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

Gerald Auten
U.S. Treasury Department

February 6, 2018
Vanderbilt Hall – 208
Time: 4:00 – 5:50 p.m.
Week 4

SCHEDULE FOR 2018 NYU TAX POLICY COLLOQUIUM

(All sessions meet from 4:00-5:50 pm in Vanderbilt 208, NYU Law School)

1. Tuesday, January 16 – Greg Leiserson.Washington Center for Equitable Growth. "Removing the Free Lunch from Dynamic Scores: Reconciling the Scoring Perspective with the Optimal Tax Perspective."

2. Tuesday, January 23 – Peter Dietsch, University of Montreal Philosophy Department. "Tax Competition and Global Background Justice."

3. Tuesday, January 30 – Andrew Hayashi, University of Virginia Law School. "Countercyclical Tax Bases."

4. Tuesday, February 6 – Gerald Auten, U.S. Treasury Department. "Income Inequality in the United States: Using Tax Data to Measure Long-Term Trends."

5. Tuesday, February 13 – Vanessa Williamson, Brookings Institution.

6. Tuesday, February 27 – Jacob Goldin, Stanford Law School.

7. Tuesday, March 6 – Lisa Philipps, Osgoode Hall Law School. "Gendering the Analysis of Tax Expenditures."

8. Tuesday, March 20 – Lisa De Simone, Stanford Graduate School of Business.

9. Tuesday, March 27 – Damon Jones, University of Chicago Harris School of Public Policy.

10. Tuesday, April 3 – Ajay Mehrotra, American Bar Foundation and Northwestern University School of Law. "T.S. Adams and the Beginning of the Value-Added Tax."

11. Tuesday, April 10 – Jason Furman, Harvard Kennedy School.

12. Tuesday, April 17 – Emily Satterthwaite, University of Toronto Law School. "Electing into a Value-Added Tax: Survey Evidence from Ontario Micro-Entrepreneurs."

13. Tuesday, April 24 – Wolfgang Schon, Max Planck Institute. "Taxation and Democracy."

14. Tuesday, May 1 – Mitchell Kane, NYU Law School.

INCOME INEQUALITY IN THE UNITED STATES: USING TAX DATA TO MEASURE LONG-TERM TRENDS*

GERALD AUTEN AND DAVID SPLINTER

Previous studies using U.S. tax return data, such as Piketty and Saez (2003), concluded that top one percent income shares increased substantially since 1960. But tax return based measures are biased by tax base changes and missing income sources. Accounting for these limitations reduces the increase in top one percent income shares by two-thirds. Further, accounting for government transfers reduces the increase over 80 percent. After-tax income results are similar. This shows that unadjusted tax return based measures present a distorted view of inequality because incomes reported on tax returns are sensitive to tax law changes and omit significant income sources.
Codes: D3, E01, H2, H5, J3, N32

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Based on the results of studies using income tax data (Piketty and Saez, 2003), the idea that 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 speculation about possible links to other social problems. Increasing inequality could be an indicator of greater concentration of political power and increased rent-seeking (Stiglitz, 2012; Lindsey and Teles, 2017), or a result of increases in the bargaining power of top earners for compensation (Piketty, Saez and Stantcheva, 2014). Under these hypotheses, increasing inequality could imply various problems: decreasing institutional accountability due to concentrated power, decreasing economic efficiency due to rent-seeking, and stagnating middle class wages due in part to shifts in relative bargaining power.

Such implications emphasize the importance of correctly measuring top income inequality. Income tax data are generally thought to be less subject to underreporting and measurement error than survey data and also better representative of top income groups.[1] However, there are important limitations to using income 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 failing to account for these limitations.

One important limitation of tax data is that the income reported on tax returns has changed over time, especially with major tax reforms. Such changes can have important effects on measures of long-term trends in top income shares. Using income as reported on U.S. tax returns, Piketty and Saez (2003, hereafter PS) estimate that the share of market income received by the top one percent of tax units increased from 9 to 20 percent between 1960 and 2015. About

[1] Information reporting to the Internal Revenue Service (IRS) and the potential for audit mean that reporting rates 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. Using IRS data, Auten and Gee (2009) found that underreported income as a fraction of reported income was highest in the bottom quintile by reported income and lowest in the top one percent. Atkinson, Piketty and Saez (2011) discuss concerns with using survey data to measure top incomes.

40 percent of this increase, however, occurred in the years just before and after the Tax Reform of 1986 (TRA86).

The potential for TRA86 to affect measures of U.S. inequality has been noted by Feenberg and Poterba (1993), Gordon and MacKie-Mason (1994), and MacKie-Mason and Gordon (1997). Several theories have been advanced for the sharp increase in measured top income shares following TRA86, including shifting 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).

Tax return based measures of income inequality can also be affected by changing incentives for distributing or retaining C corporation earnings (Gordon and Slemrod, 2000; Clarke and Kopczuk, 2016). In the 1960s and 1970s, top individual income tax rates of 70 percent (91 percent before 1964) provided business owners strong incentives to retain earnings inside corporations rather than paying dividends or higher executive salaries. This reduced measured top income shares because retained earnings do not appear as income on individual returns. This incentive decreased in the 1980s—when the top individual rate fell to 50 percent—and then reversed when TRA86 reduced the top rate to 28 percent. Several studies have found that tax return based inequality trends in other countries are also biased due to failing to account for changing incentives for corporate retained earnings.[2]

Another limitation of using tax data is that it misses important sources of income, including government transfer payments and non-taxable employer provided benefits. In

[2] 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 one sixth. Wolfson, Veall and Brooks (2016) estimated that including retained earnings of controlled private corporations increases Canadian top one percent income shares by about one quarter. 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.

addition, measured long-term trends in inequality can be affected by social changes, such as declining marriage rates, and by changes in technical tax rules that affect who is required to file a tax return and how income is reported on those returns.

This paper presents new estimates of top income shares using income measures that are consistent over time and across different types of income. Our measure of *consistent market income* includes full corporate profits and adjusts for changes from TRA86, including changes to the tax base and increased filing by dependent filers. In addition, we include employer paid payroll taxes and insurance and adjust for falling marriage rates. The effects of these adjustments on estimated top income shares are dramatic. Compared to unadjusted measures of market income, a consistent measure reduces the estimated increase in the top one percent share between 1960 and 2015 by two-thirds. Moreover, the increase in the top one percent is reduced by 83 percent using *pre-tax income* that includes government transfers and by 85 percent for *after-tax income*.

The inconsistency of unadjusted tax return income over time results in part from incomplete coverage of market incomes. For example, PS market income including capital gains accounts for only about 60 percent of NIPA income in recent years (Figure I). The inclusion of corporate retained earnings and taxes, employer paid payroll taxes and insurance, underreported income, and imputed rents in our measure of consistent market income increases this coverage to over 80 percent. However, the fraction of total income covered by these measures of market income has declined over time. Our measure of pre-tax income including government transfers increases the fraction of NIPA income covered to about 100 percent and this share is stable since 1960.[3]

[3] In Figure I, NIPA income is defined as personal income plus corporate profits less dividends so as to include corporate retained earnings as well as transfer payments. This is generally within 4 percent of national income. Pre-tax income differs from NIPA measures in a number of ways, as discussed in the sensitivity analysis and Ledbetter

Other recent studies using broader measures of income also find lower levels and smaller increases in U.S. top income shares. 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 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 PS estimates of a 10 percentage point increase from 9 to 19 percent. In comparison, our measure of pre-tax income increases by about 3 percentage points over this time period from 9 to 12 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 percentage points from 10 to 12 percent.[4]

This study makes a number of contributions to the emerging "consistent income inequality" literature. While other studies present results only for recent decades or use survey data, our paper measures consistent top income shares since 1960 using administrative tax data.[5] We adjust for a number of important tax data issues and show the sensitivity of top income shares to each issue (detailed results are available in the online data). The most important are the effects of the Tax Reform Act of 1986 on broadening the individual income tax base and changing the incentives for reporting income and organizing businesses. Another contribution is that instead of using realized capital gains—which are sensitive to capital gains tax rates and

(2007). The main differences are that social insurance contributions are not subtracted here, as they are considered later in computing after-tax income, and retirement income is included on a distribution rather than accrual basis.

[4] Fixler et al. (2016) present results using Census data to gross up to NIPA personal income, although only up to the top five percent, likely due to top-coding issues. Between 1960 and 2012, they find that the top five percent share only increased 4 percentage points from about 20 to 24 percent.

[5] One exception is Piketty, Saez and Zucman (forthcoming), which uses tax micro data to measure top shares of national income since 1962. In the sensitivity analysis we discuss differences with this study, extend our analysis to also target all of national income, and show that our results of a small increase in top shares persist when including all of national income.

reflect income that has accrued over many years—our analysis looks through the corporate veil by including retained earnings in corporations. This leads to important findings in the 1960s, when high individual income tax rates appear to have caused significant realization deferrals and sheltering of income inside corporations to avoid high individual income tax rates (Auten, Splinter and Nelson, 2016).

In addition, our measures allow for more consistently measured average effective tax rates and after-tax top income shares. This reveals that despite the top individual tax rate decreasing from 91.0 to 39.6 percent between 1960 and 2015, average top one percent tax burdens remained about the same, fluctuating around 40 percent. Except for a handful of years during the late-1990s expansion, top tax burdens were at their highest levels in 2015. These increasing tax burdens caused after-tax top one percent income shares to increase only 1.7 percentage points.

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

I. Measuring Top Income Shares with Consistent Definitions of Income

Our analysis uses annual tax microdata to first estimate *consistent market income.* Starting with the PS income and sample definitions, we adjust for: (1) major changes in tax laws, primarily TRA86, (2) the decline in marriage rates, and (3) missing sources of market income.

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.[6] The reform also motivated some corporations to switch from

[6] See the appendix and Auten, Splinter and Nelson (2016) for more detail on the base-broadening changes in TRA86.

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. 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. This incentive was even larger in the 1960s and 1970s when the top individual rate was 70 percent compared to a 48 percent corporate rate. After TRA86, the top individual tax rate was lower than the top corporate tax rate (28 vs. 34 percent), creating strong incentives to organize businesses as passthrough entities.[7] When estimating consistent incomes, we directly account for deduction limitations and indirectly account for the shift into passthrough entities by including corporate retained earnings, which tend to decline as business shifts into passthrough entities.

TRA86 also dramatically increased the number of dependent filers.[8] If no adjustments are made, these returns are effectively treated as independent low income economic units. The increase in dependent tax returns incorrectly decreases the estimated number of non-filing tax units because the Census based number of total tax units is held constant. To make the estimates 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.

