | 4.8 | 10.9 | 4.2 | 8.4 | 3.0 |
| 2003 | 12.5 | 5.0 | 11.1 | 4.5 | 8.6 | 3.2 |
| 2004 | 13.4 | 5.7 | 11.9 | 5.0 | 9.0 | 3.5 |
| 2005 | 14.4 | 6.4 | 12.8 | 5.6 | 9.7 | 4.0 |
| 2006 | 14.8 | 6.5 | 13.2 | 5.8 | 10.1 | 4.1 |
| 2007 | 14.8 | 6.5 | 13.1 | 5.7 | 9.8 | 4.0 |
| 2008 | 14.1 | 6.0 | 12.2 | 5.2 | 9.1 | 3.6 |
| 2009 | 13.2 | 5.5 | 11.3 | 4.7 | 7.8 | 2.9 |
| 2010 | 14.4 | 6.3 | 12.3 | 5.3 | 8.5 | 3.4 |
| 2011 | 13.9 | 5.8 | 12.0 | 5.0 | 8.6 | 3.2 |
| 2012 | 15.3 | 6.9 | 13.3 | 5.9 | 9.4 | 3.9 |
| 2013 | 14.0 | 5.9 | 12.1 | 5.1 | 8.6 | 3.2 |
| 2014 | 14.3 | 6.1 | 12.4 | 5.3 | 8.8 | 3.3 |
| 2015 | 14.2 | 6.0 | 12.3 | 5.2 | 8.8 | 3.4 |

*Notes*: Adjustments used to estimate various income definitions are listed in Tables 1, 2, and A1 and described in detail in the online appendix.
*Source:* Authors' calculations.

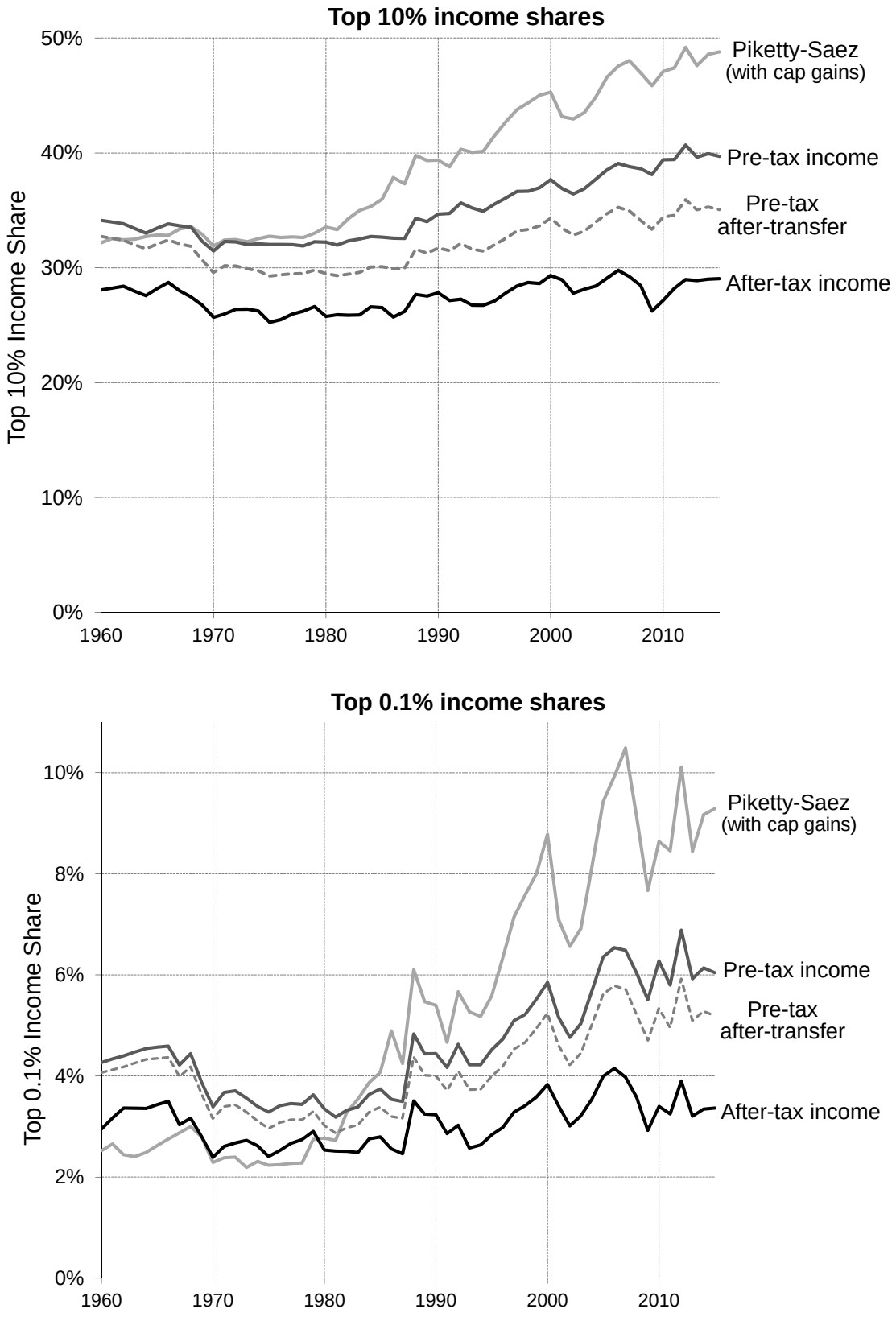


**Figure A1: Top income shares: Top 10% (top figure) and top 0.1% (bottom figure)**

*Notes*: Piketty and Saez series includes capital gains (thresholds set without capital gains).
*Sources:* Authors' calculations and Piketty and Saez (2003 and updates).