Levels and Trends in U.S. Income and its Distribution: A Crosswalk from Market Income towards a Comprehensive Haig-Simons Income Approach

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Recent research on U.S. levels and trends in income inequality varies substantially based on how these studies measure income. We crosswalk (move between standards) from a market income of tax units to a more comprehensive measure of income including realized capital gains of households using a unified data set and replicate common findings in the literature. By using a comprehensive income definition in the spirit of Haig-Simons, considering yearly accrued capital gains rather than focusing on the delayed reporting of capital gains that appear in Internal Revenue Service tax return data, the observed growth in income inequality and top income shares since 1989 is dramatically reduced.

JEL Classification: C81, D31, H24, J3

1. Introduction

When using the level and trend in income and its distribution as evidence in evidence-based tax law and fiscal policymaking, it is important to understand the assumptions underlying the alternative measures of income found in the U.S. income inequality literature. If income and its distribution were invariant across the most common measures of income in this literature, then the choice of income measure would not greatly matter. However, that is not the case.

Crosswalking across common income definitions, we show the impact of income measurement choices on observed income growth and top income shares. In particular, we show how cash market income trends differ from the ones we find when we measure income more broadly. We especially focus on the way in which the inclusion or exclusion of taxable realized

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capital gains in more comprehensive measures of income affects measured income levels and trends. Including capital gains at realization, as they are found in tax return data, produces substantially different measured income trends than when we include them in the year they accrue.

Data availability concerns will always be a factor in measuring income. It is a reason why those interested in capturing capital gains in their measure of income focus on taxable realized capital gains, since they can be precisely measured in income tax records. However, we will argue that doing so profoundly affects levels and trends in measured income and hence requires a justification beyond the fact that they are contained in tax records.

From a theoretical basis, the Haig-Simons income definition offers an attractive standard for calculating annual income, which includes capital gains. Individuals' yearly income equals their consumption plus the change in their net wealth in that year. (See Auerbach [1989] and Barthold [1993] for discussions of the Haig-Simons approach in the context of tax policy.) This definition nicely links yearly consumption, which is most fundamentally related to economic well-being but rarely available, with a measure of income that we will show researchers can largely calculate with available data.

Despite general agreement that the Haig-Simons definition is the gold standard for measuring annual income, by necessity most researchers base their choice of income definition on data availability. For example, researchers using Internal Revenue Service (IRS) tax records data typically concentrate on pretax, pretransfer cash market income of tax units, since nontaxable sources of income are not included in these data (Piketty and Saez 2003), while researchers using March Current Population Survey (CPS) data focus on pretax, post-transfer cash income of households excluding capital gains, since taxes paid, the value of most in-kind transfers and capital gains, are not included in these data (see, e.g., Smeeding, Rainwater, and Burtless 2001; Gottschalk and Danziger 2005; Burkhauser et al. 2011).[1] Burkhauser, Larrimore, and Simon (2012) and Congressional Budget Office (CBO) (2012) provide the most recent efforts to broaden income definitions toward a more comprehensive Haig-Simons measure by incorporating taxes and in-kind transfers into their income definitions.[2] However, despite both considering broader income measures, CBO (2012) and Burkhauser, Larrimore, and Simon (2012) find conflicting results. The CBO (2012) finds that comprehensive income growth at the top greatly outpaced growth at the middle or bottom in recent decades, while Burkhauser, Larrimore, and Simon observe no such divergence in trends.

By using a single unified data set to compare the results of these previous researchers, we find that the choice of whether to include taxable realized capital gains primarily drives the difference between these latter two measures. The CBO (2012) adds taxable realized capital gains to their CPS database using IRS data, while Burkhauser, Larrimore, and Simon exclude all capital gains.

The CBO (2012) decision to include taxable realized capital gains is consistent with other users of the IRS data (see, e.g., Alvaredo et al. 2013) and some of those in the top income

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[1] Piketty and Saez (2003) primarily focused on taxable income excluding taxable realized capital gains, although in recent work, they have increasingly emphasized their series with capital gains. Of the 22 country studies using income tax records in Atkinson, Piketty, and Saez (2011), the majority of them do not have data on realized capital gains and hence do not use this source of income in their estimations of top income.

[2] CBO (2011) provides a set of comprehensive income tables for income years 1979–2007. They change their measure of the value of Medicare and Medicaid in CBO (2012) from the fungible value to the full ex-ante value and update some of their earlier results in supplemental tables to adjust for this change. Our discussion of the CBO comprehensive income measure focuses on this more recent series.

literature (for a review of this literature, see Atkinson, Piketty, and Saez 2011), since that is the measure of capital gains in the IRS data set. However, while taxable realized capital gains are commonly included in tax-return–based research due to their availability, they are inconsistent with the Haig-Simons treatment of capital gains. Taxable realized capital gains *include* as current income asset appreciation that may have occurred years or decades earlier. This is because individuals can choose, through the timing of transactions, when to realize capital gains for tax purposes. Hence, income recorded as taxable realized capital gains this year may not be due to increases in net wealth this year.[3] Additionally, taxable realized capital gains *exclude* accrued gains this year from assets that are not recorded on this year's tax returns, either because the asset was not sold, was sold but held in a tax-sheltered account, or was carved out of the tax code (e.g., primary housing).

Therefore, we also provide income trends using an alternative measure of capital gains that is more consistent with Haig-Simons income principles. We follow Auerbach (1989) and Roine and Waldenstrom (2011) in using the Haig-Simons income definition that *includes* capital gains at accrual, measured as the increase or decrease in the value of capital assets in each year regardless of whether that asset was sold for a taxable realized gain. Shifting from a taxable realized capital gains concept to this yearly accrued measure of capital gains, which is more in the spirit of a Haig-Simons definition of income, produces markedly different income trends.

2. Data and Methods

Our primary data set is the public-use March CPS, enhanced with cell-means from Larrimore et al. (2008) to overcome top coding of high incomes.[4] The CPS questionnaire directly captures all cash income, including transfer income. However, it does not ask about capital gains (for a full list of income sources included in the CPS primary income measure, see Weinberg 2006). The CPS also provides values or imputations for certain government in-kind benefits, including food stamps, housing subsidies, and school lunches. We include these values in our computation.

While the CPS does not capture the premiums paid for health insurance coverage, it does ask respondents whether they are insured and, if so, the source of coverage. The Census Bureau then imputes an ex-ante value of health insurance for all covered persons based on their employer's or the government's cost of purchasing it. When doing so, however, the Census Bureau treats employer- and government-provided insurance differently. They impute the value

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[3] One potential justification for focusing on realized capital gains is that they may more closely align with consumption if realization releases the capital gains from the asset. However, cash-out refinancing of real-estate property allows individuals to use accrued gains for consumption without realizing these gains for tax purposes. Accrued capital gains can also result in greater consumption by allowing individuals to reduce their current level of savings from other income sources. Hence, accrued capital gains can provide as concurrent a pathway to consumption as the gains realized for tax purposes.

[4] In addition to top coding of high incomes, there is a known trend break in the CPS data between 1992 and 1993 when the Census Bureau changed data-collection procedures (Ryscavage 1995; Jones and Weinberg 2000; DeNavas-Walt, Proctor, and Smith 2012). We control for this break using a procedure similar to Atkinson, Piketty, and Saez (2011), Burkhauser et al. (2012), and Larrimore (2013), where all series are adjusted upward prior to 1993 such that no changes are recorded from 1992 to 1993.

of employer-provided insurance coverage to individuals at its full ex-ante cost but do not do so for government-provided insurance. Burkhauser, Larrimore, and Simon (2012) argue Medicare and Medicaid should be valued in the same way as employer-provided health insurance, as does CBO (2012). Following their approach, we use the ex-ante insurance value for all individuals, regardless of whether the insurance is provided by the government or an employer.

Although the CPS captures or imputes most sources of income, the Census Bureau does not inquire about tax credits, tax liabilities, or capital gains.[5] We supplement the CPS data with imputed and matched data as described next.