[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. Goolsbee (2004) and Auten, Splinter and Nelson (2016) reviewed this literature.

[8] 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. Aimed at preventing high income parents from shifting income to children to reduce their tax burden, TRA86 effectively reduced the amount of exempt investment income from $1,080 to $500.

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, the total number of tax units increases. Thus, the number of tax units included in the top one percent also increases (Saez, 2004). To address changing marriage rates, we take account of the two adults in married tax units and calculate income groups by the number of these adults. That is, each percentile has an equal number of adults rather than an equal number of tax units. Without this correction there are relatively too many adults in the top one percent in recent decades, which overstates top income shares.

A number of sources of market income are not included on individual tax returns. To address this issue, consistent income includes tax-exempt interest, employer paid payroll taxes and insurance, imputed rental income on housing, underreported income, and corporate retained earnings and taxes. In the aggregate, these excluded sources of pre-tax market income have averaged about 25 percent of pre-tax income since 1960 (Figure II). Because of the declining importance of corporate taxes and retained earnings since the 1970s 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.

Government transfers are added to consistent market income to obtain an estimate of *pre-tax income.* As seen in Figure II, government transfers grew from 5 to 16 percent of pre-tax income between 1960 and 2015. Federal, state, and local taxes are subtracted from pre-tax income to estimate *after-tax income*.

Different income definitions serve different goals. Market income includes only income earned from labor and investments. Pre-tax income is our broadest measure of income, as it includes transfers and sources of income excluded from the tax base. Relative to narrower measures of

income, pre-tax income is more appropriate for measuring overall economic income and for allocating tax burdens. After-tax income provides a better measure of welfare inequality because it deducts taxes as well as including government transfers.

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. These microdata allow us to estimate relative income group cutoffs after most of the adjustments discussed below. Total non-filer income, excluded combat pay, and the distribution of employer sponsored health insurance, are estimated using IRS administrative data, which includes the universe of tax returns and information returns.

Our measures of income include various sources that are not reported on income tax returns. Values for these sources of income, as well as target totals for income items that are only partially reported on tax returns, are from the Bureau of Economic Analysis (BEA) National Income and Product Accounts (NIPA). Note that *C corporation retained earnings* are defined as undistributed corporate 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.[9]

[9] For more details, see www.bea.gov/national/pdf/chapter13.pdf.

III. Adjustments to Income and Sample to Obtain Consistent Measures Over Time

This section describes the adjustments made to unadjusted individual income tax data to estimate market income, pre-tax income, and after-tax income on a consistent basis over time. Tables I and II show the impact of each of these adjustments on top one percent income shares in select years. Additional details are provided in Table A.1, the online appendix, and the online data.

Our analysis starts by replicating PS total filer market income excluding capital gains. Market income is adjusted gross income, 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 Consistent market income is estimated in three steps. First, adjustments are applied to the units of observation and income sources already included in PS market income, but measured inconsistently. Second, income groups are based on the number of adults rather than tax units. Third, permanently excluded market income sources are added. To estimate pre-tax income, government transfers are added. Finally, taxes are removed from pre-tax income to estimate after-tax income.

III.A. Consistent market income: Adjustments

It is important to ensure that the sample for our tax-based measures is consistent with the total number of tax units. The PS estimate of the total number of potential tax units is based on the U.S. Census resident population of married males and unmarried single individuals age 20 or older. However, some tax filers are younger than 20 years old or live abroad and 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 and some elderly parents. Under the assumption that these filers are not independent economic units, they are also dropped from the sample and the predicted number of tax units is reduced accordingly.[10] 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, and 3.8 million dependent filers age 20 and over, which in total accounted for over 8 percent of all returns filed. We also correct for the effect of married couples filing separate returns, as the PS number of total tax units counts all married couples as one tax unit, but some married couples file two returns.

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, substantially increasing the incomes of those taking advantage of tax shelters. Next, 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 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.

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.[11] Capital gains

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[10] 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 the incomes on their tax returns reflect only a portion of their economic resources and support. The potential to influence measured inequality trends is illustrated by the increase in school enrollment by those age 20 to 24 from 13 percent in 1960 to 40 percent in 2012. Thus, fewer in this age group are independent and self-supporting. A more detailed discussion is found in the online appendix.

[11] Reported net operating losses 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

distributions listed separately from Schedule D and Individual Retirement Account (IRA) and similar retirement account contributions are also deducted.[12] This is consistent with measuring non-gains market income and retirement income when received.

Non-filer market income is estimated using the SOI Databank, an individual level panel containing every person with a taxpayer identification number who was born before 2012 and had not died by 1996. For each filing year from 2000 through 2012, 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 market 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 as Piketty and Saez (2003) and so no adjustment is made to non-filer incomes at this stage.[13] After including underreported IRS income in a later step, non-filer incomes increase to about 30 percent of average filer income.

III.B. Consistent market income: Set income groups by number of adults

Marriage rates among tax filers have fallen consistently over the past five decades from 69% in 1960 to 39% in 2015 (after removing filers younger than 20 years old, dependent filers,

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percent. 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.

[12] Our replication of PS suggests that their computations of market income net of capital gains did not account for capital gains distributions reported on a separate line from Schedule D gains. 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.

[13] 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.

and non-residents).[14] However, marriage rates among the top one percent have remained consistently high: 90% in 1960 and 86% in 2015. Holding all else constant, declining marriage rates below the top of the income distribution increases tax unit based top income shares. The importance of adjusting for declining marriage rates is illustrated by the Larrimore (2014) estimate that declining marriage rates explain 23 percent of the increase in household income Gini coefficients between 1979 and 2007.

In order to control for these declining marriage rates, our analysis defines income groups based on the number of adults, rather than the number of tax units. This means that each percentile includes the same number of adults instead of the same number of tax units. Married filing jointly returns are counted as two adults and other returns as one adult. About 40 percent of non-filer tax units are married and thus counted as two adults.[15] Dividing tax units into income groups by the number of adults controls for changes in marriage rates while still measuring income at the tax unit level.[16] This adjustment decreases top one percent income shares by about 10 percent in all years: 0.7 percentage point in the 1960s and about 1.9 in recent years.

Other studies have found similar reductions in top one percent income shares when moving away from tax units as the unit of observation. For example, Bricker, et al. (2016b) estimate 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) find that using

[14] Growth in cohabitation can explain some of this change. While there was relatively little cohabitation before 1970, more than 27 percent of couples currently living together are cohabitating (Lundberg, Pollak and Stearns, 2016). The rise in non-married couples means tax unit incomes may understate the economic welfare of some single or head of household filers because the income of other members of the household is not included (Larrimore, Mortenson and Splinter, 2017).

[15] 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 ta unit marriage rate of about 40 percent. This assumption appears robust since 1960 (see online data).

[16] This approach differs from actual individual income shares, which results in higher measured inequality due to unequal spousal incomes (Saez and Veall, 2004). This adjustment does not re-rank tax units. In the sensitivity analysis, we re-rank by size-adjusted income to present measures more relevant for the distribution of economic welfare.

households composed of individuals at the same address rather than tax units reduces the top one percent income share by 2.0 percentage points.

III.C. Consistent market income: Expansions

The next step in computing consistent market income is to add a number of pre-tax income sources that are not captured on individual tax returns, including fiduciary and corporate income not on tax returns, imputed rental income on housing, underreported income, and employer paid payroll taxes and insurance.

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 tax-based measures of income. To include this retained fiduciary income and income taxes, we allocate them to tax returns by taxable fiduciary income.

Our measure of consistent income treats pre-tax corporate profits 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 individual corporate owners. The share of retained earnings attributed to retirement account corporate ownership is excluded to prevent double counting, as these earnings are already reflected in taxable income at the time of withdrawal or pension payments. With the growth of retirement savings, the retirement account share of corporate ownership increased dramatically from 4 to 50 percent between 1960 and 2015. The portion of retained earnings reflecting ownership by non-profit organizations and domestic government, which increased from 5 to 7 percent, is also excluded.[17]

[17] It is unclear how the corporate retained earnings earned by non-profits and governments should be distributed. Note that foreign owned equities and corporate passthrough entities (S corporations and REITs) are removed before

The remaining retained earnings associated with non-retirement private ownership are distributed to individual tax returns. Three-quarters of retained earnings are distributed based on a tax filer's share of dividends and one-quarter based on their share of realized capital gains. 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. As shown in the sensitivity analysis, the results are robust to alternative allocations.

Our imputation of retained corporate earnings should lead to similar income shares as multi-year realized corporate stock gains, which are excluded from our measure of market income.[18] The timing of capital gains may 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.

Since consistent market income is a pre-tax measure, it includes taxes paid by businesses and allocated based on assumptions of economic burden. C corporation income taxes are allocated one quarter to wages, following Joint Committee on Taxation (2013) and Congressional Budget Office (2016). The rest is allocated to individual tax returns based on shares of corporate capital ownership and interest bearing assets.[19] The fraction associated with household corporate equity ownership is allocated by three-quarters dividends and one-quarter capital gains. The fraction associated with bonds is allocated by taxable interest. The fraction

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estimating ownership shares of individuals, retirement accounts, and non-profits. Passthrough corporations have little or no undistributed profits. Our approach to attributing ownership of C corporations among these groups closely follows that of Rosenthal and Austin (2016) and Piketty, Saez and Zucman (forthcoming).

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

[19] 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.

associated with retirement plan ownership is allocated based on taxable retirement income.[20] Business property taxes are distributed to tax filers by business income (dividends, capital gains, interest, and passthrough income). 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 from non-filers, usually 5 to 10 percent of total payroll taxes, are allocated to the bottom of the distribution.

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 among 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 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

[20] 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. Since this approach was used by Piketty, Saez and Zucman (forthcoming) it is examined in the sensitivity analysis. 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.

likely decrease current or future taxes, we distribute this effect by federal and state income taxes. These inflation adjustments increase top one percent income shares by an average of 0.7 percentage points in the 1970s and early 1980s when inflation was high, but only 0.2 percentage points in most other years.[21]

There are gaps between NIPA income flows and tax-based flows, 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 NIPA income. It is important to add this missing income, which more than doubles sole proprietor and partnership net income. Our underreporting rates by income group are based on the IRS National Research Program (NRP). The 1988 Taxpayer Compliance Measurement Program (TCMP) study shows similar underreporting rates over the reported income distribution (see online appendix and data). These studies are based on detailed audits to estimate the overall extent of underreporting. BEA largely bases their NIPA estimates of misreported income on these studies.

