Deconstructing Income and Income Inequality Measures:

A Crosswalk from Market Income to Comprehensive Income

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Abstract

Recent research on United States levels and trends in income inequality vary substantially in how they measure income. Piketty and Saez (2003) examine market income of tax units based on IRS tax return data, Denavas-Watt, Proctor, and Smith (2012) and most CPS-based research uses pre-tax, post-transfer cash income of households, while the CBO (2012) uses both data sets and focuses on household size-adjusted comprehensive income of persons, including taxable realized capital gains. This paper provides a crosswalk of income growth across these common income measures using a unified data set. It then uses a more consistent Haig-Simons income definition approach to comprehensive income by incorporating yearly accrued capital gains to measure yearly changes in wealth rather than focusing solely on the realized taxable capital gains that appear in IRS tax return data. Doing so dramatically reduces the observed growth in income inequality across the distribution, but most especially the rise in top-end income since 1989.

Much of the debate over the distributional fairness of fiscal policies is discussed in the context of the current distribution of income in the United States and how it has changed over time. Given the importance of income statistics in such debates, there is a surprising lack of consensus in the economics literature over what should be counted as income in distributional analyses. Most economists agree that cash market income, such as labor earnings, interest, and dividends should be included. But should income be measured on a pre-tax or post-tax basis? Should cash transfers such as Social Security, unemployment, and disability payments be included? What about in-kind benefits such as employer-provided health insurance, Medicare, Medicaid, food stamps, or school lunches? Further, should capital gains be included and, if so, should it be on a yearly accrual basis or at realization?

We will show that the answers to these questions profoundly impact observed levels and trends in "income" and its distribution. Too often, the choice of income definition has been based largely on data availability with research based on IRS tax records concentrating on pre-tax, pre-transfer cash market income of tax units and research based on March Current Population Survey (CPS) data focusing on pre-tax, post-transfer cash income of households excluding capital gains.

While data availability concerns will always be a factor in measuring income, from a theoretical basis, the Haig-Simons income definition is an attractive standard for calculating annual income. Under this definition, an individual's yearly income is defined as that person's consumption plus his or her change in net wealth in that year. (See Auerbach, 1989 and Barthold, 1993 for discussion of the Haig-Simons approach in the context of tax policy.) Such a definition nicely links yearly consumption, which is most fundamentally related to well-being but rarely available, with a measure of income that with some effort can largely be measured with available data.

Burkhauser, Larrimore, and Simon (2012) and Congressional Budget Office (CBO) (2012) provide the most recent efforts to broaden an income definition based solely on IRS tax records toward a more comprehensive Haig-Simons income measure using CPS data.[1] Given data limitations, neither approaches a full Haig-Simons income definition, which would include income such as the imputed rent on owner-occupied housing, but both broaden the income definitions substantially compared to previous research. Burkhauser et al. (2012) show that moving from a Piketty and Saez (2003) IRS tax record-based pre-tax, pre-transfer cash market income of tax unit measure to a more comprehensive CPS-based household size-adjusted post-tax, post-transfer cash income of persons measure substantially increases observed median income growth since 1979 and flattens the level of growth across the distribution. This is even more the case when they include the ex-ante value of employer- and government-provided health insurance. But while health insurance is the most substantial in-kind benefit, Burkhauser, Larrimore, and Simon (2012) do not consider other in-kind benefits and, because of CPS data limitations, they do not include capital gains. In contrast, the Congressional Budget Office (2012), using data from both the IRS and CPS, not only includes the ex-ante value of employer- and government-provided health insurance but also includes food stamps and school lunches in its measure of the household size-adjusted post-tax, post-transfer cash income of persons. But most importantly, the CBO also includes taxable realized capital gains based on IRS data. When doing so, they observe markedly faster income growth at the top of this income distribution measure.

CBO's decision to include taxable realized capital gains is consistent with other users of the IRS data (see, e.g. Piketty and Saez, 2003), since that is the measure of capital gains in the

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[1] CBO (2011) provides a set of comprehensive income tables for income years 1979-2007. As will be discussed below, they changed their measure of the value of Medicare and Medicaid in CBO (2012) and updated some of their earlier results in supplemental tables to adjust for this change. In our discussion of the CBO comprehensive income measure, we most closely mirror this more recent series.

IRS dataset. Here we provide an alternative measure of capital gains that is more consistent with the income principles laid out by Haig-Simons.[2] This alternative approach *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. In contrast, taxable realized capital gains, since individuals can choose when to realize them for tax purposes through the timing of transactions, *include* in current income gains, asset appreciation that may have occurred years or decades earlier. Hence, income recorded as taxable realized capital gains this year may not be due to increases in net-wealth this year. 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).

Here we crosswalk from a Piketty-Saez (2003) market income definition to the more comprehensive Burkhauser, Larrimore, Simon (2012) income measure excluding capital gains to the CBO (2012) measure including taxable realized capital gains. In doing so, we demonstrate the extent to which the inclusion of taxable realized capital gains as income drives the increase in income inequality observed by the CBO. We then show that shifting from a taxable realized capital gains to a yearly accrued measure of capital gains, more in the spirit of a Haig-Simons definition of income, produces markedly different income trends.

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[2] As noted by Auerbach (1989) and Roine and Waldenstrom (2011), the Haig-Simons income definition should include all capital gains in the year that they accrue, not just those that are realized.