To impute tax credits and liabilities, we use the National Bureau of Economic Research (NBER) TaxSim 9.0 to estimate federal and state income tax liabilities, including Federal Insurance Contributions Act (FICA) and Self Employed Contributions Act (SECA) taxes, based on the tax laws in effect in each year (for an overview of the NBER TaxSim program, see Feenberg and Coutts 1993). Since the CPS samples households rather than tax-filing units, we divide each household into tax units prior to imputing tax liabilities. We perform this division using the procedure described in Burkhauser et al. (2012), which mirrors the Piketty and Saez (2003) definition of potential tax units. We consider all single individuals age 20 and over, married couples, and divorced or widowed individuals to be independent tax units. We consider never-married children under the age of 20 to be dependents and assign them to the tax unit of their parent or guardian.[6]

Finally, for capital gains, we separately employ two procedures, one for taxable realized capital gains and one for yearly accrued capital gains. For taxable realized capital gains, we array all tax units into percentiles of taxable income in the CPS data in each year. Auten and Gee (2009) observe that over 90% of working-age adults and over 85% of all adults over age 25 file a tax return. Nevertheless, it is important to account for nonfilers in tax data when matching across the CPS and IRS INSOLE data sets. Therefore, within each income percentile, we assign tax units a probability of filing a tax return based on the distribution of nonfilers in the taxable income distribution, excluding capital gains from the Joint Committee on Taxation 2007 Individual Tax Model (for details, see Joint Committee on Taxation 2011). Since the distribution of nonfilers is not available in all years, we assume that the relative probability of filing across income percentiles is unchanged over time. However, to reflect the fact that the fraction of nonfilers changes over time, we scale the filing probabilities at each percentile up or down based on the population-wide filing probabilities. The filing probabilities are based on the percent of tax units filing a return in each year from supplementary data to Piketty and Saez (2003).[7] Matching the

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[5] In 1992, the Census Bureau began imputing taxable realized capital gains in the CPS data. This series was updated in 2004 (see O'Hara 2004). However, when we compared the distribution of realized taxable capital gains in the CPS data to those from the actual 2007 IRS tax records, we found that the CPS results were much less concentrated at the top of the distribution. Hence, we impute the capital gains data directly based on the administrative tax records rather than use the CPS imputation.

[6] In the small number of cases where never-married individuals under age 20 live in a household without a parent or guardian, we assign them to the tax unit of the household's primary family or the oldest adult in the household when there is no primary family. Only if the household has no adults over age 20 are they considered their own tax unit.

[7] Part of the change in filing probabilities, in each year, results from changes in tax law. Such changes may alter the characteristics of nonfilers as well as the fraction of the population that files. However, the fraction of the population filing a tax return has been relatively consistent (between 90% and 96% in each year; Piketty and Saez 2003), and most nonfilers are in the lower tail of the distribution, while most taxable realized capital gains are reported by higher-income individuals. This suggests that the impact of this assumption on our results will be relatively modest.

observation of Piketty and Saez (2007), the vast majority of nonfilers are individuals at the lower tail of the taxable income distribution, below the legal filing limit.

Among imputed filers in the CPS data, we again rank tax units by taxable income into percentiles. We perform a similar ranking on the IRS tax return data for each year. We then input the taxable realized capital gains for each tax unit in the CPS data as the mean taxable realized capital gains for tax units in the same percentile of the taxable income distribution in the tax return data, assuming that nonfilers have no taxable realized capital gains.

We implement a similar matching procedure for yearly accrued capital gains using the Survey of Consumer Finances (SCF) data. From the SCF, we obtain for each percentile of the distribution the mean total assets and asset allocation in both taxable and nontaxable accounts. The SCF samples approximately 5000 households every three years. This is much smaller than either the CPS or IRS INSOLE sample. Hence, the SCF is likely to have greater sampling error than these other data sets, although its sampling error will be limited to some degree for those in the upper quintiles of the distribution, where asset holdings are greater because the SCF oversamples high-wealth households. Nevertheless, the SCF is one of the most widely used surveys for measuring wealth and asset holdings in the United States (see, e.g., Castañeda, Díaz-Giménez, and Ríos-Rull 2003; Wolff and Zacharias 2009). In addition, the SCF was chosen for inclusion in the Luxembourg Wealth Study to compare wealth distributions across countries (Sierminska, Brandolini, and Smeeding 2006), and its wealth distribution results closely match those from Household Balance Sheet data (Davies et al. 2011).

However, because of a major break in the ability of the SCF data to capture wealth before and after 1989, for consistency we compare only our yearly accrued capital gains estimates for 1989 onward. Following Smeeding and Thompson (2010), we impute accrued capital gains from stocks as the appreciation in the Dow Jones Industrial Average in the year the assets were held in stocks and mutual funds. Unlike Smeeding and Thompson (2010), however, for this measure and for our capital gains from real estate and privately held businesses, we use the single-year level of appreciation rather than a long-run average to more closely reflect the single-year Haig-Simons income growth measure.

While the SCF asset data include information on bond holdings along with holdings of stocks and mutual funds, we do not estimate capital gains from bonds. The primary return from bonds for most bond holders is in the interest they pay rather than in capital gains, and the yearly change in accrued capital gains on those bonds will depend on their fixed life spans. Hence, unlike stocks, where realized capital gains per year can be relatively easily estimated by assuming a given return on all stocks held in that year, there is no obvious way to link an average return on a bond index to the information the SCF provides on the bond holdings of individuals. So we do not include capital gains on bonds in our analyses.[8]

In addition to estimating capital gains from public equity investments, we also estimate capital gains from personal business ownership of nonpublic companies. Such private businesses are an important source of wealth and income for very high-income individuals. As is the case for investment accounts, the SCF inquires about the value of privately held

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[8] To test the sensitivity of excluding capital gains on our measures of capital gains, we replicated all our results including an estimate of bond capital gains. We calculated bond capital gains as bond holdings multiplied by the annual rate of return on the Vanguard Bond Fund (VBMFX), which follows the Barclay's Capital Aggregate Bond Index. In estimating the bond rate of return, we excluded dividend payment from the return on the index to minimize double counting of interest income. When doing so, we obtained quintile income growths between 1989 and 2007 within one percentage point of those we provide in our main results for all quintiles.

businesses, allowing us to use the same technique as above to match to the CPS data based on income percentile. However, since these firms are not traded on a public market, it is a substantial challenge to determine their rate of return. Moskowitz and Vissing-Jorgensen (2002) observe that the return to private equity investing is similar to that of investing in publicly held corporations and that these rates of return are highly correlated. Hence, we assume the growth rate for privately held corporations matches that of public corporations. However, given the findings of Davis et al. (2007), who found that employment growth at privately held firms is more volatile than at publicly held firms, we recognize that there are differences between firms with different ownership structures and conduct sensitivity analyses with regards to the capital gains accrual rate for privately held businesses.

While our measure is plausibly the best currently available for imputing yearly accrued capital gains on investments, we acknowledge that the lack of available data on capital gains accruals limits its precision. Most importantly, when imputing yearly accrued capital gains, we assume that all investments receive the ordinary rate of return. Hence, we will not capture extranormal returns received by some individuals on their investments. This may be of particular concern for private equity investors who generate larger returns on investments through purchasing entire companies and reforming their production process or business model. Our yearly accrued capital gains measure will understate extranormal returns on such investments. However, this will only impact our trends in top income shares to the extent that the relative return on these investments compared to the rest of the market changes over time.[9]

Along with the capital gains from investments, we impute capital gains on primary housing to reflect gains in wealth from real-estate holdings. Since only homeowners can obtain housing capital gains, we use the same matching technique for homeowners in the CPS to homeowners in the SCF to obtain an estimate of house values by income percentile. We then impute housing capital gains as the growth in the House Price Index of the Federal Housing Finance Agency (FHFA) multiplied by the estimated home value.[10] Since individual homeowners accrue the full return from appreciation in their home, including the leveraged portion of the property, capital gains on housing are based on the full value of the property rather than just their equity in the home.[11] Importantly, since the SCF does not include state or

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[9] Our assumption that all investors receive the same rate of return each year on investments is likely to understate the share of income held by top income groups in all periods, since in any period individual differences in skill and/or luck will affect individuals' return on investment and hence lead to higher incomes for those with disproportionate amounts of either. However, it should not impact the trends in this share that we focus on, unless the variance of investment returns increases or decreases over time.