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.[22] While the top one percent receives about 18 percent of reported AGI, it accounts for only about 5 percent of underreported income. If underreported income were distributed evenly across taxpayers within AGI groups then top shares should decrease. Underreported income, however, is concentrated in a subset of taxpayers and so its inclusion moves some taxpayers into the top one percent while

[21] Steuerle (1985) suggests that higher income business owners were better able to secure loans to take advantage of inflation tax arbitrages than lower income business owners. Accounting for this conjecture would further increase top income shares in periods of high inflation.

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

others drop out. This re-ranking effect explains why the top one percent share in 2001 was unchanged when adding underreported income.

We distribute underreported income in four steps. First, underreported income is estimated as the difference between amounts already in market 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.[23] Within each AGI group, the amounts of underreported income are then allocated to specific tax returns. Underreported wages are distributed 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. Fourth, in order to incorporate a re-ranking effect, a subset of taxpayers is selected to receive underreported business income such that we target the 2001 estimated changes between reported and true income shares.[24]

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.

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[23] Table 3 of Johns and Slemrod (2010) shows that in 2001 the bottom 90 percent of the distribution by reported AGI accounts for 80 percent of underreported income. For other income groups it is distributed as follows: P90-95 receive 5%, P95-99 receive 10%, P99-99.5 receive 2%, P99.5-99.9 receive 1.5%, P99.9-99.99 receive 1%, and the top 0.01 percent receive 0.5% (the final three groups divide the estimated share of the top 0.5 percent by average relative income shares). These shares are used to distribute underreported income to tax filers in all years by AGI income groups using tax unit weights.

[24] Specifically, of tax units with business income, 50% of tax units in the bottom 95 percent and 10% of tax units in the top 5 percent are selected to receive underreported business income. This generates large re-ranking effects at the top so that in 2001 the top one percent income shares are unchanged (when distributing only to filers, since Johns and Slemrod (2010) estimates are based only on filers). The re-ranking effect that emerges from this approach tends to slightly decrease top shares during business expansions but has little effect in recessionary years, such as 2001.

Non-housing rents from consumer durable goods, such as cars and washing machines are not included. Including these other rents would likely reduce top income shares by a small amount.

Employer provided insurance is non-taxable income and thus another important addition to market income. Between 1960 and 2015, these benefits increased from 1 percent to 6 percent of market 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 reported on 2014 Forms 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 online appendix).[25]

In summary, consistent income expansions add the following income sources: (1) fiduciary undistributed income and taxes, (2) C corporation retained earnings associated with non-retirement private ownership, (3) C corporation taxes, (4) business property taxes, (5) the inflationary component of business interest deductions and other inflation adjustments, (6) under-reported income, (7) imputed rental income on housing (including property taxes), (8) the employer portion of payroll taxes, and (9) employer provided insurance costs. Table I and Figure A.1 show the impact of each 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.

III.D. Pre-tax income: Including government transfers

[25] 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. Others may argue that the value exceeds the pre-tax income required to purchase that level of insurance, in part because of the tax exclusion of this fringe benefit.

Government cash and non-cash transfers represent a growing share of personal income and are included in our measure of pre-tax income.[26] First, Social Security and unemployment insurance (UI) benefits reported on tax returns are added to income. The remaining NIPA Social Security and UI total benefits are added to the income of the bottom 90 percent.[27] For earlier years, when these benefits were not reported on tax returns, the 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 transfers from state and local governments. In addition, $83 billion in 2008 stimulus payments are distributed 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 I, the inclusion of transfers decreases top one percent income shares with a growing effect over time: 0.6 percentage point in 1960, 0.9 in 1979, and 2.3 in 2015.

III.E. After-tax income

Taxes are subtracted from pre-tax income sequentially in order to show the effect of each tax on top one percent shares (Table II). For each tax, 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.

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

[27] 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.

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.[28] Estate and gift taxes are not considered because personal transfers are not included in pre-tax income.

Several adjustments are made to federal individual income tax liability. Foreign tax credits, which reflect foreign withholding taxes paid, are added back. Refundable tax credits are not accounted for here because they are already included in cash transfers in pre-tax income. Self-employment taxes are included later with other payroll taxes. State and local income taxes and residential real estate taxes are allocated by deducted amounts. Business property taxes, which were previously included, are subtracted for after-tax income. The large effect of property taxes on top shares in 1960 is due to the substantial fraction of business property taxes allocated to corporate equity owners. This fraction declines as corporate ownership shifts to retirement accounts. Corporate income taxes are those previously calculated for market income.

Payroll taxes include employer and employee 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).[29] Sales and other taxes are distributed by disposable income (after-tax income after removing payroll taxes) less savings, where saving rates are significantly larger for higher income groups and come from the Surveys of Consumer Finance results presented in Dynan, Skinner and Zeldes (2004).

[28] The fraction of the top one percent itemizing was generally at least 95 percent between 1960 and 2015.
[29] The revenues from the 0.9 percent Additional Medicare Tax, which began in 2013, are included in federal income taxes.

IV. Results

Using a measure of market income that is consistent over time and captures sources not included in tax-based measures has a dramatic effect on top income shares. These effects are shown in Figure III and in summary form in Table III. Since the addition of retained earnings can be viewed as reflecting capital gains accruing inside of C corporations, consistent market income is compared to PS income including capital gains.

For 1960, our estimate of the top one percent share of consistent market income is 11.3 percent, 2.3 percentage points higher than the PS market 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 income 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, the consistent market income share was 14.9 percent, while the PS income share was 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 (0.9 percentage point), and including employer provided insurance (0.8 percentage point) and the employer share of payroll taxes (0.6 percentage point).

Between 1960 and 2015, the top one percent share of market income increased by 3.6 percentage points. This is one-third of the PS market income increase of 11.3 percentage points. From 1960 to 1979, the top income share *decreased* by about one percentage point. Over the more recent period from 1979 to 2015, the top one percent share of market income share increase was less than half the PS increase (5.0 vs. 11.3 percentage points).[30]

[30] While significantly reduced in magnitude, there is still a relatively large 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

Our measure of pre-tax income includes government transfers, the largest of which is Social Security benefits. In 1960, the top one percent pre-tax income share was only slightly lower than the market income share (10.7 vs. 11.3 percent) because government transfers were relatively small. In 2015, the pre-tax income share was significantly lower (12.6 vs. 14.9 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.

Using pre-tax income, the increase in the top one percent income share since 1960 is about 83 percent smaller than the PS estimate (1.9 vs. 11.3 percentage points). The overall difference in the top share increase of 9.4 percentage points is accounted for as follows: about 2 percentage points from using C corporation retained earnings in place of realized capital gains, about 2 percentage points from including corporate taxes and business property taxes, about 2 percentage points from including government transfers, about 1 percentage point from correcting filer demographics and income definitions, about 1 percentage point from including employer paid payroll taxes and insurance, and about 1 percentage point from controlling for falling marriage rates.

Taxes reduce top one percent shares by between about one and two percentage points, but have little impact on the trend in top income shares. 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 consistent, pre-tax, and after-tax incomes (Figure A.2).

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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.

IV.A. 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 IV, the approach of PS (online updates) using unadjusted tax return based incomes implies that about two-thirds (65%) of the increase in pre-tax market income between 1979 and 2015 went to the top one percent of tax units. In contrast, applying this approach to consistent market income would imply that one-quarter (25%) of the increase in income went to the top one percent of adults. The approach also implies that the top one percent received only one-fifth (19%) of pre-tax income and one-tenth (10%) of after-tax income. Using this cross-sectional approach, consistent income measures thus suggest that economic growth has been shared more equally than implied by market income as reported on tax returns.[31]

It is important to note that such cross-sectional computations of the distribution of economic growth have the implicit assumption that it is the same people at the top of the income distribution over time. The beneficiaries of economic growth cannot be determined by comparing two cross-sections because the composition of income groups changes over time. More than one-third of 1979 adults filing tax returns died by 2015 and were replaced by a larger cohort of new adults and immigrants moving into the 2015 sample. This new cohort of adults earned more than half of AGI in 2015. 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, Auten, Gee and Turner (2013) found that at least one third of those in the top one percent 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 10 years.

[31] Average real income of the bottom 90 percent increased 50% for tax return based income, but increased 127% for consistent market income and 172% for pre-tax income.

Considering income dynamics of specific people has effects over the entire distribution. The Piketty, Saez and Zucman (forthcoming) 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 average annual growth rates of 19 percent for those in the bottom quintile in 1996, 4 percent for the median, and -2 percent for the top 0.01 percent.

These results illustrate that most of those at the top in a particular year tend to 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.B. Tax burdens over time

The top individual income tax rate has fallen dramatically from 91 percent in 1960 to 39.6 percent in 2015 and was as low as 28 percent from 1988 to 1990. However, these top tax rates present only a limited picture of the true tax burden of the top one percent. Before the base-broadening reforms of TRA86, high income taxpayers were able to shelter more of their income and only a small fraction of taxpayers were subject to the top tax rates. In recent decades the top tax rates have applied more broadly and the bottom 90 percent has received a larger share of its income from sources not included in the tax base. These considerations suggest that it would be useful to examine overall tax burdens using a consistent measure of broad income. Figure IV shows the total federal, state, and local tax burden as a percent of pre-tax 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 (bottom figure) of adults from 1960 through

2015. Payroll taxes are excluded at this point and considered later along with social insurance benefits.

Total tax burdens of the top one percent ranged from 33 to 46 percent over this period, averaging 38 percent and with no clear trend. Indeed, the average effective tax rate was 42 percent in 1960 and 43 percent in 2015. 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.[32] 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.[33] 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 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

[32] For the top one percent in 1966, Okner (1975) estimated that total federal, state, and local taxes were from 32 to 39 percent of their 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.

[33] In 2013, the average federal individual income tax rate of the top one percent increased about 4 percentage points due to an increase in the top rate and the adoption of two new surtaxes (Auten, Splinter and Nelson, 2016). Including payroll taxes increases the 2015 top one percent average tax from 43 to 45 percent of income.

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 of 24 percent for 1960 compared to our estimate of 16 percent. Our lower effective rate is due to including retained corporate earnings in place of realized capital gains. In more recent years there is much less difference in our estimates. For 2004, Piketty and Saez (2007) estimated an average federal individual tax rate of 21 percent compared to our estimate of 23 percent. Although offset by the inclusion of untaxed underreported income, our slightly higher effective rate is largely due to grouping tax units by the number of adults to control for declining marriage rates over time. Since the marriage rate is much higher for the top one percent, grouping by the number of adults means that the top one percent includes fewer tax units and consequently higher average incomes and tax burdens.