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I. Data and Methods

The public-use CPS, enhanced with cell-means from Larrimore et al. (2008) to overcome topcoding of high incomes, is our primary data.[3] The CPS questionnaire directly captures all cash income, including transfer income, excluding capital gains (see Weinberg, 2006 for a full list of income sources included in their primary income measure). Additionally, the CPS 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 the source of that coverage. Given the source of individuals' insurance coverage, the Census Bureau imputes an ex-ante insurance value of health insurance for all covered persons based on the cost to their employer or the government of purchasing their insurance coverage. When doing so, however, they treat government- and employer-provided insurance differently. The Census Bureau imputes the value of employer-provided insurance coverage to individuals at its full ex-ante cost. The Census determines the value of employer contributions by first asking individuals whether they were covered by health insurance through their employer, and whether their employer paid for all, part, or none of the cost of the plan. Then, individuals in the March CPS were statistically matched to those in the National Medical Care Expenditure Survey or Medical Expenditure Panel Survey, depending on survey year, based on a number of explanatory variables common to both.[4] This statistical matching provides an imputation for the dollar contribution of employers toward individuals'

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

[4] These variables include: type of plan (family or individual), proportion of cost paid for by employer, earnings, full-time/part-time work status, industry, occupation, public or private sector, region, residence, and demographic characteristics.

health insurance. We use this Census Bureau ex-ante value of in-kind employer-provided health insurance to the individual in our analysis.

In contrast to its treatment of employer-provided insurance, the Census Bureau imputes a fungible insurance value of Medicare and Medicaid to covered individual, which is intended to represent the level of resources individuals would have spent on health insurance had it not been provided to them. The ex-ante value for Medicare and Medicaid is calculated as the respective program's average outlay by state and risk class in the income year in question.[5] For higher income individuals, the Census bureau values insurance as this ex-ante value, just as was the case for employer-provided insurance. But for families that cannot meet basic food and housing requirements, the Census assumes that the family derives no value from the insurance, since the family cannot cover its needs and thus government provision of insurance frees up no income to be spent otherwise if the family would be unlikely to purchase insurance on their own. This approach implicitly assumes that since such families cannot afford their basic needs, they would be unlikely to purchase this insurance at any price.

Such assumptions regarding the value of insurance to low income individuals seem too strong. The fact that they would likely forego insurance if it were not provided to them does not indicate that they receive no value from it. It simply implies that their consumer surplus from the purchase of insurance is less than the consumer surplus they would receive from other purchases given the same level of spending. Following the approach taken in Burkhauser, Larrimore, and Simon (2012) and CBO (2012), we use the ex-ante insurance value for all individuals, regardless of whether the insurance is government-provided or employer-provided.[6] For high income

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[5] Medicare risk classes are 1) age 65 and older, and 2) blind and disabled. Medicaid risk classes are 1) age 65 and older, 2) blind and disabled, 3) age 21-64 nondisabled, and 4) age less than 21, nondisabled.

[6] In their earlier work, CBO (2011) used the Census fungible value measure to value health insurance, but revised their approach in their subsequent work, CBO (2012)

individuals the Census-imputed values are used as the value of government insurance. For low income individuals, we follow the Census imputation formula but ignore the Census decision to replace these values with a zero insurance value.

Although the CPS captures or imputes most sources of income, the Census does not inquire about tax credits, tax liabilities, or capital gains.[7] As such, we supplement the CPS data with imputed and matched data as described below.

To impute tax credits and liabilities, we use the NBER TaxSim 9.0 to estimate federal and state income tax liabilities including FICA and SECA taxes based on the tax laws in effect in each year (see Feenberg and Coutts, 1993 for an overview of the NBER TaxSim program). Since the CPS samples households rather than tax filing units, each household is divided into tax units prior to imputing tax liabilities. This division is performed using the procedure described in Burkhauser et al. (2012) which mirrors the Piketty and Saez (2003) definition of potential tax units. All single individuals age 20 and over, married couples, and divorced or widowed individuals are considered independent tax units. Never-married children under the age of 20 are considered dependents and are assigned to the tax unit of their parent or guardian.[8]

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. Within each income percentile, we assign tax-units a probability of filing a tax return based on the distribution of non-filers in the taxable income distribution excluding capital gains from the Joint Committee on

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[7] The Census Bureau currently imputes taxable realized capital gains; this was not the case for the entire period of our analysis. Additionally, when comparing the distribution of Census-imputed taxable realized capital gains in the CPS data to that from IRS tax records in 2007, we observed that the Census Bureau's imputation results in gains being more evenly distributed throughout the distribution than is actually the case.

[8] 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.

Taxation 2007 Individual Tax Model (See Joint Committee on Taxation 2011 for details). The vast majority of non-filers are individuals at the lower tail of the taxable income distribution, below the legal filing limit. Since the distribution of non-filers is not available in all years, we assume a constant distribution of non-filers in all years.

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 non-filers 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 non-taxable accounts. Following Smeeding and Thompson (2010) we impute accrued capital gains from stocks as the appreciation in the Dow Jones Industrial Average in the year times the assets held in stocks and mutual funds and we impute accrued capital gains from bonds as the 10-year Treasury bond rate in the year times the assets held in bonds. Unlike Smeeding and Thompson (2010), however, for this measure and for our capital gains from real estate, we use the single-year level of appreciation rather than an average across multiple years to more closely reflect the single-year Haig-Simons income growth.