[10] As a sensitivity test, we also used S&P 500 data to impute our measure of investment returns and the Case-Shiller Home Price Index as our measure of real-estate returns. The overall trend for the S&P 500 is similar to that for the Dow Jones, but since S&P 500 growth in 2007 was below that of the Dow Jones Index, income growth from 1999 through 2007 is lower when using the S&P. For housing prices, the Case-Shiller index is more volatile than the FHFA index and observed a more marked decline in home values in 2007. Hence, the imputed incomes of homeowners when using Case-Shiller were lower in 2007 than the values we report. This particularly impacted the income growth for the bottom quintile, where the ratio of home values to income is highest. Nevertheless, for both the housing and equity measures, the alternate specifications strengthened the finding that the income growth for the top quintile relative to the middle quintile is slower when using accrued capital gains than when using realized capital gains. Results using these alternate specifications are available in Appendices 1 and 2.

[11] The fact that a homeowner takes out additional debt on their property to finance consumption will affect their stock of wealth but will have no additional impact on a Haig-Simon measure of income. If we were simply observing changes in asset values in a panel data set, we would need to measure the extent that the new debt is added to observed assets. However, since we are instead calculating the return on assets based on existing asset holdings, this added debt should not enter into the calculation of Haig-Simon income.

Table 1. Mean Income Growth by Quintile, 1979–2007

	(1)	(2)	(3)	(4)
	Tax-Unit Unadjusted Cash Market Income	Household Size–Adjusted Pretax, Post-Transfer Cash Income	Household Size–Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Income	Column (3) Plus Realized Taxable Capital Gains
Bottom quintile	−33.0	9.9	31.8	30.0
Second quintile	0.7	15.6	31.3	31.9
Middle quintile	2.2	22.8	34.4	36.5
Fourth quintile	12.3	29.2	38.8	42.2
Top quintile	32.7	42.0	54.0	79.3
Top 5%	37.9	48.7	68.9	128.5

Source: Author calculations based on March CPS data merged with IRS Statistics of Income (SOI) tax return data and NBER TaxSim results.

locality information, we base all of our housing capital gains on national estimates of home values and home price appreciation. Hence, we miss the substantial importance of local housing markets. Nevertheless, in the absence of local identifiers, this is the best available data for imputing housing capital gains. It is similar to the method Smeeding and Thompson (2010) use to impute accrued housing capital gains.

3. Results

Table 1 compares income growth by quintile and for the top 5% across several common income definitions over the entire three-business-cycle period from 1979 to 2007. In all cases, the quintiles are defined based on the income definition in the column, so individuals may not be in the same quintile across each column. This table allows us to crosswalk from the relatively narrow market income of tax units definition used by IRS-data–based researchers in column 1, which excludes taxable realized capital gains, to the more comprehensive household size-adjusted, post-tax, post-transfer definition of personal income, including in-kind income and taxable realized capital gains, in column 4 used by CBO (2012). We chose 1979 and 2007 as our comparison years because they are peak income years of business cycles and avoid conflating business cycle effects with long-term trends. Limitations in separately observing the income held by the top 1% in the public-use CPS data we use here prevent us from providing trends in their distribution.

The first column reports mean income growth using market income of tax units. Using this measure, which is typical for those using solely IRS data, the rich have gotten richer (37.9% increase for the top 5%), the poor have gotten poorer (33.0% decline in the bottom quintile), and the middle has stagnated (2.2% increase in the middle quintile). However, this income definition does not include transfers, taxes, or capital gains.

Column 2, which is in line with much of the CPS-based research, broadens the income definition to include cash transfers and expands the sharing unit to the household to reflect the sharing of resources by cohabiting couples and other householders not filing a collective tax return (for examples of research using similar definitions, see Gottschalk and Smeeding 1997; Smeeding, Rainwater, and Burtless 2001; Gottschalk and Danziger 2005; Burkhauser et al.

2011). It focuses on the individual as the unit of analysis and adjusts for household size to reflect returns to scale of larger households. When doing so, income growth accelerates for all quintiles, but especially for the bottom quintile, where mean income growth is now 9.9%, and in the middle, where income increases by 22.8%, or 10 times the growth of market income found in column 1.[12] This is partially because government transfers are primarily directed to individuals that otherwise have lower than average pretransfer incomes. However, it also reflects the growth of cohabiting couples and of adult children living with their parents who share the resources of others in their household—a behavioral change not captured by focusing solely on the market income of a tax unit unadjusted for the number of people in that tax unit.

A justifiable concern with this income measure used by CPS researchers is that it includes some of the benefits received by individuals from the government, but it does not include the taxes used to pay for them. Additionally, it includes only some transfers, excluding both noncash transfers and transfers administered through the tax code. Column 3 expands the income definition to reflect income post-tax liabilities and the presence of in-kind transfers and benefits. Converting to a post-tax income measure reduces the income of those with positive tax liabilities but increases the income of those receiving refundable credits such as the Earned Income Tax Credit (EITC)—the largest means-tested antipoverty cash transfer program in the United States (Ben-Shalom, Moffitt, and Scholz 2011). This column also incorporates several of the most important sources of in-kind benefits and government transfers: employer- and government-provided health insurance, food stamps, housing subsidies, and subsidized school lunches. To avoid double counting, we do not include defined-benefit pension contributions at accrual, since they are included in the CPS data at the point of payout in retirement. We also do not include the yearly accrued value of Social Security contributions for the same reason.

The inclusion of taxes—because they have fallen as a share of income, especially at higher-income levels—and in-kind benefits—because they have risen as a share of income, especially at lower income levels—increases income growth throughout the distribution, but it does so most among the bottom two quintiles. As a result, income growth between 1979 and 2007 is remarkably similar for each of the bottom four quintiles. The top quintile and the top 5% continue to grow faster, 54.0% and 68.9%, respectively (column 3), but the gap in growth between them and the bottom quintile is dramatically smaller than the gap using the cash market income of tax unit measure.

The final column of Table 1 reports results adding taxable realized capital gains, which is the approach used by the CBO (2012), to incorporate capital gains information. When doing so, we mirror the income growth patterns that they observe. Since the majority of realized capital gains are accrued by individuals with greater asset levels and greater incomes, income growth patterns since 1979 dramatically diverge relative to column 3 for higher-income groups. Growth in the top quintile and among the top 5% is now 79.3% and 128.5%, respectively, while growth in the bottom three quintiles remains approximately the same.

Given our general agreement with the CBO findings on income growth by quintile when using this income measure between 1979 and 2007, we now report income growth for each

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[12] See Burkhauser et al. (2012) for further discussion of size adjusting household income and a more detailed breakdown of column 1 to column 2 changes attributable to the broader income definition, the larger sharing unit, and the size adjustment.

Table 2. Gini Coefficients and Mean Income Growth by Quintile for Each Business Cycle from 1979 to 2007

	(1) Tax-Unit Unadjusted Cash Market Income	(2) Household Size– Adjusted Pretax, Post-Transfer Cash Income	(3) Household Size– Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Income	(4) Column (3) Plus Realized Taxable Capital Gains
Panel A: 1979–1989				
Bottom quintile	−0.2	0.0	4.3	2.7
Second quintile	−0.2	4.3	7.0	7.0
Middle quintile	0.0	9.1	11.8	11.9
Fourth quintile	4.0	12.9	15.7	15.5
Top quintile	17.6	23.4	29.4	32.5
Top 5%	25.6	32.0	44.6	54.8
Panel B: 1989–2000				
Bottom quintile	17.8	17.2	20.6	22.6
Second quintile	11.7	13.5	16.7	18.1
Middle quintile	7.5	13.1	14.6	16.7
Fourth quintile	10.7	13.3	12.6	15.7
Top quintile	14.7	16.2	13.5	28.3
Top 5%	14.4	16.5	13.9	41.3
Panel C: 2000–2007				
Bottom quintile	−43.0	−6.2	4.8	3.1
Second quintile	−9.8	−2.4	5.2	4.3
Middle quintile	−4.9	−0.4	4.9	4.5
Fourth quintile	−2.5	1.0	6.6	6.4
Top quintile	−1.6	−1.0	4.8	5.5
Top 5%	−4.0	−3.3	2.6	4.5
Panel D: Gini Coefficients				
1979	0.536	0.384	0.301	0.302
1989	0.565	0.423	0.346	0.357
2000	0.571	0.427	0.338	0.375
2007	0.584	0.430	0.338	0.378

Source: Author calculations based on March CPS data merged with SOI tax return data and NBER TaxSim results.

single business cycle since 1979 in Table 2. It also provides the Gini coefficient for each business cycle peak, to provide a summary level of inequality across the business cycles.[13]

When doing so, even when using the measure of income including taxable realized capital gains in column 4, we observe that while income inequality has grown across all business cycles, the majority of that inequality growth occurred in the 1980s. There was somewhat less inequality growth in the 1990s and very little in the 2000s.