Figure IV suggests that taxes reduce inequality more in recent decades than in 1960. While taxes for the top one percent fluctuated around 40 percent of income with no clear trend, taxes for the bottom of the distribution decreased from 19 to 15 percent of income.[34] 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, 2017). This suggests that the increase in overall tax progressivity was primarily due 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 before and after-tax income. These social

[34] Including refundable tax credits here would decrease 2015 tax rates another percentage point for the bottom 90 percent.

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.[35] 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 V shows that that before the mid-1980s, payroll taxes and social insurance benefits were about the same percent of pre-tax income for both the bottom 90 and top one percent. 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 unchanged. These changes increased the overall progressivity of the combined payroll tax and social insurance policies.

The estimates in Figure V do not include the income tax on Social Security benefits of higher income taxpayers since 1984 that goes into the Social Security Trust Fund. In addition, it excludes 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 in Figure V this would show 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.

[35] The OASDI tax base is capped and HI taxes were also capped before 1993. 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 only 15 percent of the amount above about $9,000.

This section presents sensitivity tests of alternative assumptions. In addition, we discuss the treatment of retirement income and show results when targeting national income. 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. Most are within a percentage point of our main results (See Table V).

V.A. Corporate tax, retained earnings, and offshore income

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 75 percent of the corporate tax burden to corporate capital and interest bearing assets and 25 percent of the corporate tax burden to wages. Using this approach, the top one percent shares of pre-tax income increased from 10.7 percent in 1960 to 12.6 percent in 2015, an increase of 1.9 percentage points. Alternatively, distributing all of the corporate tax to corporate capital and interest bearing assets results in top one percent pre-tax income shares of 10.9 and 12.7 percent, an increase of 1.8 percentage points. Distributing the corporate tax to all forms of non-housing capital, including passthrough capital (as in Piketty, Saez and Zucman, forthcoming), results in top one percent pre-tax income shares of 10.6 and 12.8 percent, an increase of 2.2 percentage points.

Corporate retained earnings can also be distributed in different ways. Consider two alternatives. First, rather than distributing all of the retirement ownership portion of corporate retained earnings by retirement income reported on tax returns, distribute 50 percent by wages. Second, rather than 25 percent capital gains and 75 percent by dividends, distribute 50 percent of retained earnings by capital gains and 50 percent by dividends. Both of these approaches leave the levels and increases in top one percent after-tax income shares essentially unchanged.

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 shares in 2012 by one percent, or $550 billion. Assuming that this wealth earns a 5 percent return and is owned by the same individuals in the top of the income distribution, it would increase our top one percent pre-tax income shares by about 0.2 percentage points.[36]

V.B. Base income groups on number of individuals and size-adjusted income

In order to adjust for the decline in marriage rates, our baseline analysis uses incomes at the tax unit level and bases income groups on the number of adults. Therefore each percentile includes an equal number of adults. A measure more relevant to the distribution of economic welfare could base income groups on the total number of individuals (including dependents) and rank tax units using size-adjusted incomes, as in Congressional Budget Office (2016). This approach accounts for economies of scale and sharing, as well as the effects of supporting dependents. For example, when a family shares a residence the incremental costs are likely to decline with each additional person.

Researchers use various equivalence scales to account for size differences among tax units or households. The Congressional Budget Office (2016) divides tax unit income by the square-root of the number of individuals in the unit, including both adults and dependents, in ranking tax units. This adjustment is similar to that used by the Census Bureau to estimate equivalence-adjusted income inequality. The square-root of the number of individuals in the sharing unit is between the extremes of assigning the full tax unit income to each individual (complete economies of scale, i.e., non-rivalrous consumption) and per capita income (equal

[36] IRS efforts to identify untaxed offshore income are on-going, which means that estimates at the present time are uncertain.

sharing but no economies of scale, i.e., completely rivalrous consumption). This commonly used size-adjustment implicitly assumes equal sharing among all individuals in the tax unit. Using the square-root method to adjust for family size and basing income groups on the number of individuals, top one percent after-tax income share increase from 8.7 to 10.4 percent between 1960 and 2015, an increase of 1.6 percentage points (compared to 1.7 percentage points for the main estimates).

V.C. Retirement income

The treatment of retirement savings and income presents difficult choices when thinking about distribution issues (Nelson, 1987). The basic options are to count retirement income when it is earned, 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. While consistent with measures of accrued income, this approach implies that many retired people have very little income. In addition, it is unclear how to use tax data to distribute this income to workers because most is not reported on tax returns until distribution and annual accruals for defined benefits pensions are poorly defined due to threshold effects, such as minimum years to vest. If retirement income is counted only when distributed, this provides better measures of the incomes of retired people and their ability to consume, but relative to an accrual approach this shifts income from individuals' working years. Some distribution studies count retirement income both when accrued and when distributed, but this results in more total income than exists in the economy.

Our consistent income measures generally include income from pensions, retirement savings accounts, and annuities when the retirement income is distributed.[37] Some factors

[37] This is the approach used in most studies of income inequality, including Piketty and Saez (2003).

suggest that counting the market component of such income when it accrues would likely increase the estimated income shares of top income groups. First, individuals tend to save more later in their working lives when their incomes are generally higher and they are thus higher in the income distribution. Second, higher income tax units at any age tend to contribute more to retirement savings and accrue more private pension rights. As discussed in the following section on targeting national income, we estimate that relative to a distribution approach, an accrual approach for private pensions and retirement accounts would increase the 2014 top one percent income share by about one and a half percentage points. However, a consistent and comprehensive measure of accrued retirement income should also include the accrual of Social Security retirement benefits. The effect would be large, as the 2013 benefits paid were $811 billion, about equal to total private pension and IRA distributions ($639 and $214 billion, respectively).

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 subject to individual income taxes in the year they accrue (other than the corporate and other business taxes on their investments) 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. Defined benefit plans act like annuities, for which 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, our 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.

V.E. National income targeting

Piketty, Saez and Zucman (forthcoming, hereafter PSZ) present estimates of top income shares based on distributing national income. To provide a comparison with their estimates, we provide estimates of after-tax national income that fully account for government taxation and spending. To estimate after-tax national income we add three income sources to our after-tax income: (1) undistributed current year income of retirement accounts, (2) government deficits (or surpluses), and (3) other undistributed income, which consists of non-profit and government income, remaining indirect taxes, transfers, subsidies, surplus of government enterprises, and government consumption.

Undistributed retirement account income is distributed according to the shares of non-Social Security pension income as in PSZ. Government deficits are distributed by income and payroll taxes paid, but excluding state income taxes because almost all deficits are at the federal level.[38] Government consumption includes spending valued at cost of military expenditures, schooling costs, and other non-transfer government spending. Given the uncertainty of how government consumption and other undistributed income should be allocated, these are added last and such that income shares are unaffected, similar to the approach in PSZ. While adding undistributed retirement income increases the recent top one percent shares about half a percentage point in recent years, government deficits undo this change leaving after-tax national income shares essentially unchanged: remaining at 8.5 percent in 1960 and increasing slightly from 10.1 to 10.2 percent in 2015.

[38] PSZ allocate the deficit equally to tax units by taxes paid and government spending received. They argue that the deficit may cause government transfers to be cut in the future, but current year transfer recipients cannot bear the deficit this way, as they actually do receive those transfers in the given year. Ricardian equivalence also suggests that current year taxpayers bear all the burden of current deficits (through decreases in consumption in order to save to pay future taxes, which can be thought of as a form of voluntary tax withholding). Transfer recipients, however, are unlikely to change their current year behavior by saving more in response to deficits and the expectation of lower future transfers.

In 2014, top one percent after-tax national income shares were estimated by PSZ to be 15.7 percent, as compared to our estimate of 10.2 percent—a 5.5 percentage point difference. To decompose the sources of this difference, we sequentially change assumptions to those used by PSZ: (1) treat all non-Social Security retirement income on an accrual basis rather than only the undistributed amount,[39] (2) distribute government deficits half by taxes and half by government spending, (3) use an equal-split of married incomes to assign income groups,[40] (4) reintroduce young, dependent, and non-resident filers and undo various income adjustments (state tax refunds, gambling losses, net operating losses, capital gain distributions, combat pay, and foreign tax credits) and (5) distribute underreported income by wages and positive business income reported on tax returns.[41]

Including distributed retirement income on an accrual basis increases shares 1.0 percentage point. Assigning government deficits half by taxes and half by government spending, rather than fully by taxes, increases it another 0.4 percentage point, equal-split incomes by 0.2 percentage point, removing corrections to filer demographics and income by 0.3 percentage point, and distributing underreported income by reported income by 2.6 percentage points. The remaining percentage point of difference is due to other methodology and data source differences.

Note that nearly one half of the gap in top one percent share is due to PSZ attributing much more underreported income to top earners than suggested by the IRS National Research Program (NRP). Most of this is due to PSZ distributing underreported passthrough income by

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[39] Based on the PSZ online data, our current understanding is that after-tax retirement income excludes retirement distributions and instead consists of employer and employee contributions and the surplus of private pensions, both of which should be on an accrual basis.

[40] Applying an adjustment not used elsewhere, PSZ divide married incomes by two for their benchmark estimates. This approach assumes equal sharing of income but no economies of scale. Also, it does not take into account dependents either for economies of scale or in setting the size of each income group.

[41] When distributing income, PSZ truncate business income at zero. This ignores the substantial share of underreported business income being found on tax returns with reported business losses, as discussed in more detail in the online appendix.

reported passthrough income. In 2014, this implies distributing about 50 percent of this income to the top one percent. But, NRP based estimates suggest that only about 15 percent should go to the final top one percent after re-ranking. A back of the envelope estimate suggests that this explains 1.4 percentage points of the gap.[42] PSZ explain that they allocate more underreported income to the top of the distribution because of lower-quality NRP audits of complex partnerships. That approach effectively removes income lower in the distribution, which was estimated from audits, and creates new income for the top. A more correct approach would be to leave the income in national income that is based on the NRP and provide estimates with the additional top income added to national income.

The results of these sensitivity tests suggest that while alternative assumptions can result in modestly higher or lower top income shares and changes in these shares, the results are robust to alternative assumptions. Our basic findings of lower levels of inequality and relatively little change in top income shares since the 1960s change little from the main results, even when distributing all of national income.

VI. Summary and Conclusions

Studies using tax return data have argued that the market income shares of top income groups have increased substantially since 1960. However, such studies generally do not account for the effects of major tax reforms, income sources not in the individual income tax base, and changes in marriage rates. Failing to account for these factors results in a distorted view of income inequality levels and trends. Using administrative U.S. tax data, this paper examines the importance of using broader and more consistent measures of income.