While we believe that this measure is the best currently available approach for imputing yearly accrued capital gains on investments, we acknowledge several imperfections. In particular, to the extent that wealth invested in privately owned businesses rather than in investment accounts, the gains on these investments will not be observed. However, as taxable

realized capital gains would only observe gains on such businesses when the business is sold the taxable realized capital gains measure likely misses many of these gains as well.[9] Additionally, when imputing yearly accrued capital gains we assume that all investments receive the ordinary rate of return for investments of that class. To the extent that some individuals receive extra-normal returns on investments, these extra-normal returns would not be captured. This may be of particular concern for some private equity investors who generate excess returns on investments through purchasing entire companies and reforming their production process or business model to increase personal investment returns. As such, returns on these private equity investments may be understated in the yearly accrued capital gains measure and, to the extent that the frequency or size of such investments have changed over time, this approach may also fail to fully capture the income growth of high-wealth private equity investors.

In addition to imputing capital gains from investments, we impute capital gains on primary housing to reflect gains in wealth resulting 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. The housing capital gains are then imputed as the growth in the House Price Index of the Federal Housing Finance Agency times the estimated home value.[10] Importantly, since the SCF does not include state or locality information, all housing capital gains are based on national estimates of home values and home price appreciation and miss the substantial importance of local housing markets. Nevertheless, in the absence of local identifiers this is the

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[9] Additionally, since there is a step-up in basis on investments at death for tax purposes, in the case of family owned businesses that are passed on to one's children, the capital gains would never appear as realized capital gains on tax returns.

[10] It was also considered to use the S&P 500 to impute investment returns or the Case-Schiller home price index to measure real estate returns. The trends in these indices are substantively similar to those for the indices chosen and thus produce comparable results. However, when using the Case-Shiller home price index, real estate returns are more volatile, especially during the home-price decline in 2007, which results in lower imputed incomes for homeowners in this year than those presented in the paper.

best available information for imputing housing capital gains, and this approach closely matches the method for imputing accrued housing capital gains from Smeeding and Thompson (2010). Finally, because of a major break in the ability of the SCF data to capture wealth before and after 1989, for consistency we only compare our yearly accrued capital gains estimate for 1989 onward.

II. Results

Table 1 compares income growth by quintile and for the top 5 percent across several common income definitions, starting in Column 1 with the relatively narrow Piketty and Saez-based market income of tax units income definition which excludes taxable realized capital gains to the more comprehensive Congressional Budget Office (2012)-based, household size-adjusted, post-tax post-transfer income of person income definition including in-kind income and taxable realized capital gains in Column 4.[11] Comparisons are made over the entire three-business cycle period from 1979-2007. Both 1979 and 2007 are peak income years of business cycles and thus are chosen to avoid conflating business cycle effects with long-term trends. The trends for the top 1 percent of the distribution is not provided due to limitations of separately observing the top 1 percent income share in the public use CPS data we use in this paper.

[Insert Table 1 About Here]

The first column reports mean income growth using a Piketty-Saez style market income of tax unit income measure. Using this measure, which is typical for those solely using IRS data,

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[11] In their original work, Piketty and Saez (2003) primarily focus on taxable income net of taxable realized capital gains. Burkhauser et al. (2012) show that CPS data can track this Piketty and Saez (2003) measure of the market income of tax units. In their more recent work, Piketty and Saez focus more on taxable income including taxable realized capital gains. As we will show, this makes a dramatic difference in the growth of income among upper income groups.

the rich have gotten richer (37.9 percent increase for the top 5 percent), the poor have gotten poorer (33 percent decline in the bottom quintile) and the middle has stagnated (2.2 percent increase in the middle quintile). However this income definition does not include transfers, taxes, or capital gains.[12]

Column 2, which is more in keeping with 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 of cohabiting couples and other householders who do not file a collective tax return (see Gottschalk and Danziger, 2005; Smeeding, Rainwater, and Burtless, 2001; and Burkhauser et al., 2011 for examples of research using similar definitions). In keeping with the traditional inequality literature, it focuses on the individual as the unit of analysis and adjusts for household size to reflect returns to scale of larger households.[13] When doing so, income growth accelerates for all quintiles, but especially for the bottom quintile where mean income growth is now 9.9 percent, and in the middle where income increases by 22.8 percent or ten times the growth of market income found in column 1. This is partially because government transfers are primarily directed to individuals that otherwise have lower than average pre-transfer incomes. But it also reflects the growth of cohabiting couples or of adult children living with their parents who share in 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 traditional income measure used by CPS researchers is that it includes as income some of the benefits received by individuals from the government, but

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[12] Of the 22 country studies using income tax records discussed in the Atkinson, Piketty and Saez (2011) review of the top income literature, the majority do not have data on taxable realized capital gains and hence do not use this source of income in their estimations of top income

[13] See Gottschalk and Smeeding (1997) for an early review of this literature and 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.

does not include the taxes used to pay for them. Additionally, such a measure selectively includes only some transfers, excluding both non-cash 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 for those receiving refundable credits such as the EITC—the largest means-tested anti-poverty 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 (SNAP), housing subsidies, and subsidized school lunches. To avoid double counting, we do not include another important in-kind benefit, 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 percent continue to grow faster, 54 and 68.9 percent respectively, but the gap in growth between them and the bottom quintile is dramatically smaller than the gap using a Piketty-Saez style cash market income of tax unit measure of income.