In the 1980s business cycle, the top 5% of the income distribution saw their income grow by 54.8%, over 4.5 times the 11.9% growth in the middle quintile and almost 20 times the 2.7%

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[13] We base the starting and ending years of business cycles on the peaks in median size-adjusted household income of persons (Karoly and Burtless 1995; Daly and Valletta 2006; Burkhauser, Larrimore, and Simon 2012; each use similar definitions). These years often correspond to the last full year of macroeconomic growth as defined by the NBER. However, in cases such as the 2000–2007 business cycle, where the macroeconomic decline began in December 2007, the end year here is defined as 2007, when median size-adjusted household income peaked.

growth in the bottom quintile. In the 1990s, the growth pattern was U-shaped, with the bottom quintile's income growing faster than those in the middle. While income growth at the bottom and in the middle of the distribution was slower than for those at the top, the difference was less extreme than in the 1980s—income growth was 41.3% for the top 5% versus 22.6% for the bottom and 16.7% for the middle quintile.

In contrast to the previous two periods where income growth was unequal but relatively rapid for most groups, in the early 2000s income growth was relatively equal but slow across all quintiles. Income grew between 3.1% and 6.4% over the period throughout the distribution, with the top three quintiles experiencing slightly faster growth than the bottom two.

We find a similar pattern in our Gini coefficients in panel D. Using this summary inequality measure of CBO-style income, inequality increased from 0.302 to 0.357 (a 17.9% increase) in the 1980s business cycle and from 0.357 to 0.375 (a 5.1% increase) in the 1990s business cycle. However, in the 2000s business cycle, it grew by just 0.8% to 0.378. So while inequality remains at an elevated level, comprehensive income inequality did not increase dramatically over the 2000s business cycle, even when including taxable realized capital gains.

Including Accrued Capital Gains

The results using the income definition including realized capital gains seem to validate the claim that inequality (fueled by a major increase in income at the top) has risen dramatically over the period 1979–2007. This increase far exceeds inequality growth in our comprehensive post-tax, post-transfer measure of income, excluding all capital gains from column 3, that shows that inequality fell slightly in the 1990s and remained constant in the 2000s.

However, as previously noted, taxable realized capital gains deviate from the spirit of Haig-Simon comprehensive income. In particular, including taxable realized capital gains will confound asset appreciation in earlier years, but declared in the current year, with capital gains actually accrued in the current year. Hence, it will artificially delay the receipt of some capital gains income from when it should be counted under Haig-Simons principles.[14] Additionally, it almost completely ignores housing capital gains due to the $500,000 exclusion from taxation of housing capital gains for primary residences owned by a married couple and also ignores capital gains held in nontaxable accounts. Since housing assets represent the largest single asset of many middle-class households, the failure of tax-based data to capture the capital gains of these tax-sheltered assets will likely distort the impact of capital gains from a Haig-Simons perspective. Thus, to more closely reflect Haig-Simons' principles in the treatment of capital gains, in Table 3 we now turn our attention to the way in which inequality trends would change using yearly accrued capital gains of taxable and tax-sheltered assets rather than just realized taxable gains. As was the case in Table 1, the quintiles here are defined based on the income definition in the column, so individuals may move between quintiles across the columns.

This analysis relies on the SCF, but since the SCF data prior to 1989 are not comparable with SCF data thereafter, we consider only income growth using this measure for the two-business-cycle period from 1989 to 2007. Additionally, since the SCF is a triennial survey, it is available only for select years, which do not include the 2000 business cycle peak. Thus, we

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[14] Taxable realized capital losses are almost always delayed even further beyond the year of realization if they are not offset by realized capital gains in the same year. This is because individuals may not report more than $3000 of net capital losses in a given year, but they may carry those losses forward indefinitely to offset future capital gains.

Table 3. Mean Income Growth by Quintile, 1989–2007

	(1) Tax-Unit Unadjusted Cash Market Income	(2) Household Size–Adjusted Pretax, Post-Transfer Cash Income	(3) Household Size–Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Income	(4) Column (3) Plus Realized Taxable Capital Gains	(5) Column (3) Plus Accrued Capital Gains from Public Investments	(6) Column (3) Plus Accrued Capital Gains, Including Housing	(7) Column (3) Plus Accrued Capital Gains, Including Housing and Privately Held Businesses
Bottom quintile	−32.9	9.9	26.4	26.3	30.4	13.7	16.0
Second quintile	0.8	10.8	22.7	23.3	23.4	9.0	3.6
Middle quintile	2.3	12.6	20.2	22.0	18.6	6.6	0.0
Fourth quintile	8.0	14.4	20.0	23.1	17.6	6.1	0.0
Top quintile	12.9	15.1	19.0	35.3	12.4	0.7	−13.5
Top 5%	9.9	12.7	16.8	47.7	8.7	−2.7	−24.2

Source: Author calculations based on March CPS data merged with SOI tax return data, Survey of Consumer Finance Data, and NBER TaxSim results.

provide only full business-cycle results for the two-business-cycle period. However, we will discuss the triennial income trends and top income share results for each available year between 1989 and 2010 in greater detail below. For comparability, we provide each of the previously discussed series for this two-business-cycle period.

In the two business cycles since 1989, when looking solely at market income of tax units, the rich get richer, the poor get poorer, and the middle class stagnate, but over the peak years of these business cycles, growth is considerably slower for the top income quintile and the top 5% than it was when considering the three-business-cycle period since 1979. Once again this story changes when we expand our income definition in columns 2 and 3. Income growth across all quintiles since 1989, and even in the top 5%, narrows remarkably when compared to the extended period since 1979 seen earlier. In column 3, growth in the bottom quintile is greatest and growth among the top 5% is smallest over this period. It is only when we add taxable realized capital gains in column 4 that income growth in the top quintile and among the top 5% is greater than that in the bottom four quintiles.

However, in column 5, when we include yearly accrued capital gains, excluding housing and private business gains, instead of taxable realized capital gains, the inclusion of these gains slows income growth in all but the bottom two quintiles of the distribution. Thus, when using this measure, which is more in line with Haig-Simon's income principles, the top quintile of the distribution had the *least* growth in income from 1989 through 2007, while the bottom quintile of the distribution had the *most*. Measured in this way, income inequality fell between 1989 and 2007.[15]

How is it possible that the choice of treatment of capital gains can have such a dramatic difference? It results from both the timing of realizing gains and from the likelihood of assets appearing in taxable accounts for individuals at different points in the income distribution.

Table 4 presents the mean value of equity investments in taxable and nontaxable accounts in the SCF data for each quintile of the income distribution (based on a household size-adjusted, post-tax, post-transfer, cash plus in-kind income of persons measure of income—our column 3 income measure in Table 3) in 1989 and 2007. Although equity holdings have increased throughout the distribution, they have increased at a faster pace for those at the lower end of the distribution than for those at the top. For example, in the bottom quintile, mean equity investment holdings (column 3 in Table 4) grew over 6-fold from $7166 in 1989 to $42,896 in 2007. This compares to the top quintile where mean equity holdings in 2007 were 3.1 times their 1989 amount ($658,139 versus $208,480).