[42] [(50%-15%) • $0.6 trillion in underreported non-wage income] / $15.2 trillion national income = 1.4%

While market income is an incomplete measure, for comparison purposes we start by estimating an improved measure of market income that corrects for tax base changes, adds market income excluded from the individual tax base, such as undistributed corporate profits and employer provided insurance, and adjusts for declining marriage rates. Our measure of consistent market income indicates that between 1960 and 2015 the top one percent income share increased by less than 4 percentage points. Using unadjusted tax-based measures, Piketty and Saez (2003 and updates) estimated that the top market income share increased by 11 percentage points. The most important factors in the difference are accounting for C corporation retained earnings (2 percentage points), corporate taxes and business property taxes (2 percentage points), employer paid payroll taxes and insurance (1 percentage point), and falling marriage rates (1 percentage point).

While market income measures how individuals are compensated for their labor and investments, it provides an incomplete picture of the overall resources available at both the top and bottom of the income distribution. Because government transfers have grown substantially in recent decades, the inclusion of transfers has become more important in measures of income inequality. Our measure of broad pre-tax income includes government transfers and suggests that the top one percent share increased since 1960 from 10.7 to 12.6 percent, about 2 percentage points.

The use of broad and consistent income measures is also important for measuring tax burdens and after-tax incomes over time. The average tax burden of the top one percent (not including payroll taxes) was approximately the same percent of pre-tax income in 1960 and 2015, in spite of much lower statutory rates. Since the average tax burden of the bottom 90 percent declined over this period, this suggests that the overall tax system has become moderately more progressive. Considered separately, the combined effects of payroll taxes and

social insurance benefits have also become more progressive. The top one percent share of after-tax income increased from 8.5 to 10.1 percent, less than 2 percentage points.

An alternative narrative about top income shares emerges when consistent and broad measures of pre-tax and after-tax incomes are used: changes in the top one percent income shares over the last half century are likely to have been relatively modest.

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Appendix

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 A.2 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 $50 billion of increased taxable income, or about one quarter of the observed increase in top one percent 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 unadjusted top one percent 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 A.4 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% 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%). 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 I: 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 (with CGs, PS)	9.0	9.0	11.1	13.8	20.3	----	----	----	----	----
Piketty-Saez (no CGs)	8.3	8.1	9.2	12.8	18.6	-0.7	-0.9	-1.9	-1.0	-1.7
Panel 1: Consistent Market Income, Adjustments & Group by Adults										
Remove non-deduct. losses	8.3	8.3	9.7	----	----	*	0.2	0.5	----	----
Add tax-exempt interest	8.6	8.7	10.1	13.2	18.7	0.3	0.3	0.4	0.3	0.2
Limit returns to adult residents	8.6	8.5	10.0	12.9	18.3	-0.1	*	*	-0.3	-0.4
Correct income definition	8.6	8.5	9.9	12.7	17.9	*	*	-0.1	-0.1	-0.4
Set income groups by #adults	7.9	7.5	8.9	11.5	16.1	-0.7	-1.0	-1.0	-1.2	-1.9
Cumulative change from PS						**-1.1**	**-1.5**	**-2.2**	**-2.3**	**-4.2**
Panel 2: Consistent Market Income, Expansions										
Fiduciary retained income	8.1	7.7	9.2	11.8	16.2	0.2	0.2	0.2	0.3	0.2
C-corp retained earnings	10.1	9.4	10.1	12.2	17.0	2.0	1.6	1.0	0.4	0.8
C-corp taxes	11.5	9.7	10.2	12.3	17.1	1.4	0.4	0.1	*	*
Business property tax	12.1	9.9	10.3	12.4	17.3	0.6	0.2	0.1	0.2	0.2
Inflation correction for interest	12.2	10.6	10.7	12.9	17.3	0.1	0.7	0.4	0.4	0.0
Underreported income	12.0	10.8	11.2	12.7	16.7	-0.2	0.2	0.5	-0.2	-0.6
Imputed rent	11.6	10.6	11.1	12.6	16.3	-0.4	-0.2	-0.1	-0.2	-0.4
Employer payroll tax	11.4	10.2	10.6	12.0	15.7	-0.2	-0.4	-0.5	-0.5	-0.6
Employer insurance	11.3	9.9	10.2	11.5	14.9	-0.1	-0.3	-0.4	-0.5	-0.8
Consistent market income and total changes	**11.3**	**9.9**	**10.2**	**11.5**	**14.9**	**2.2**	**0.9**	**-0.9**	**-2.3**	**-5.4**
Panel 3: Pre-tax Income, Add Transfers										
SS benefits	11.0	9.4	9.7	10.9	14.1	-0.3	-0.4	-0.5	-0.6	-0.8
UI benefits	10.9	9.4	9.6	10.9	14.0	-0.1	*	*	*	0.0
Other cash transfers	10.7	9.2	9.5	10.7	13.7	-0.2	-0.2	-0.1	-0.2	-0.3
Medicare	----	9.1	9.3	10.5	13.3	----	-0.1	-0.1	-0.2	-0.5
Other non-cash transfers	10.7	9.0	9.1	10.3	12.6	*	-0.2	-0.2	-0.2	-0.6
Pre-tax income and total changes	**10.7**	**9.0**	**9.1**	**10.3**	**12.6**	**1.7**	**0.0**	**-2.0**	**-3.5**	**-7.7**

Notes: Cumulative changes are relative to the Piketty and Saez series with capital gains (thresholds set without capital gains). See Table A.1 and online appendix for detailed description of adjustments. * denotes changes between -0.05 and 0.05 percentage points.
Sources: Authors' calculations, IRS, BEA, and Piketty and Saez (2003 and updates).

Table II: Effects of taxes 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	10.7	8.8	9.0	9.9	12.4	----	----	----	----	----
Remove taxes										
Federal indiv. income tax	9.8	8.1	8.0	9.0	10.4	-0.9	-0.9	-1.1	-1.3	-2.3
State/Local indiv. income tax	9.7	8.0	7.8	8.7	9.8	-0.1	-0.1	-0.2	-0.3	-0.5
Corporate income tax	8.4	7.6	7.8	8.6	9.6	-1.3	-0.3	-0.1	-0.1	-0.2
Property tax	7.8	7.5	7.7	8.5	9.4	-0.6	-0.1	-0.1	-0.1	-0.3
Payroll tax	8.1	8.1	8.3	9.2	9.9	0.3	0.6	0.7	0.8	0.6
Sales and other taxes	8.5	8.4	8.7	9.5	10.1	0.3	0.3	0.3	0.2	0.2
After-tax income and total changes	**8.5**	**8.4**	**8.7**	**9.5**	**10.1**	**-2.3**	**-0.6**	**-0.5**	**-0.8**	**-2.5**

Notes: Cumulative changes are relative to pre-tax income. Tax totals are based on NIPA amounts. Fuel and utility taxes are not included. See Table A.1 and online appendix for detailed description of adjustments.
Sources: Authors' calculations, IRS, and BEA.

Table III: Comparison of top 1% income share increases

	1960	1979	2015	1979-2015 Change	1960-2015 Change
Piketty Saez market income	9.0	9.0	20.3	11.3	11.3
Consistent market income	11.3	9.9	14.9	5.0	3.6
Pre-tax income	10.7	9.0	12.6	3.7	1.9
After-tax income	8.5	8.4	10.1	1.7	1.7

Notes: Piketty and Saez market income includes capital gains and thresholds are set by income excluding capital gains to make more comparable to consistent market incomes. Adjustments used to estimate consistent market income, pre-tax income, and after-tax income are listed in Tables I, II, and A.1 and described in detail in the online appendix.
Sources: Authors' calculations, IRS, BEA, and Piketty and Saez (2003 and updates).

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

	Piketty-Saez Market Income	Consistent Market Income	Pre-tax Income	After-tax Income
1960-2015	38%	18%	14%	8%
1979-2015	65%	25%	19%	10%
1993-2015	52%	25%	20%	11%

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

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

	1960	2015	1960-2015 Change
Corporate tax burden alternatives (pre-tax income)			
Baseline: 25% wages/75% corporate capital	10.7	12.6	1.9
0% wages/100% corporate capital	10.9	12.7	1.8
0% wages/100% non-housing capital	10.6	12.8	2.2
Corporate retained earnings (after-tax income)			
Baseline: individuals: 25% capital gains/75% dividends	8.5	10.1	1.7
individuals: 50% capital gains/50% dividends	8.4	10.0	1.6
retirement accounts: 50% by wages/50% distributions	8.4	10.1	1.7
Centile groups and size-adjusted income (after-tax income)			
Baseline: groups by # of adults, ranked by tax unit income	8.5	10.1	1.7
groups by all individuals, ranked by size-adj. income	8.7	10.4	1.6
Targeting national income			
Baseline: consistent after-tax income	8.5	10.1	1.7
after-tax national income	8.5	10.2	1.7

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, IRS, BEA, and Piketty, Saez and Zucman (forthcoming).

Table A.1: Descriptions of adjustments to income and tax units

Adjustments	Years	Adjustment Method
Consistent Market Income		
Corrections		
Remove nondeductible losses	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
Remove filers <20 years old	All Years	Remove tax filers not in Census age 20+ population
Remove other dependent filers	1987-2015	Primarily college students age 20-23, few 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.
Include excluded dividends	1960-1986	$100/200 exclusion ended with Tax Reform Act of 1986
Add tax-exempt combat pay	1995-2015	Use information returns and interpolate for missing years
Net out gambling losses	1972-2015	From tax returns. Before 1991, misc. deductions up to other income which includes gambling income.
Remove cap. gains distributions	1971-2015	1040 amounts not on Schedule D. Not separate <1975 or 1997/98
Remove IRA contributions	1975-2015	Remove amount reported on return, in data since 1975
Remove tax refunds adjustment	1971-2015	Adjustment for previously deducted state and local tax refunds, not on 1040 before 1971
Remove net operating losses	1960-2015	Before 1989, equals 80 percent of other income losses
Set income groups by #adults	All Years	Set income groups by giving joint filers twice their tax unit weight
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
Add corporate income tax	All Years	Allocate household portion 3/4 by capital & 1/4 by wages, retirement portion by taxable pension income on 1040
Add business property tax	All Years	Allocate to corporate capital by asset share and then hh equities by dividends, capital gains, interest, and taxable pension income on 1040
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 rents	All Years	Allocate by real estate taxes deducted
Add employer payroll tax	All Years	Calculated based on reported wages or non-filer income
Add employer paid insurance	All Years	Allocate NIPA employer provided health, life, and workers' comp. insurance using 2014 Form W-2 insurance distribution
Pre-tax 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, ref. tax credits, workers comp., state/local social insurance family assistance, temporary disability, etc.
Add Medicare	1965-2015	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. tax	All Years	Includes foreign tax credits as are taxes paid to foreign governments
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

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

Table A.2: Revenue estimates of base-broadening provisions in the Tax Reform Act of 1986 that affect total 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 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 A.3: Changes in top 1% 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 1% 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 A.4: Increase in top 1% 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 total 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 1% thresholds are based on tax return income including capital gains and the number of tax returns (non-filers are excluded).
Sources: 1985 base year individual tax return panel and authors' calculations.