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 percent is now 83.1 and 136.7 percent 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 single business cycle since 1979 in Panels A, B, and C of Table 2. Panel D provides the Gini coefficient for the peak-year of each business cycle since 1979, which offers a summary level of inequality at the peak of each business cycle.[14]

[Insert Table 2 about here]

When doing so, we show that even when we use the measure of income including taxable realized capital gains in Column 4, while income inequality has grown across all business cycles, the majority of that inequality growth occurred in the 1980s—with somewhat less in the 1990s and very little in the 2000s. In the 1980s business cycle, the top 5 percent of the income distribution saw their income grow by 55.6 percent, over 4.5 times the 11.7 percent growth in the middle quintile and over 20 times the 2.6 percent 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

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[14] The starting and ending years of business cycles are considered the peaks in median size-adjusted household income of persons (Burkhauser, Larrimore, and Simon, 2012; Daly and Valletta, 2006; and Karoly and Burtless, 1995, 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.

1980s—income growth was 43.4 percent for the top 5 percent versus 21.8 percent for the bottom and 16.4 percent 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 4 and 7 percent over the period, throughout the distribution with the top two quintiles experiencing slightly faster growth than the bottom three.

We find a similar pattern in our Gini coefficients in Panel D. Using this summary inequality measure of CBO-style income, inequality increased from 0.303 to 0.359 (an 18 percent increase) in the 1980s business cycle and from 0.359 to 0.380 (a 6 percent increase) in the 1990s business cycle. But in the 2000s business cycle, it grew by just 0.8 percent to 0.383. So while inequality remains at an elevated level, even when considering the income definition including taxable realized capital gains, inequality did not increase dramatically over the 2000s business cycle.

Including accrued capital gains

The results using the income definition that includes 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 that seen in our compenhensive post-tax, post-transfer measure of income excluding all capital gains from Column 3.

However, as previously noted taxable realized capital gains deviate from the spirit of Haig-Simon comprehensive income. In particular, including taxable realized capital gains in this way will confound asset appreciation in earlier years but declared in this year with capital gains actually accrued in this year. Hence it will artificially delay the receipt of some capital gains

income from when they should be counted under Haig-Simons principles. 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 non-taxable 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 how inequality trends would change using yearly accrued capital gains of taxable and tax-sheltered assets rather than just realized taxable gains.

[Insert Table 3 about here]

This analysis relies on the Survey of Consumer Finance (SCF), but since the SCF data prior to 1989 are not comparable with SCF data thereafter, we only consider income growth using this measure for the two business-cycle period from 1989-2007. Additionally, since the SCF is a triennial survey, it is only available for select years, which do not include the 2000 business cycle peak. Thus, we only provide full business-cycle results for the two-business-cycle period. However, we will discuss the triennial top income share results for each available year between 1989 and 2007 in greater depth below. For comparability, each of the previously discussed series are also provided for in 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 smaller for the top income quintile and the top 5 percent 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

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all quintiles since 1989, and even in the top 5 percent, 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 percent is smallest over this period. It is only when we add taxable realized capital gains that income growth in the top quintile and among the top 5 percent is greater than that in the bottom four quintiles.

But in Column 5 when we include yearly accrued capital gains excluding housing 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 that 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*. As a result, when including accrued capital gains excluding housing gains, income inequality actually fell between 1989 and 2007.

How is it possible that the choice of treatment of capital gains could 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 on the income distribution.

Table 4 presents the mean investments in taxable and non-taxable 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 1989 and 2007. This table illustrates that while asset 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 the mean investment holdings grew almost 6-fold from $7,132 in 1989 to $42,634 in 2007. This compares to the top

quintile where assets in 2007 were 3.2 times the amount seen in 1989 ($609,330 versus $188,632).

[Insert Table 4 about here]

Further, this increase in asset holdings has disproportionately occurred in tax-sheltered accounts. Throughout the distribution, the use of tax-sheltered accounts increased over this period such that over half of investments for each quintile of the distribution are now tax-sheltered. In comparison, in 1989 no quintile saw more than 40 percent of their investments held in tax-sheltered accounts. Thus, the focus on taxable capital gains will miss this increasingly important source of capital gains income throughout the distribution. And to the extent that a larger fraction of assets are held in tax-sheltered accounts among the lower- and middle-quintiles, researchers focusing on just taxable income will disproportionately miss income received by these lower-income individuals.

Although tax-sheltered accounts are an important source of missed income-growth for the bottom of the distribution relative to the top, at least as 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 and bonds over time. In particular, the appreciation of the Dow Jones Industrial Average in 1989 was a substantial 27 percent, compared to a more tempered 6.4 percent in 2007. Thus, the lower growth rate means that one should expect a lower level of accrued gains, other than for individuals where asset holdings in 2007 were dramatically above those in 1989.

In part, this simply represents the volatility inherent in a realized capital gains measure, seen 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

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alter the results, it also is a reflection of the slower growth in capital gains that has occurred in the 2000s when compared to either the 1980s or 1990s. The inflation-adjusted average yearly growth in the Dow Jones Industrial Average was 8.2 percent over the 1980s business cycle (1980-1989), 11.2 percent over the 1990s business cycle (1990-2000), but only 1.1 percent over the 2000s business cycle (2001-2007). So stock accrual over almost any year of the 2001-2007 business cycle will be lower than over the previous two business cycles.