Further, this increase in equity holdings has disproportionately occurred in tax-sheltered accounts, but this is particularly true for lower- and middle-income households (column 2). Thus, to the extent that large and growing fractions of equities for middle- and lower-quintile

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[15] The focus of this article is on the sensitivity of including alternative measures of capital gains in more comprehensive measures of income on measured levels and trends in income inequality using CPS data. However, given the interest of researchers in using IRS-based data directly to measure the market income of tax units, it is useful to show how our main results compare with those using the tax unit as our sharing unit, since this is the sharing unit available in IRS data. In Appendix 3, we offer a comparison of income growth by quintile when measuring market income without capital gains and then adding either taxable realized capital gains or accrued capital gains to the market income of tax units. As is the case when looking at the treatment of capital gains in a measure of the comprehensive income of households, adding accrued gains to the market income of tax units instead of adding taxable realized gains generally slows the growth of incomes at the top of the distribution relative to those with lower incomes.

Table 4. Inflation-Adjusted Mean Equity Investment Assets by Quintile of Household Size–Adjusted Comprehensive Income, Excluding All Capital Gains in 1989 and 2007

|	Taxable Equity Investment Assets	Tax-Sheltered Equity Investment Assets	Total Equity Investment Assets	% of Investment Assets in Tax-Sheltered Accounts
Panel A: 1989				
Bottom quintile	4923	2243	7166	31.3
Second quintile	10,668	5405	16,074	33.6
Middle quintile	17,697	10,612	28,309	37.5
Fourth quintile	26,549	17,814	44,363	40.2
Top quintile	154,649	53,831	208,480	25.8
Panel B: 2007				
Bottom quintile	21,323	21,573	42,896	50.3
Second quintile	29,210	42,833	72,044	59.5
Middle quintile	40,425	62,356	102,781	60.7
Fourth quintile	53,736	94,465	148,201	63.7
Top quintile	383,956	274,183	658,139	41.7

Source: Author calculations based on Survey of Consumer Finance Data, indexed to 2012 price levels using the CPI-U-RS.

individuals are held in tax-sheltered accounts, researchers focusing on just taxable income will disproportionately miss income received by these individuals.

Although tax-sheltered accounts are an important source of missed income growth for the bottom of the distribution relative to the top, even more important for reconciling the divergent findings of using taxable realized capital gains and yearly accrued capital gains is the trend in capital gains from stocks over time. In particular, the appreciation of the Dow Jones Industrial Average in 1989 was a substantial 27%, compared to a tepid 6.4% in 2007. Thus, the lower growth rate means that one should expect a lower level of accrued gains, other than for individuals whose asset holdings in 2007 were dramatically greater than in 1989.

In part, this simply represents the volatility inherent in an accrued capital gains measure, as illustrated in Figure 1, which depicts the real appreciation in the Dow Jones Industrial Average in each year since 1979. However, while the series is volatile and a comparison of different years would alter the results, there were generally slower rates of return on equity assets in the 2000s compared to either the 1980s or 1990s. The inflation-adjusted average yearly growth in the Dow Jones Industrial Average was 8.2% over the 1980s business cycle (1980–1989), 11.2% over the 1990s business cycle (1990–2000), but only 1.1% over the 2000s business cycle (2001–2007). So accrued capital gains from equities in almost any year of the 2001–2007 business cycle will be lower than over the previous two business cycles.

Given the lower stock market returns in the 2000s, it is not surprising that the rapid accrual of capital gains occurred in the 1980s and 1990s rather than in the 2000s. This pattern can be quite different from the one that results when focusing on taxable realized capital gains, since the appreciation of investments in the 1980s and 1990s may not appear on income tax returns until later. As a result, the high taxable realized capital gains income observed on tax returns today are not necessarily a reflection of higher current incomes in a Haig-Simons sense and, instead, are more likely to be a residual effect of previously accrued capital gains that are only now being realized.
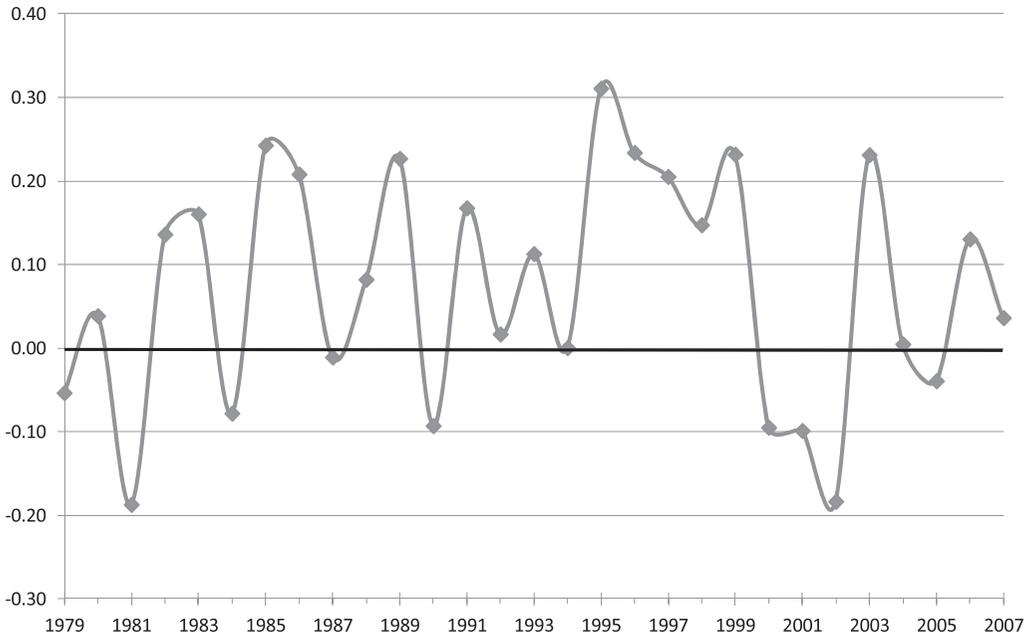
Figure 1. Real Inflation-Adjusted Return on Stock Investments, Based on the Dow Jones Industrial Average, 1979–2007

Although the inclusion of yearly accrued capital gains from investment accounts in column 5 of Table 3 is more in keeping with Haig-Simons principles than using taxable realized capital gains, it still excludes a primary source of wealth accumulation for many Americans—the increase in value of their primary residence. In column 6 of Table 3, we expand our income definition to include yearly accrued capital gains from owner-occupied housing.

As was the case with yearly accrued capital gains from equity investments, the real accrued capital gains from housing in 2007 (−4.7%) was below that seen in 1989 (0.7%).[16] Thus, including this source of income should result in lower levels of observed income for homeowners in 2007 than was the case in column 5 of Table 3, but the drop in home prices is likely to affect growth at lower-income levels as well as at upper-income levels.

Table 5 shows why this is likely to be the case. Individuals with higher incomes are both more likely to own a home (columns 1 and 3) and, conditional on owning a home (columns 2 and 4), are more likely to own expensive homes. As a result, the absolute decline in income from including housing capital gains when housing prices started falling in 2006 is generally larger for those in the upper tail of the distribution than for those in the lower tail. However, the home value is generally smaller relative to one's income for those in the top quintile than those at the bottom, so the impact on percentage income growth will be smaller at the top of the distribution.

As column 6 of Table 3 shows, this is the case. Income growth slows for all income quintiles relative to column 5 of Table 3, but it slows more for those lower in the distribution—16.6 percentage points for the bottom quintile (from 30.4% to 13.7%)—than it does for those near the top—11.7 percentage points for the top quintile (from 12.4% to 0.7%).

Nevertheless, similar to our column 3 of Table 3 results, where we exclude all capital gains, the income growth for the top quintile of the distribution was the slowest from 1989 through

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[16] The annual accrued gains data set from housing using the FHFA data is available from the authors upon request.