Table A.5: Top Income Shares, 1960-2015

	Consistent market income		Pre-tax income		After-tax income	
Year	Top 1%	Top 0.1%	Top 1%	Top 0.1%	Top 1%	Top 0.1%
1960	11.3	4.0	10.7	3.8	8.5	2.7
1961	11.2	4.0	10.6	3.8	8.7	2.8
1962	11.1	3.9	10.5	3.7	8.8	2.9
1963	11.5	4.1	10.9	3.9	9.2	3.1
1964	11.8	4.3	11.2	4.1	9.5	3.3
1965	11.7	4.3	11.1	4.0	9.5	3.3
1966	11.6	4.3	11.1	4.0	9.6	3.3
1967	11.4	4.1	10.8	3.8	9.3	3.1
1968	11.3	4.2	10.7	3.9	8.8	3.0
1969	10.4	3.7	9.8	3.4	8.2	2.6
1970	9.7	3.2	9.0	3.0	7.8	2.4
1971	10.0	3.4	9.2	3.1	8.0	2.5
1972	10.2	3.4	9.4	3.1	8.1	2.6
1973	10.0	3.3	9.2	3.0	8.4	2.7
1974	9.8	3.2	9.0	2.9	8.2	2.6
1975	10.0	3.3	9.0	2.9	8.3	2.6
1976	9.8	3.3	8.8	2.9	8.0	2.6
1977	9.9	3.3	9.0	3.0	8.4	2.7
1978	9.8	3.3	8.9	3.0	8.4	2.8
1979	9.9	3.4	9.0	3.0	8.4	2.8
1980	9.6	3.2	8.6	2.9	7.9	2.6
1981	9.3	3.1	8.4	2.7	8.1	2.6
1982	9.5	3.3	8.5	2.9	8.0	2.7
1983	9.7	3.4	8.6	3.0	8.1	2.7
1984	10.2	3.9	9.2	3.5	8.6	3.1
1985	10.2	3.8	9.1	3.4	8.6	3.1
1986	9.7	3.6	8.7	3.2	7.8	2.8
1987	10.0	3.6	9.0	3.2	8.1	2.8
1988	12.0	4.9	10.8	4.4	9.8	3.9
1989	11.5	4.5	10.3	4.0	9.5	3.6
1990	11.6	4.5	10.3	4.0	9.6	3.6
1991	11.0	4.1	9.7	3.6	8.7	3.2
1992	11.8	4.7	10.3	4.1	9.0	3.4
1993	11.1	4.3	9.7	3.7	8.2	2.9
1994	11.2	4.3	9.8	3.8	8.2	2.9
1995	11.8	4.6	10.3	4.0	8.6	3.1
1996	12.2	4.8	10.7	4.2	8.8	3.2
1997	12.7	5.2	11.2	4.5	9.2	3.4
1998	12.9	5.3	11.4	4.6	9.3	3.5
1999	13.3	5.6	11.8	4.9	9.4	3.6
2000	13.8	5.9	12.3	5.3	9.9	3.9
2001	13.0	5.3	11.4	4.7	9.8	3.7
2002	12.3	4.9	10.8	4.3	9.2	3.5
2003	12.7	5.2	11.1	4.5	9.6	3.8
2004	13.6	5.9	11.9	5.1	10.1	4.1
2005	14.7	6.6	12.9	5.7	10.7	4.5
2006	15.2	6.8	13.4	6.0	11.2	4.8
2007	15.1	6.8	13.2	5.9	11.0	4.6
2008	14.8	6.6	12.6	5.6	11.0	4.7
2009	13.8	6.0	11.6	5.0	10.0	4.2
2010	15.0	6.8	12.5	5.7	10.8	4.7
2011	14.5	6.3	12.2	5.2	10.5	4.3
2012	16.0	7.4	13.6	6.2	11.4	5.0
2013	14.5	6.3	12.4	5.4	10.0	4.0
2014	15.0	6.6	12.7	5.5	10.1	4.1
2015	14.9	6.5	12.6	5.5	10.1	4.1

Notes: Adjustments used to estimate consistent market income, pre-tax income, and after-tax income are listed in Tables I, II, and A.1 and described in detail in the online appendix.
Sources: Authors' calculations.

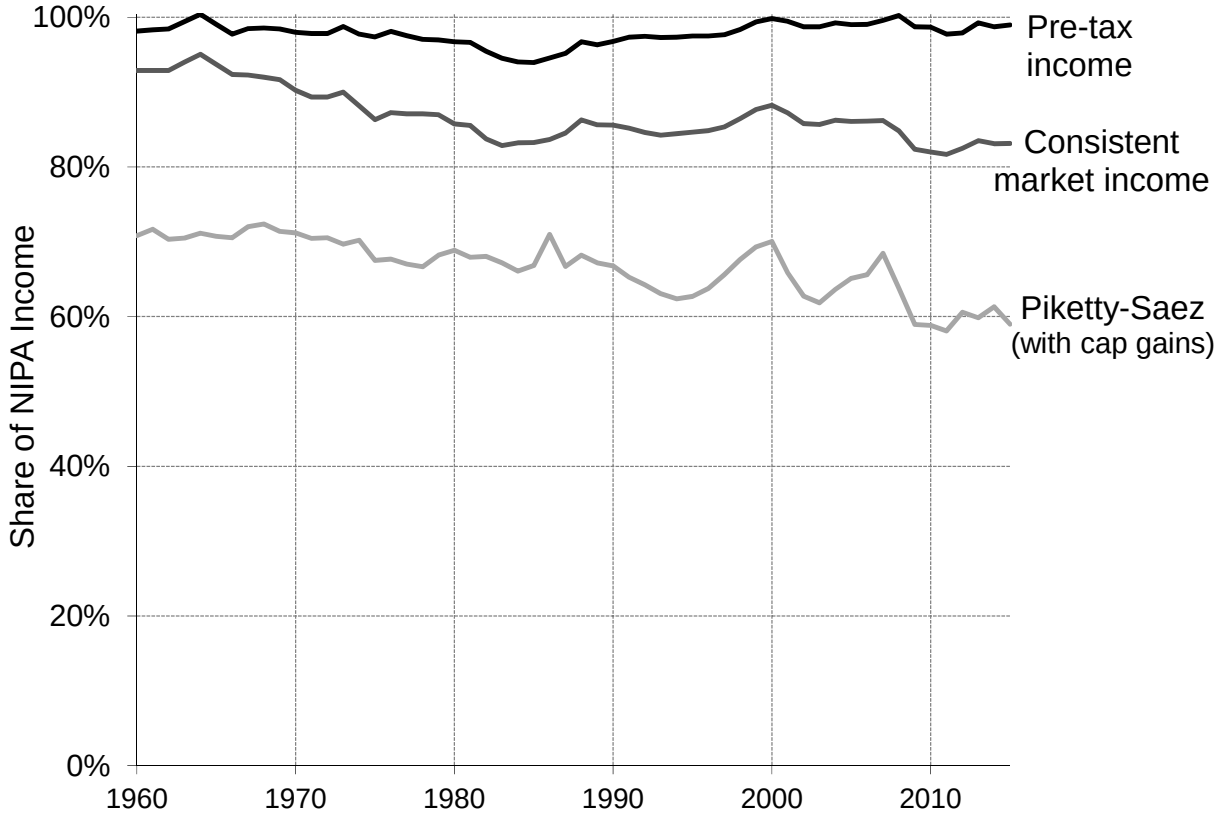

Figure I: Total income as a share of NIPA income

Notes: NIPA income is personal income plus corporate profits less net dividends. Pre-tax income is consistent market income plus government transfers. Adjustments used to estimate consistent market income and pre-tax income are listed in Tables I and A.1 described in detail in the online appendix. All measures are pre-tax.

Sources: Authors' calculations, IRS, BEA, and Piketty and Saez (2003 and updates).