[Insert Figure 1 about here]

A similar but less volatile pattern can be observed for bonds. As can be seen in Figure 2 the real return on bonds in 1989, based on the return on 10-year treasury bills, was 4.2 percent. In 2007 it was 1.8 percent. The average return was 5.4 percent over the 1980s business cycle, 3.9 percent over the 1990s business cycle, but only 1.8 percent over the 2001-2007 business cycle. Thus, similar to stocks, the lower bond yields reflect the lower real return on investments over the early 2000s relative to the previous two business cycles.

[Insert Figure 2 about here]

Since stock appreciation and, to a lesser extent, bond yields are a primary source of capital gains, it is notable that the rapid accrual of capital gains seems to have occurred in the 1980s and 1990s rather than in the 2000s. When focusing on taxable realized capital gains, the appreciation of investments in the 1980s and 1990s may not appear on income tax returns until a later date. 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.

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 investments, the real accrued capital gains from housing in 2007 (-4.7 percent) was below that seen in 1989 (0.7 percent).[15] 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 and, conditional on owning a home, are more likely to own expensive homes. As a result, the absolute decline in income from including housing capital gains should be larger for those in the upper tail of the distribution than for those in the lower tail. But, relative to their total income excluding housing gains, the home value should be smaller for the top quintile relative to their income so the impact on percentage income growth will be smaller at the top of the distribution.

[Insert Table 5 about here]

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 —17.6 percent for the bottom quintile (from 32.2 percent to 14.6 percent) — than it does for those near the top — 11.2 percent for the top quintile (from 12.8 percent to 1.6 percent).

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[15] Annual accrued gains from housing using the FHFA data is available upon request from the author.

Nevertheless, similar to our Column 3 of Table 3 results where all capital gains were excluded, the income growth for the top quintile of the distribution was the slowest from 1989 through 2007 and the income growth for the bottom quintile was the largest. Further, the top 5 percent of the income distribution experienced a decline in their income, while each of the lower quintiles experienced modest income growth. Therefore, when viewed in this context when all accrued capital gains are added to a compensive income measure without capital gains (Column 3 of Table 3), the evidence supporting dramatic increases in income inequality powered by major increases in capital gains (as measured by taxable realized capital gains) in recent years not only dissipates but reverses.

Annual Top Income Shares

In addition to the income growth by quintile, we can also consider the share of income going to the top quintile or top 5 percent of the distribution. This measure, unlike income growth by quintile, captures changes in the relative well-being of individuals at the top of the distribution rather than changes in absolute well-being. We do so just for our four primary comprehensive income series: post-tax, post-transfer income including in-kind benefits but excluding all capital gains (Column 3 from Table 3); post-tax, post-transfer income including in-kind benefits and realized taxable capital gains (Column 4 from Table 3); post-tax, post-transfer income including in-kind benefits including yearly accrued capital gains from investments excluding housing (Column 5 from Table 3); and post-tax, post-transfer income including in-kind benefits including yearly accrued capital gains from investments and housing (Column 6 from Table 3). The first of these series closely matches the income series from Burkhauser, Larrimore, and Simon (2012) and the second closely matches the income series from Congressional Budget Office (2012). Once again, for the two yearly accrued capital gains

measures, because we are dependent on SCF data to estimate them we only have information every three years. Figure 3 presents the income share for the top 5 percent of the income distribution based on each of our four income series for all available years from 1989 through 2007. Figure 4 does so for the top quintile of the income distribution. Given that when capital gains are positive they are disproportionately received by the top of the income distribution, it should not be a surprise that the top income shares are generally lower for the series excluding capital gains than for any of the series that include these gains. But it is also notable how flat the top income shares have been since 1989 when using our comprehensive measure of income that excludes capital gains. The top 5 percent of the income distribution has captured between 15.7 percent and 16.5 percent of total income in each year since 1989. Similarly, the top quintile has captured between 40.4 and 41.3 percent of total income every year during this period. Hence when capital gains are excluded, but comprehensive income is considered, there is no evidence that the top of the distribution captured an increasing share of national incomes between 1989 and 2007.

[Insert Figure 3 about here]

[Insert Figure 4 about here]

Of course, it is undeniable that capital gains are an important source of income for the top of the income distribution, so how do results differ when including realized taxable capital gains or yearly accrued capital gains with income? When including taxable realized capital gains, the trend in top income shares is in-line with the observation from CBO (2012) that top income shares have increased over the past two decades and are now at or near their all-time peak.

But that is not the case when using either of the yearly accrued realized capital gains series. When using the realized taxable capital gains series, the top income share measures are

noticeably more volatile, even with the limitation that it can only be observed for every third year due to the SCF limitations. But despite this volatility, valuable trends can be observed. When using the realized taxable capital gains series, the income shares of top 5 percent and top quintile of the distribution are below those using yearly accrued gains in each of the observed years in the 1990s. In contrast, since 2000 the top income share using taxable realized gains have equaled or exceeded the top income share using yearly accrued gains. This is consistent with the idea that recent taxable realized capital gains are, in part, the residual of gains from earlier years and do not reflect current capital gains income.

When acknowledging this point and using either of our realized capital gains series, our top income share trend changes. We previously observed an increase in the top income shares since 1989 when including taxable realized capital gains. However, when using either yearly accrued measure, the income shares of the top 5 and 20 percent 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 including capital gains in a way that is consistent with when gains are accrued, as should be done under the Haig-Simons income principles, top income shares are volatile but do not appear to have increased over the last 20 years.