Table 5. Homeownership- and Inflation-Adjusted Home Values by Quintile of Household Size–Adjusted Comprehensive Income, Excluding All Capital Gains in 1989 and 2007

	1989 Percent Homeowners	1989 Mean Home Value of Homeowners	2007 Percent Homeowners	2007 Mean Home Value of Homeowners
Bottom quintile	39.8	103,524	44.2	175,702
Second quintile	60.1	114,872	62.4	175,578
Middle quintile	71.5	119,157	74.2	184,892
Fourth quintile	78.5	142,193	82.2	225,564
Top quintile	84.9	262,267	89.0	430,468

Source: Author calculations based on Survey of Consumer Finance Data, indexed to 2012 price levels using the CPI-U-RS.

2007 and the income growth for the bottom quintile was the largest. Further, the top 5% of the income distribution experienced a decline in their income, while each of the lower quintiles experienced modest income growth. These results not only dissipate but reverse the evidence supporting dramatic increases in income inequality powered by major increases in capital gains when measured by taxable realized capital gains.

It is somewhat controversial to include housing capital gains in a measure of comprehensive income. This is, in part, the reason we separate its impact from capital gains from investments in our tables. Some would argue that for those who do not move, fluctuations in the value of their houses are irrelevant, but past studies find a link between appreciation of housing wealth and increased consumption. Bostic, Gabriel, and Painter (2009), for instance, estimate that the elasticity of consumer spending in response to changes in housing wealth are greater than those for financial wealth. It has also been argued that the dramatic boom and bust in housing over the last decade have affected overall consumption. This Haig-Simon relationship between housing appreciation and consumer spending is consistent with individuals viewing gains from rising housing prices as increases in their income during the mid-2000s and equating the housing crash and lost housing wealth of 2007 and 2008 with a fall in their income and in their consumption. Given the impact that accrued gains have on consumer sentiment, the inclusion of these gains help to relate comprehensive income trends to spending patterns.

In the final column of Table 3, we add in a final element of accrued capital gains—those that occur on closely held businesses. In doing so, we emphasize the increased uncertainty around this estimate of accrued capital gains on privately held businesses given the lack of a public market for such companies. In estimating these accrued capital gains, since investing in privately held companies is riskier than investing in public corporations (Moskowitz and Vissing-Jorgensen 2002), one may expect private companies to have a greater rate of return to account for the additional risk. However, despite this expectation, Moskowitz and Vissing-Jorgensen (2002) observe there is a strong correlation between the average rates of return on public and private companies, and that the rates of return for private equity investments are similar to those for public equity. Therefore, in estimating the rates of return when including accrued gains on privately held businesses, we assume that the rate of return in each year matches that of publicly traded corporations.[17]

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[17] Recognizing this uncertainty, we conducted a sensitivity analysis, assuming that the rate of return on private equity exceeds that observed for public equity by 2 percentage points per year. The results of such an analysis were similar, with the lower end of the distribution observing the greatest income growth since 1989. The results of this supplemental analysis are available from the authors upon request.

Table 6. Private Business Ownership and Inflation-Adjusted Business Values by Quintile of Household Size–Adjusted Comprehensive Income, Excluding All Capital Gains in 1989 and 2007

	1989 Percent Private Business Owners	1989 Mean Business Value of Business Owners	2007 Percent Private Business Owners	2007 Mean Business Value of Business Owners
Bottom quintile	2.1	23,937	4.9	46,487
Second quintile	6.0	19,562	5.3	34,581
Middle quintile	8.4	25,472	8.9	45,362
Fourth quintile	12.7	36,918	13.1	96,707
Top quintile	19.2	220,700	21.4	500,229

Source: Author calculations based on Survey of Consumer Finance Data, indexed to 2012 price levels using the CPI-U-RS.

Including the accrued capital gains from privately held businesses has very little effect on the income growth of the bottom quintile of the distribution from 1989 through 2007, but income growth for all the higher quintiles is slower than that for the previous series. In fact, among the top quintile, top incomes actually fell. This is because private business ownership is largely concentrated among the top quintiles of the distribution, as can be seen in Table 6 (columns 1 and 3). Furthermore, among business owners, individuals with higher pre–capital-gains incomes tend to own businesses with substantially higher valuations (columns 2 and 4). Given this concentration of business ownership wealth, the lower estimated rate of return on both public and private equity in 2007 compared to 1989 results in the further erosion of top incomes when including capital gains from privately held businesses. Since there is additional uncertainty regarding the rate of return on private equity, our preferred results in Table 3 are those from column 6, which excludes the capital gains on privately held businesses. Nevertheless, the results from including capital gains on privately held businesses appear to reinforce our primary observation that focusing on accrued capital gains presents a dramatically different picture than that observed when using taxable realized capital gains, which are limited to assets that are taxable and more easily manipulated through market timing.

The focus thus far has been on 1989 and 2007, since those years represent equivalent points in the business cycle. As such, these years represent the most consistent comparison of income trends over time devoid of business cycle variations. However, given the volatility of capital gains observed in Figure 1 along with the end of the housing boom in 2007, it is reasonable to also consider whether the choice of years is driving these results. Figure 2 shows the growth in income for each quintile of the distribution for each year that the SCF is available from 1989 through 2010 using our comprehensive income measure without capital gains, with taxable realized capital gains, and with each of the accrued capital gains measures. To focus on the trends, in each case 1989 is normalized to 1.

Figure 2 shows that the full business cycle results presented earlier are not an anomaly. The growth in top 5% and top quintile incomes between 1989 and any year since 2001 is below any of the other income quintiles. Events such as the housing boom are apparent, as all income quintiles exhibit stronger income growth in panel D between 2001 and 2004, which includes housing gains, relative to panel C, which excludes them. Similarly, the housing bust can be readily observed by comparing the income gains across all quintiles from 2004 to 2007 in panel C to the decline in panel D when housing gains are included. As previously mentioned, this inclusion of housing accrual may better relate comprehensive income trends to the observed trends between housing wealth and consumer spending (Bostic, Gabriel, and Painter 2009).
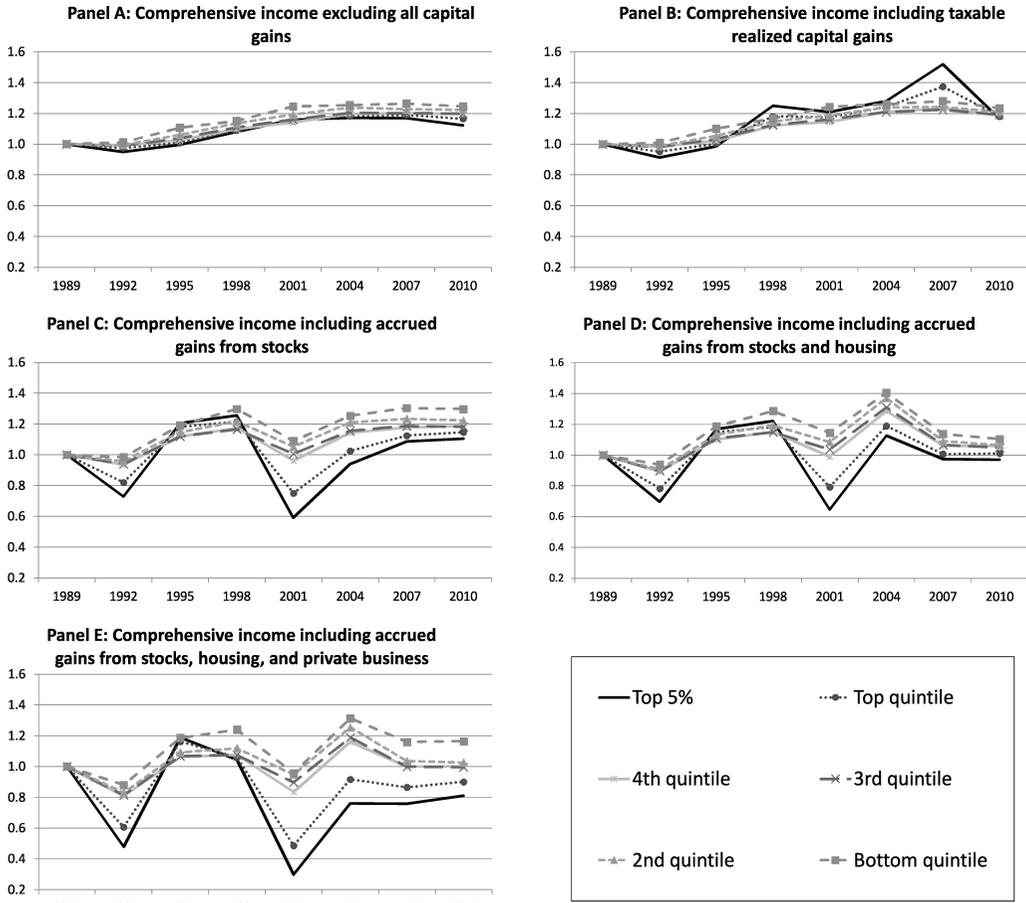
Figure 2. Income Trends by Quintile since 1989 for Comprehensive Income with Alternate Treatments of Capital Gains (Income for Each Quintile in 1989 Normalized to 1).
Source: Author calculations based on March CPS data merged with IRS Statistics of Income (SOI) tax return data, Survey of Consumer Finance Data, and NBER TaxSim results.
Notes: (1) Survey of Consumer Finance data set are only available on a triennial basis, so results are displayed only for the years where the data are available. (2) Due to revisions to Census Bureau data collection procedures between 1992 and 1993, a direct comparison across these years is not possible. Following the procedure of Burkhauser et al. (2012), we assume no change in the Census-based income distribution across these two years. This adjustment is made for all four series.