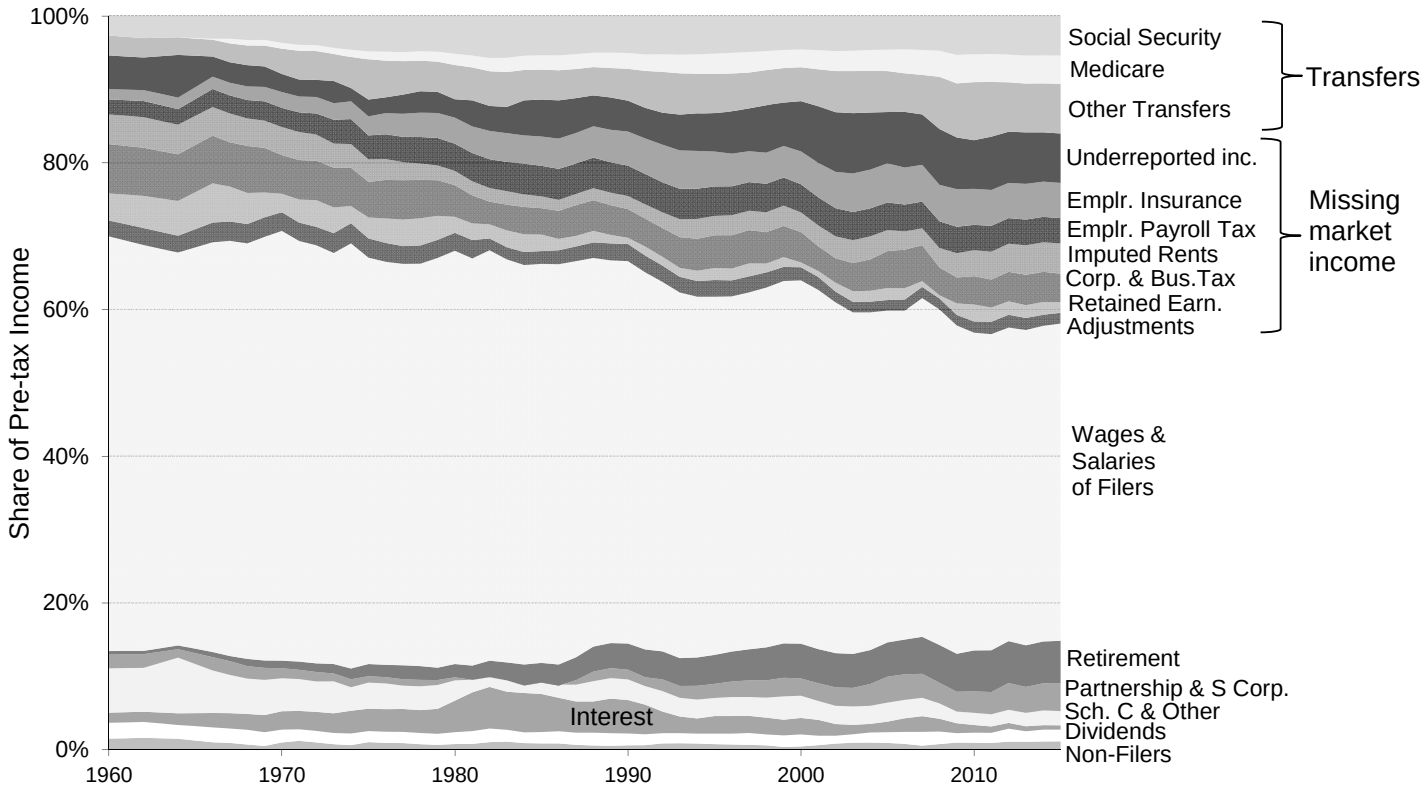

Figure II: Income sources as a share of pre-tax income

Notes: Adjustments (bottom group of missing market income) are listed in Table I, Panel 1. Sch. C and Other includes small amounts from unlisted sources, such as alimony, rents, etc. Corp. and Bus. Tax is federal and state corporate income tax and business property taxes. Income sources are pre-tax.
Sources: Authors' calculations, IRS, and BEA.

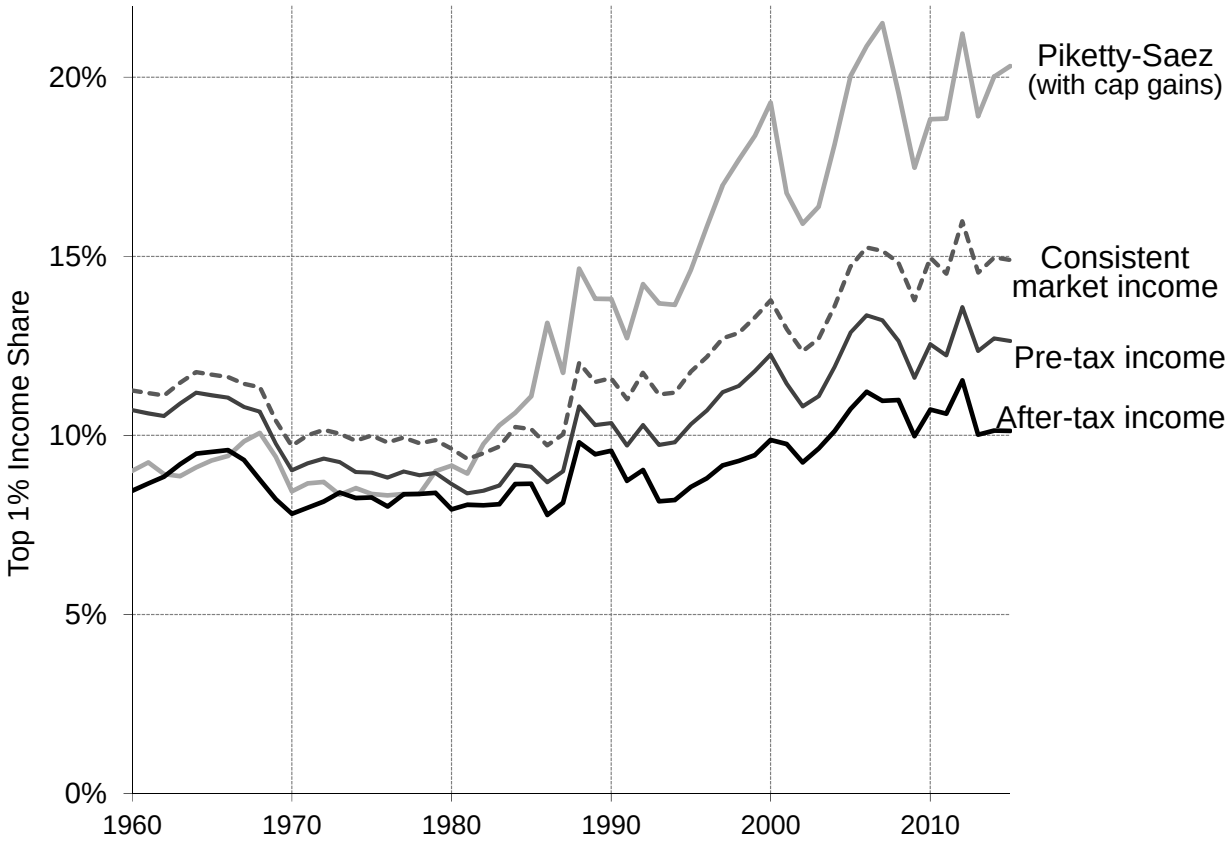

Figure III: Comparison of top 1% income shares

Notes: Piketty and Saez series includes capital gains (thresholds set without capital gains). Pre-tax income is consistent market income plus government transfers. After-tax income subtracts federal, state, and local taxes.

Sources: Authors' calculations, IRS, BEA, and Piketty and Saez (2003 and updates).

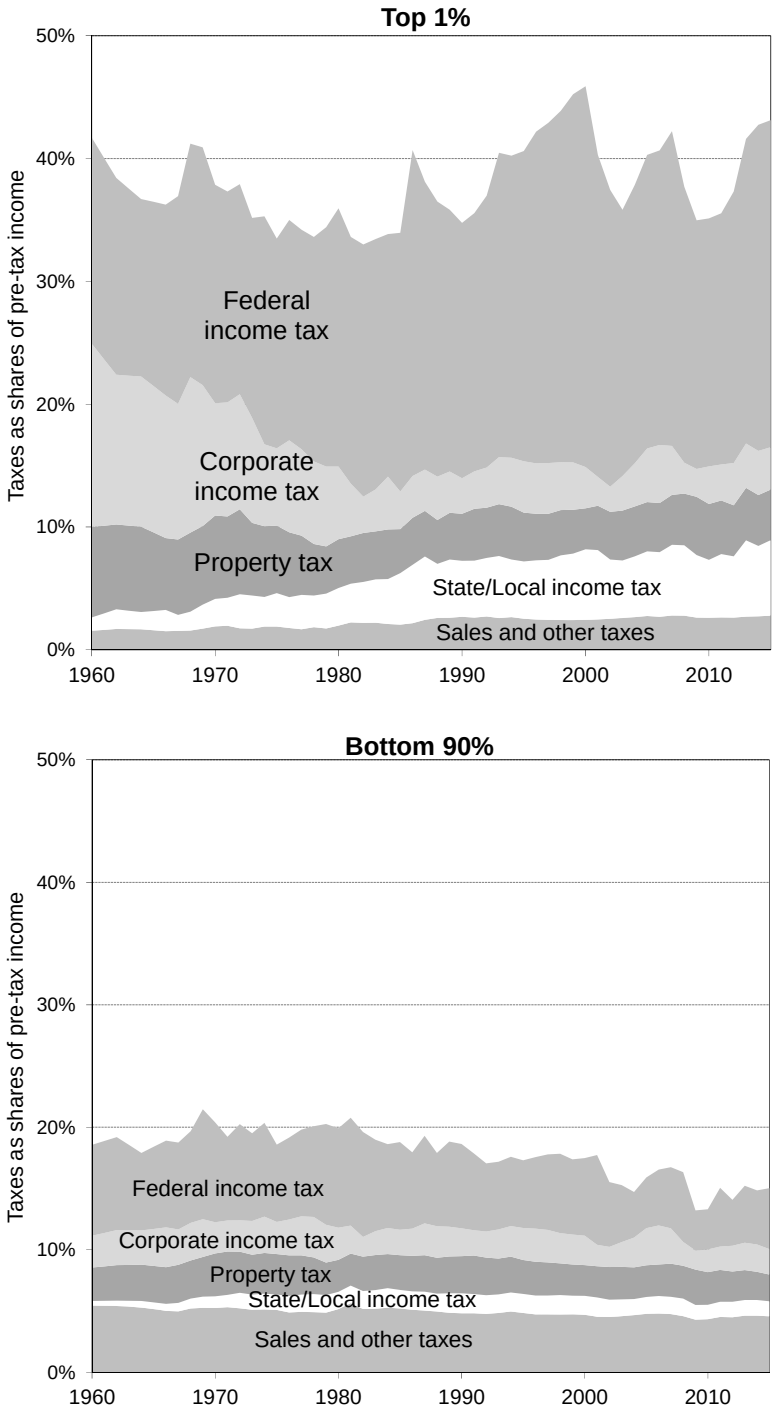

Figure IV: Taxes as shares of pre-tax income

Notes: Payroll taxes are examined in Figure V in connection with transfer payments. Refundable tax credits are included in pre-tax income and excluded from income taxes.

Sources: Authors' calculations, IRS, BEA, and Piketty and Saez (2003 and updates).