IV. Conclusion

As the level and trends in income and its distribution are considered when debating tax laws and fiscal policies, it is increasingly important to understand the assumptions underlying the alternative measures of income our analysis provides. If income and its distribution were invariant across the most common measures of income we report here, then the choice of income measure would not greatly matter. But that is not the case. Hence for policy purposes it is critical

to use a measure of income that is most consistent with the policy question being asked. For those focused on taxable income of tax units excluding taxable capital gains—a Piketty and Saez (2003) measure of market income, based on tax returns—undoubtedly income inequality has grown substantially in recent years, and the middle-class is struggling. The inclusion of taxable realized capital gains in income measures that are more inclusive—like the CBO (2012) measure using both tax returns and CPS data—will reinforce this view of rising inequality, but it does so by including a measure of capital gains that by definition misstates the timing of gains and misses the increasingly important capital gains in tax-sheltered accounts.

In contrast, when using our comprehensive income definition that mirrors the CBO (2012) report but excludes all capital gains, we observe that incomes have risen throughout the distribution and since 1989 have largely risen uniformly throughout the distribution. Alternatively, when we include capital gains in our series but do so on a yearly accrued basis that is more in line with Haig-Simons principals, it increases the volatility of income trends but demonstrates slower growth throughout the income distribution than when capital gains are excluded. This reflects lower capital gains accrual rates in the most recent business cycle than in the proceeding ones. But it also illustrates that inequality growth has not risen in recent years, as the top quintile of the income distribution had the slowest income growth from 1989 through 2007 while the bottom quintile had the fastest.

Recognizing the increased volatility of the accrued capital gains series and its triennial rather than annual availability, we acknowledge that this series comes with substantial limitations for researchers interested in observing current annual income and inequality trends. Additionally, since capital gains are an irregular source of income, some researchers may opt to avoid this volatility by excluding gains all together—as the Census Bureau has traditionally done

in their official income statistics (DeNavas-Watt, Proctor, and Smith 2012). However, should one wish to include capital gains, doing so based on yearly accrued capital gains is more appropriate than including just taxable realized capital gains since it both includes gains accruing in tax-sheltered accounts and avoids the timing problems that occur with the delayed realization of capital gains for tax filing purposes. Doing so provides evidence that 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.

REFERENCES

Atkinson, A.B., T. Piketty, and E. Saez. 2011. "Top Incomes in the Long Run of History," *Journal of Economic Literature* 49(1), 3–71.

Auerbach, A.J. 1989. "Capital Gains Taxation and Tax Reform," *National Tax Journal* 42(3): 391–401.

Barthold, T. 1993. "How Should We Measure Distribution," *National Tax Journal* 46(3): 291–99.

Ben-Shalom, Y., R.A. Moffitt, and J.K. Scholz. 2011. "An Assessment of the Effectiveness of Anti-Poverty Programs in the United States," NBER Working Paper No. 17042.

Burkhauser, R.V., S. Feng, S.P. Jenkins, and J. Larrimore. 2011. "Trends in United States Income Inequality Using the March Current Population Survey: The Importance of Controlling for Censoring," *Journal of Economic Inequality* 9(3): 393–415.

Burkhauser, R.V., S. Feng, S.P. Jenkins, and J. Larrimore. 2012. "Recent Trends in Top Income Shares in the USA: Reconciling Estimates from March CPS and IRS Tax Return Data," *Review of Economics and Statistics* 94(2), 371–388.

Burkhauser, R.V., J. Larrimore, and K. Simon. 2012. "A Second Opinion on the Economic Health of the Middle Class," *National Tax Journal* 61(1), 7–22.

Congressional Budget Office. 2011. *Trends in the Distribution of Household Income between 1979 and 2007*. U.S. Government Printing Office, Washington, DC.

Congressional Budget Office. 2012. *The Distribution of Household Income and Federal Taxes, 2008 and 2009*. U.S. Government Printing Office, Washington, DC. Supplemental data tables available online via: http://www.cbo.gov/publication/43373

Daly, M.C., and R.G. Valletta. 2006. "Inequality and Poverty in the United States: The Effects of

Rising Dispersion of Men's Earnings and Changing Family Behavior," *Economica* 73(289), 75–98.

DeNavas-Walt, C., B.D. Proctor, and J.C. Smith. 2012. *Income, Poverty, and Health Insurance Coverage in the United States: 2011*. US Census Bureau Population Reports, P60-243, U.S. Government Printing Office, Washington, DC.

Gottschalk, P., and S. Danziger. 2005. "Inequality of Wage Rates, Earnings and Family Income in the United States, 1975–2002," *Review of Income and Wealth* 51(2), 231–254.

Gottschalk, P., and T.M. Smeeding. 1997. ''Cross-National Comparisons of Earnings and Income Inequality,'' *Journal of Economic Literature* 35, 633–687.

Feenberg, D., and E. Coutts. 1993. "An Introduction to the TAXSIM Model," *Journal of Policy Analysis and Management* 12(1), 189–94, http://www.nber.org/~taxsim/

Joint Committee on Taxation. 2011. *Summary of Economic Models and Estimating Practices of the Staff of the Joint Committee on Taxation* JCX-46-11. U.S. Government Printing Office, Washington, DC.

Jones, A.F., and D.H. Weinberg. 2000. "The Changing Shape of the Nation's Income Distribution," *Current Population Reports,* U.S. Census Bureau.