Thus, while we prefer the full business cycle results, since they largely remove cyclical fluctuations, comprehensive income measures including accrued gains may help link income to broader macroeconomic trends. Importantly, it does not appear that the results we described here for the full two-business-cycle period are unique to the specific comparison years chosen.

Annual Top Income Shares

To better link our results to the top income literature, we show the trends in the share of all income held by the top 5% (Figure 3) and top quintile (Figure 4) of the distribution over all available years between 1989 and 2010 across five alternative measures of income with and
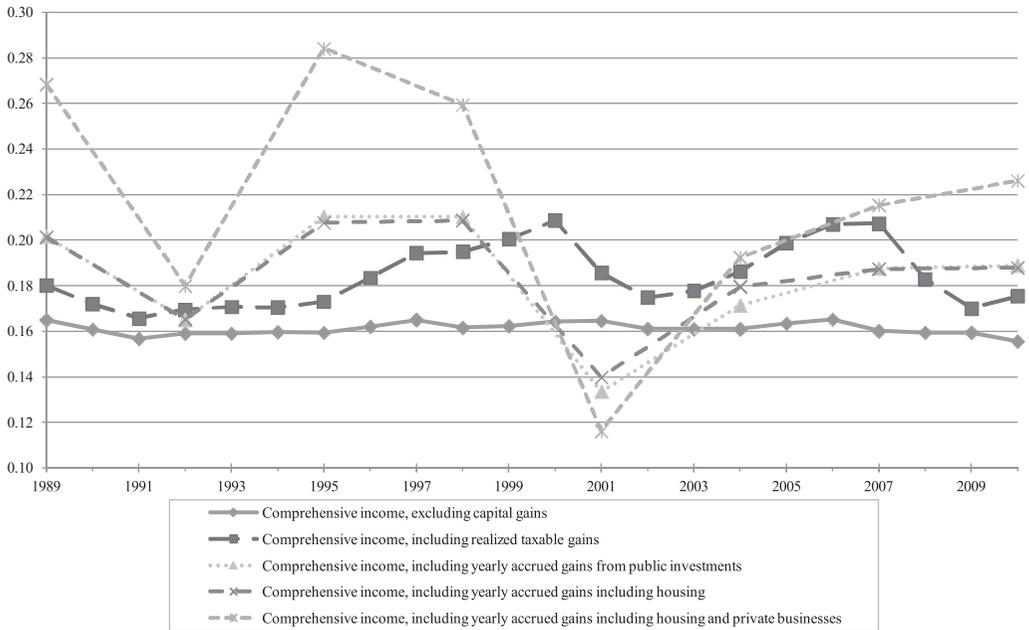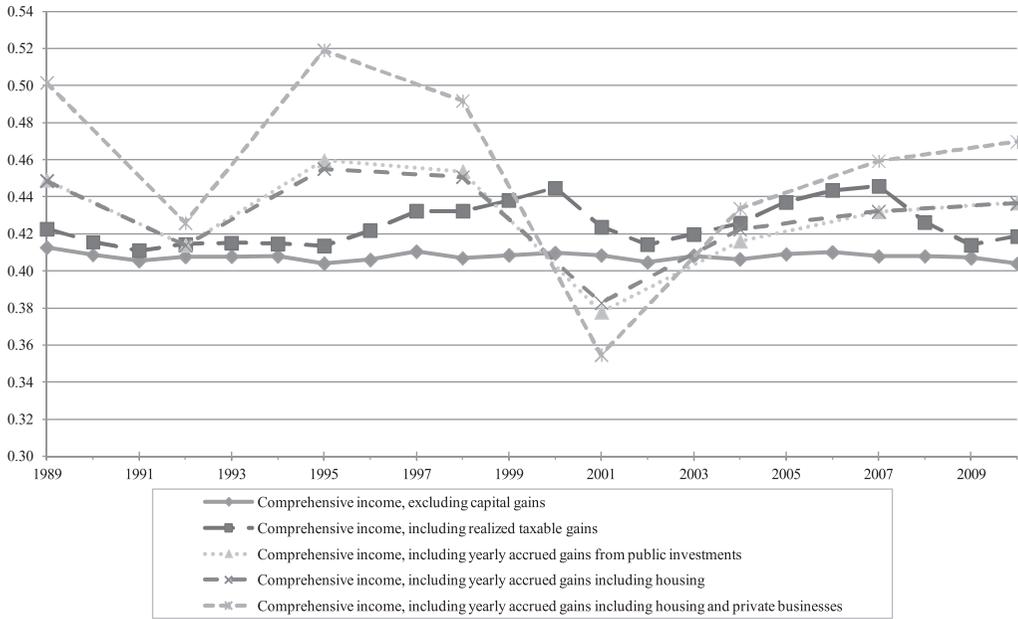
Figure 3. Top 5% Income Share Using Various Comprehensive Income Definitions, 1989–2007
Source and Notes: See Figure 2.

without capital gains. The first two are post-tax, post-transfer income including in-kind benefits but excluding all capital gains (column 3 from Table 3), which closely match the income series from Burkhauser et al. (2011), and post-tax, post-transfer income including in-kind benefits and realized taxable capital gains (column 4 from Table 3), which closely matches the income series from CBO (2012).

The next three, like the CBO measure, also contain post-tax, post-transfer income including in-kind benefits, but rather than using taxable realized capital gains, they offer alternative measures of capital gains that are more consistent with Haig-Simons principles: the first includes yearly accrued capital gains from investments, excluding housing (column 5 from Table 3); the next includes yearly accrued capital gains from investments and housing (column 6 from Table 3); and the last includes yearly accrued capital gains from investments and housing and personally held businesses (column 7 from Table 3). Once again, because we are dependent on SCF data to estimate the three yearly accrued capital gains measures, we have information only for every three years.

Our traditional measure of full income based on CPS data that excludes capital gains shows that the share of this income held by top income groups (either the top 5 or top 20%) has been remarkably stable over the entire period from 1989 to 2010. Because top income groups hold a disproportionate amount of assets in the United States, it is not surprising that all four of our measures that include capital gains show a higher share of that income is held by top income groups in most years, but the pattern of growth in the share of full income captured by these four measures is quite different.

When we include taxable realized capital gains, the trend in top income shares is in line with the CBO (2012) observation that top income shares have increased over the past two

Figure 4. Top Quintile Income Share Using Various Comprehensive Income Definitions, 1989–2007
Source and Notes: See Figure 2.

decades and were at or near their all-time peak in 2007 before falling in the Great Recession. However, that is not the case when using the three yearly accrued realized capital gains series.