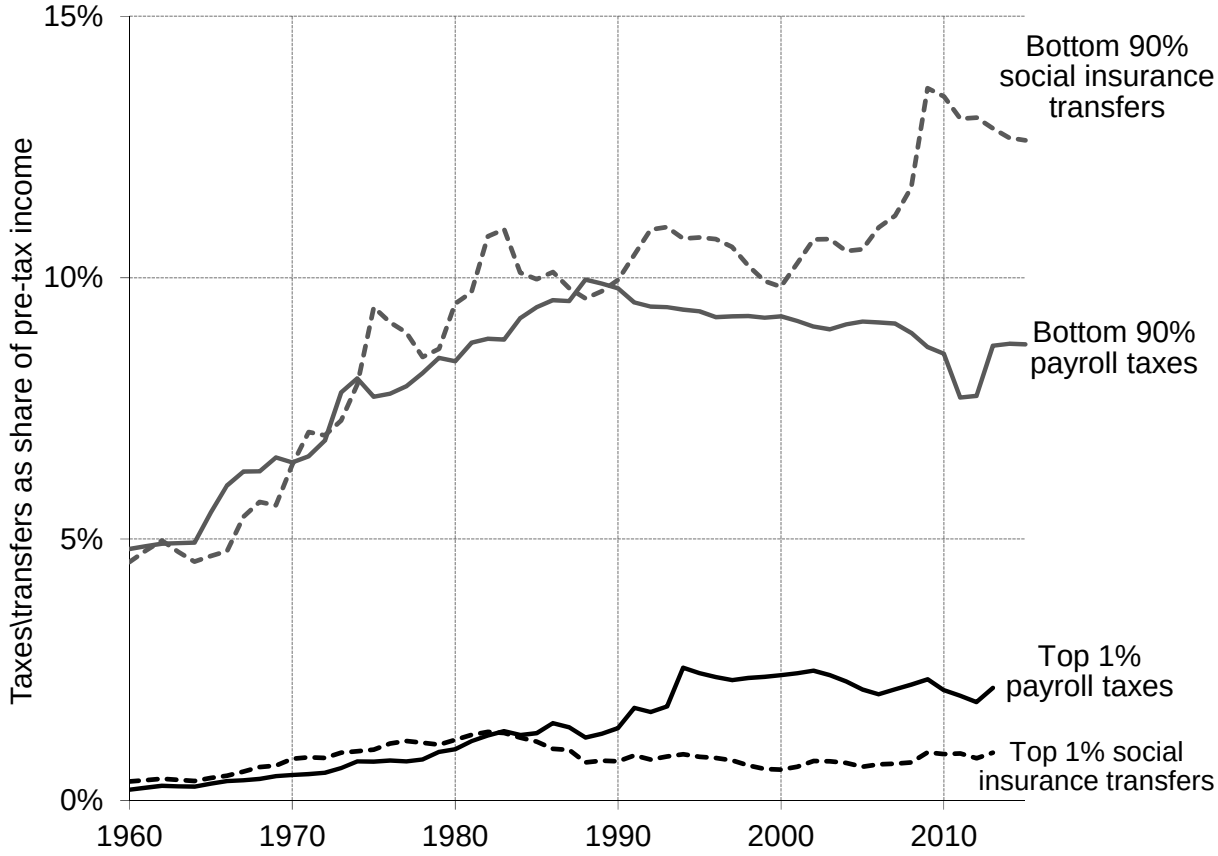

Figure V: Payroll and social insurance as a share of pre-tax income

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, IRS, BEA, and Piketty and Saez (2003 and updates).

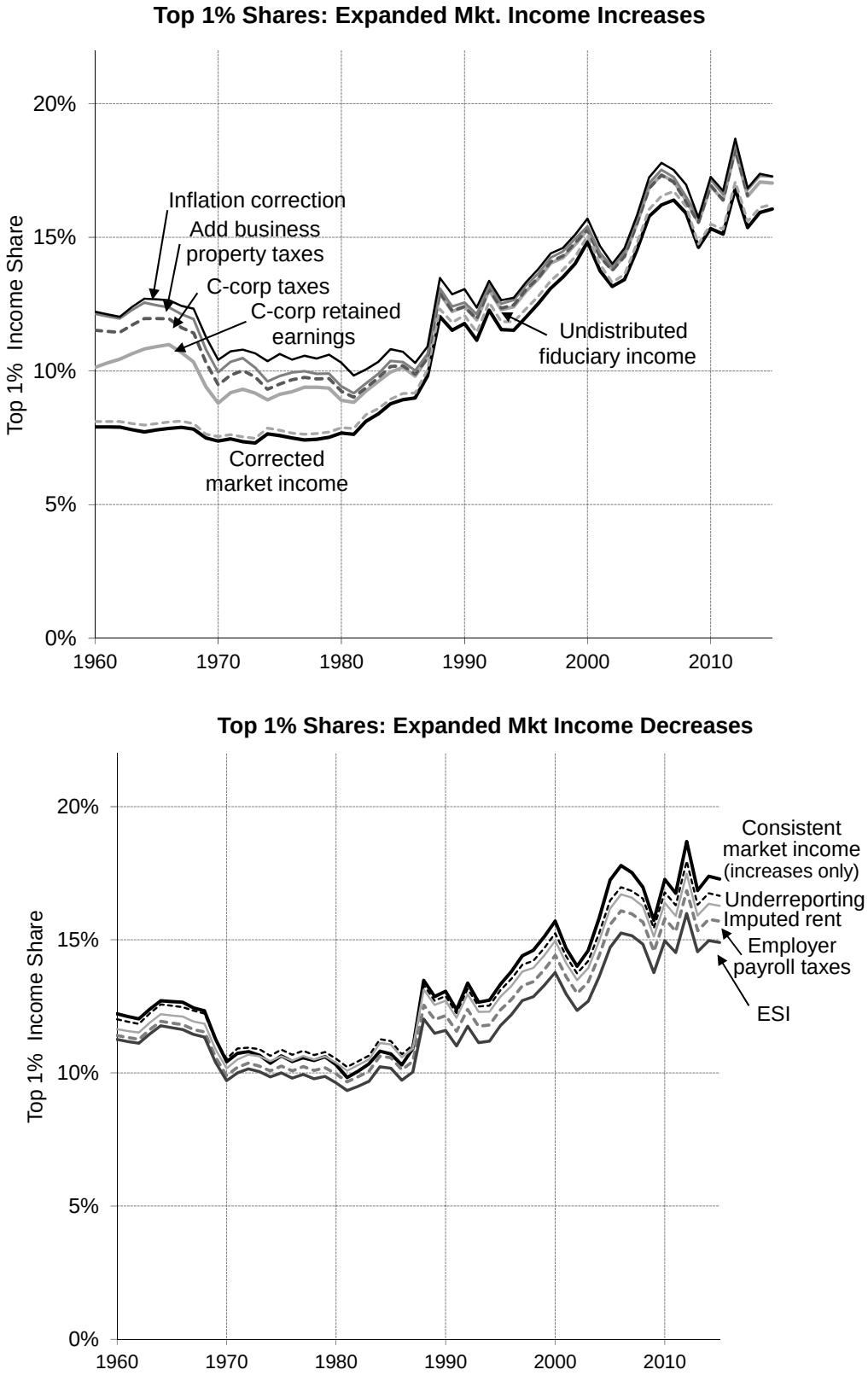

Figure A.1: Top 1% income shares: Consistent market income adjustments

Notes: PS market income is replicated Piketty and Saez series excluding capital gains. See text for description of adjustments.

Sources: Authors' calculations, IRS, BEA.

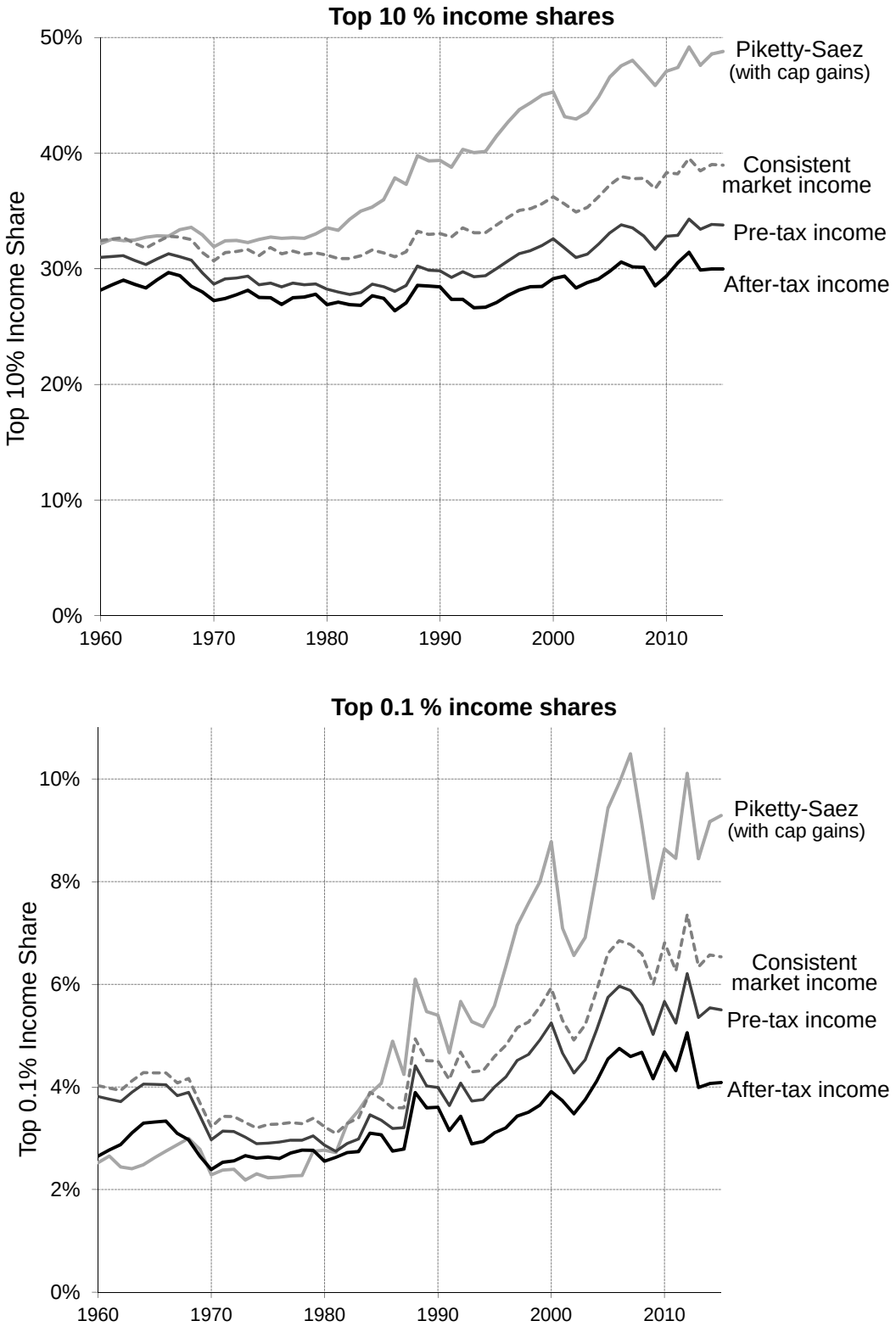

Figure A.2: Top income shares: Top 10% (top figure) and top 0.1% (bottom figure)

Notes: Piketty and Saez series includes capital gains, where top one percent thresholds are defined by income excluding capital gains. Pre-tax income is consistent market income plus government transfers. After-tax income subtracts federal, state, and local taxes.

Sources: Authors' calculations, IRS, BEA, and Piketty and Saez (2003 and updates).