Karoly, L.A., and G. Burtless. 1995. "Demographic Change, Rising Earnings Inequality, and the Distribution of Personal Well Being, 1959-1989," *Demography* 32(3), 379–405.

Larrimore, J. Forthcoming. "Accounting for United States Household Income Inequality Trends: The Changing Importance of Household Structure and Male and Female Labor Earnings Inequality," *Review of Income and Wealth*.

Larrimore, J., R.V. Burkhauser, S. Feng, and L. Zayatz. 2008. "Consistent Cell Means for Topcoded Incomes in the Public Use March CPS (1975-2007)," *Journal of Economic and*

Social Measurement 33(2-3), 89–128.

Piketty, T., and E. Saez. 2003. "Income Inequality in the United States, 1913–1998," *Quarterly Journal of Economics* 118(1), 1–39.

Roine, J., and D. Waldenstrom. 2011. "On the Role of Capital Gains in Swedish Income Inequality." *Review of Income and Wealth* 58(3): 569–587.

Ryscavage, P. 1995. "A Surge in Growing Income Inequality?" *Monthly Labor Review* 118(8), 51–61.

Smeeding, T., L. Rainwater, and G. Burtless. 2001. "United States Poverty in a Cross-National Context," *FOCUS Institute for Research on Poverty* 21(3), 50–54.

Smeeding, T.M., and J.P. Thompson. 2010. "Recent Trends in the Distribution of Income: Labor, Wealth, and More Complete Measures of Well Being," *Political Economy Research Institute Working Paper Series, No. 25*.

Weinberg, D.H. 2006. "Income Data Quality Issues in the CPS," *Monthly Labor Review* 129(6): 38–45.

TABLE 1— MEAN INCOME GROWTH BY QUINTILE, 1979-2007

	Tax-unit unadjusted cash market income	Household size-adjusted pre-tax, 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	31.1
2nd Quintile	0.7	15.6	31.3	32.0
Middle Quintile	2.2	22.8	34.4	36.7
4th Quintile	12.3	29.2	38.8	42.7
Top Quintile	32.7	42.0	54.0	83.1
Top 5%	37.9	48.7	68.9	136.7

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

	Tax-unit unadjusted cash market income	Household size-adjusted pre-tax, post-transfer cash income	Household size-adjusted post-tax, post-transfer income plus in-kind income	Column (3) plus realized taxable capital gains
Panel A: 1979-1989				
Bottom Quintile	-0.2	0.0	4.3	2.4
2nd Quintile	-0.2	4.3	7.0	6.4
Middle Quintile	0.0	9.1	11.8	11.7
4th Quintile	4.0	12.9	15.7	15.6
Top Quintile	17.6	23.4	29.4	33.1
Top 5%	25.6	32.0	44.6	55.6
Panel B: 1989-2000				
Bottom Quintile	17.8	17.2	20.6	21.8
2nd Quintile	11.7	13.5	16.7	17.9
Middle Quintile	7.5	13.1	14.6	16.4
4th Quintile	10.7	13.3	12.6	15.5
Top Quintile	14.7	16.2	13.5	29.2
Top 5%	14.4	16.5	13.9	43.4
Panel C: 2000-2007				
Bottom Quintile	-43.0	-6.2	4.8	5.1
2nd Quintile	-9.8	-2.4	5.2	5.2
Middle Quintile	-4.9	-0.4	4.9	5.1
4th Quintile	-2.5	1.0	6.6	6.9
Top Quintile	-1.6	-1.0	4.8	6.5
Top 5%	-4.0	-3.3	2.6	6.1
Panel D: Gini Coefficients				
1979	0.536	0.384	0.301	0.303
1989	0.565	0.423	0.346	0.359
2000	0.571	0.427	0.338	0.380
2007	0.584	0.430	0.338	0.383

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

Notes: See Table 1.

TABLE 3— MEAN INCOME GROWTH BY QUINTILE, 1989-2007

	Tax-unit unadjusted cash market income	Household size-adjusted pre-tax, post-transfer cash income	Household size-adjusted post-tax, post-transfer income plus in-kind income	Column (3) plus realized taxable capital gains	Column (3) plus accrued capital gains, excluding housing	Column (3) plus accrued capital gains, including housing
Bottom Quintile	-32.9	9.9	26.4	28.0	32.2	14.6
2nd Quintile	0.8	10.8	22.7	24.0	25.0	9.9
Middle Quintile	2.3	12.6	20.2	22.3	20.2	7.9
4th Quintile	8.0	14.4	20.0	23.5	18.7	7.3
Top Quintile	12.9	15.1	19.0	37.5	12.8	1.6
Top 5%	9.9	12.7	16.8	52.2	9.3	-1.4

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

Notes: See Table 1.

	Taxable Investment Assets	Tax Sheltered Investment Assets	Total Investment Assets	% of Investment Assets in Tax Sheltered Accounts
Panel A: 1989				
Bottom Quintile	4,995	2,137	7,132	30.0
2nd Quintile	12,375	5,378	17,753	30.3
Middle Quintile	16,597	10,067	26,664	37.8
4th Quintile	26,777	17,382	44,159	39.4
Top Quintile	139,613	49,019	188,632	26.0
Panel B: 2007				
Bottom Quintile	21,137	21,498	42,634	50.4
2nd Quintile	28,619	40,155	68,773	58.4
Middle Quintile	37,919	58,582	96,501	60.7
4th Quintile	50,149	89,279	139,428	64.0
Top Quintile	356,039	253,290	609,330	41.6

Source: Author calculations based on Survey of Consumer Finance Data.