When using any of the accrued capital gains series, the top income share measures are noticeably more volatile, even with the qualification that they can only be observed for every third year due to the SCF limitations. Despite this volatility, valuable trends can be observed. The top income shares in each of our four years of observation in the 1990s (1989–1998) are noticeably higher when using accrued capital gains than when excluding capital gains or including only realized capital gains. This is consistent with the idea that the taxable realized capital gains series is understating top incomes in this period, both because capital gains accrued faster than they were realized and because the realized gains series missed gains for asset classes that are not reported on tax returns.[18]

However, there is a shift in this relationship in the 2000s. In 2001, accrued gains at the top fell, resulting in lower top income shares using the accrued gains method than is seen when using realized capital gains or excluding capital gains completely. Even in 2004 and 2007, the three series using accrued capital gains show top income shares at or below those using realized gains. This shift in the relationship between the top income series with different treatments of capital gains is consistent with the idea that recent taxable realized capital gains are, in part, the residual of gains from earlier years when accruals were more rapid and do not reflect current capital gains income. It is only in 2010 during the aftermath of the Great Recession that top

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[18] In the long run, one should expect fewer capital gains to be realized on tax returns than the total of accrued capital gains. This is partially because some gains are deferred until death, at which point there is a step-up in basis (the basis in the investment is increased to the value at the date of death), so the capital gains on this investment will never be reported. Furthermore, since some capital gains, such as those on primary housing and Roth individual retirement accounts (IRAs), are tax exempt, these gains will never appear on tax returns.

income shares using accrued gains surpass those seen when using taxable realized gains. However, even this may be due in part to the rules regarding capital gains reporting for tax purposes. In Figure 1, we observed that the rate of return on stocks had recovered by 2010 (albeit on a lower asset base), but realizations of capital gains had not yet returned to the pre-recession level, both reflecting individuals waiting for assets' values to recover further before selling, but also reflecting the capital loss carry-forwards from losses realized in 2008.

Because of this time shifting for taxable realized capital gains, top income share patterns using any of our accrued gains series differ from those based on realized taxable capital gains. We previously observed an increase in the top income shares since 1989 when including taxable realized capital gains. However, when using any of the yearly accrued measures, the income shares of the top 5 and 20% of the distribution in each year of available data since 2000 were below those seen at the start of the series in 1989. So when we, based on Haig-Simons principles, include capital gains in the year they accrue, top income shares are volatile but do not appear to have increased over the last 20 years.

4. Conclusion

For policy purposes, it is critical to use a measure of income consistent with the policy question. If that question is, "How has the distribution of market income changed over time?," then a Piketty and Saez (2003) measure—taxable income of tax units excluding taxable capital gains based on tax returns—is appropriate, and undoubtedly income inequality has grown substantially in recent years, and the middle class is struggling.

To answer the broader question, "How has the distribution of total income available to American households changed over time?," taxes and transfers must also be taken into account. The same is true to answer the corollary question, "How effectively do our tax and transfer programs provide total income support for those with little or no market income?"

Since capital gains are an important source of income for many individuals, particularly at the top of the income distribution, when asking how the distribution of total income has changed over time, it is reasonable to include some measure of this source of income. However, the measure chosen matters greatly. Using taxable realized capital gains as CBO (2012) does reinforces the view of rising income inequality, but this measure of capital gains not only misses the timing of capital gains accruals but increasingly misses the importance of realized and accrued capital gains in tax-sheltered accounts held by those not in top income groups.

In contrast, following Haig-Simons principles, which include capital gains on a yearly accrued basis, the volatility of income trends increases but results in slower growth throughout the income distribution than when we exclude capital gains. This reflects lower capital gains accrual rates in the most recent business cycle compared to the preceding business cycles. However, it also shows that inequality did not rise in recent years. The top quintile of the income distribution had the slowest income growth from 1989 through 2007, while the bottom quintile had the fastest.

The volatility of the accrued capital gains series and the triennial rather than annual nature of the SCF data limit its value to researchers interested in observing current annual income and inequality trends. More fundamentally, since capital gains are an irregular source of income, some researchers may opt to avoid this volatility by excluding capital gains altogether—as the

Census Bureau has traditionally done in their official income statistics (DeNavas-Walt, Proctor, and Smith 2012). However, for those who wish to include capital gains, doing so based on yearly accrued capital gains is more appropriate than including only taxable realized capital gains. Using yearly accrued capital gains will include gains accruing in tax-sheltered accounts and avoid the timing problems that occur with the delayed realization of capital gains for tax-filing purposes. As we show in this article, this fuller measure of capital gains contradicts the notion that income inequality fueled by capital gains at the top end of the distribution has dramatically increased over the past two business cycles.

Appendix 1. Robustness of Results for Mean Income Growth by Quintile Based on Choice of Asset Appreciation Measure for Equity Assets, 1989–2007

		Original Results Estimate of Accrued Capital Gains Using the Annual Dow Jones Industrial Average Appreciation Rate		*Alternate Method* Estimate of Accrued Capital Gains Using the Annual S&P 500 Index Appreciation Rate	
	(1)	(2)	(3)	(4)	(5)
	Household Size–Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Income	Column (1) Plus Accrued Capital Gains from Public Investments	Column (1) Plus Accrued Capital Gains, Including Housing and Privately Held Businesses	Column (1) Plus Accrued Capital Gains from Public Investments	Column (1) Plus Accrued Capital Gains, Including Housing and Privately Held Businesses
Bottom quintile	26.4	30.4	16.0	28.1	11.9
Second quintile	22.7	23.4	3.6	21.5	0.0
Middle quintile	20.2	18.6	0.0	16.4	−4.1
Fourth quintile	20.0	17.6	0.0	15.1	−4.7
Top quintile	19.0	12.4	−13.5	6.1	−23.2
Top 5%	16.8	8.7	−24.2	−0.3	−35.6

Source: Author calculations based on March CPS data merged with SOI tax return data, Survey of Consumer Finance Data, and NBER TaxSim results.

Appendix 2. Robustness of Results for Mean Income Growth by Quintile Based on Choice of Asset Appreciation Measure for Real Estate, 1989–2007

		Original Results Estimate of Accrued Capital Gains for Real Estate Using the Annual Federal Housing Finance Agency House Price Index Growth Rate	*Alternate Method* Estimate of Accrued Capital Gains for Real Estate Using the Annual Case-Shiller Home Price Index Growth Rate
	(1)	(2)	(3)
	Household Size–Adjusted Post-Tax, Post-Transfer Income Plus In-Kind Income and Accrued Capital Gains from Public Investments	Column (1) Plus Accrued Capital Gains from Housing	Column (1) Plus Accrued Capital Gains from Housing
Bottom quintile	30.4	13.7	−19.2
Second quintile	23.4	9.0	−8.9
Middle quintile	18.6	6.6	−8.5
Fourth quintile	17.6	6.1	−8.6
Top quintile	12.4	0.7	−14.3
Top 5%	8.7	−2.7	−17.9

Source: Author calculations based on March CPS data merged with SOI tax return data, Survey of Consumer Finance Data, and NBER TaxSim results.

Appendix 3. Mean Income Growth by Quintile, 1989–2007

	(1)	(2)	(2)	(3)	(4)
	Tax-Unit Unadjusted Cash Market Income	Column (1) Plus Realized Taxable Capital Gains	Column (1) Plus Accrued Capital Gains from Public Investments	Column (1) Plus Accrued Capital Gains, Including Housing	Column (1) Plus Accrued Capital Gains, Including Housing and Privately Held Businesses
Bottom quintile	−33.0	−24.6	3.8	−50.8	−29.3
Second quintile	0.8	2.3	0.0	−22.8	−23.7
Middle quintile	2.3	5.2	3.7	−9.9	−17.2
Fourth quintile	7.9	12.3	7.7	−3.2	−7.9
Top quintile	12.8	23.1	10.6	0.9	−15.0
Top 5%	9.9	29.3	5.1	−3.6	−27.4

Source: Author calculations based on March CPS data merged with SOI tax return data and Survey of Consumer Finance Data.

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