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	96,708	44.2	164,135
2nd Quintile	60.1	107,309	62.4	164,018
Middle Quintile	71.5	111,312	74.2	172,719
4th Quintile	78.5	132,832	82.2	210,713
Top Quintile	84.9	245,000	89.0	402,128

Source: Author calculations based on Survey of Consumer Finance Data
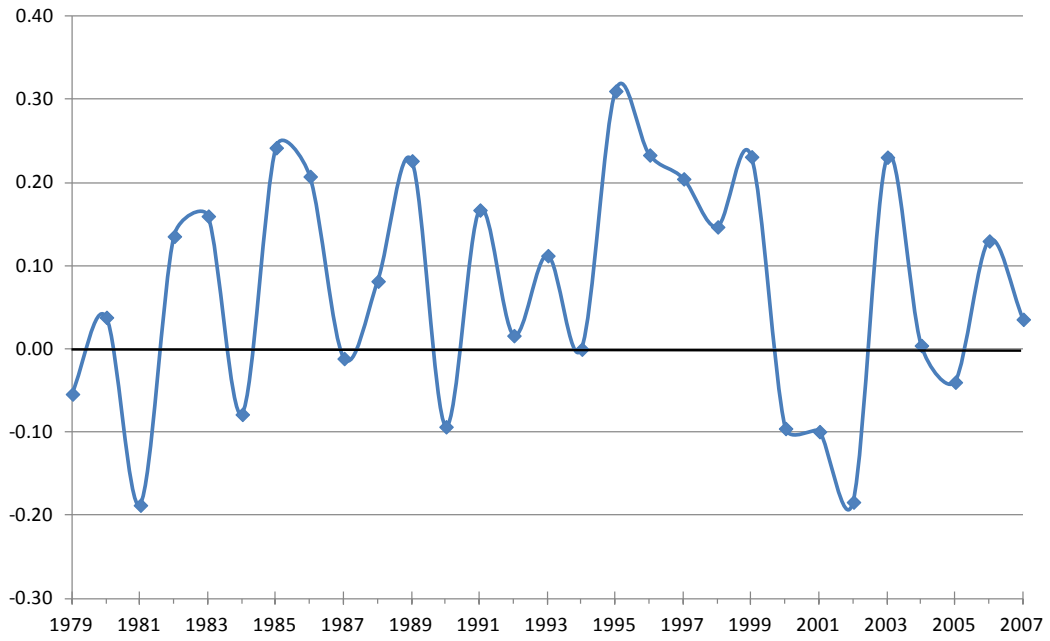
FIGURE 1. REAL INFLATION-ADJUSTED RETURN ON STOCK INVESTMENTS,
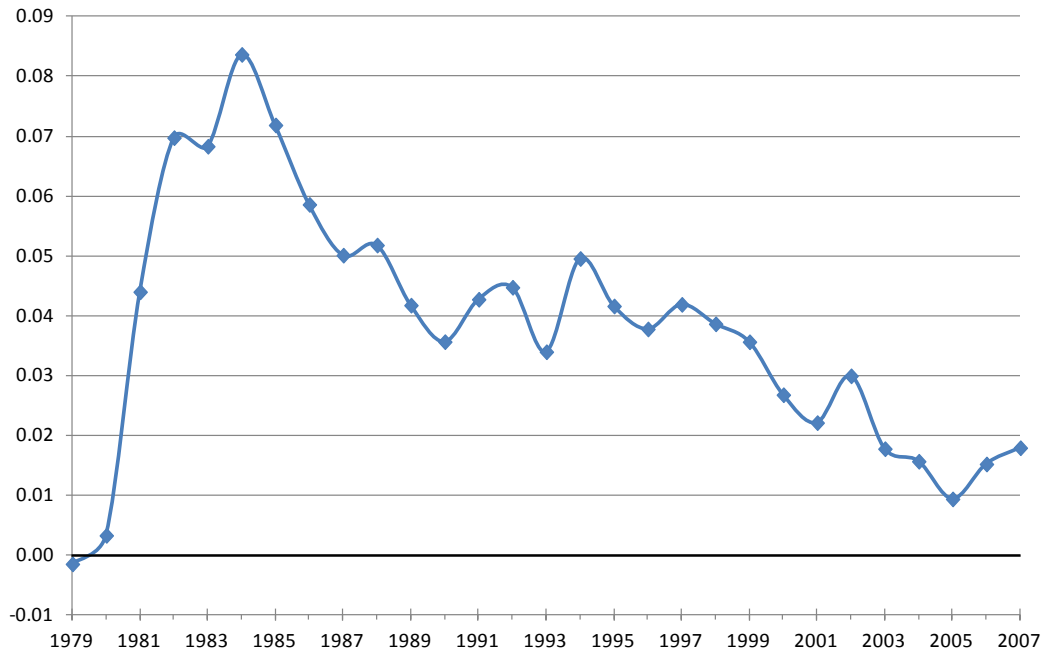
BASED ON THE DOW JONES INDUSTRIAL AVERAGE, 1979-2007

FIGURE 2. REAL INFLATION-ADJUSTED RETURN ON BOND INVESTMENTS,

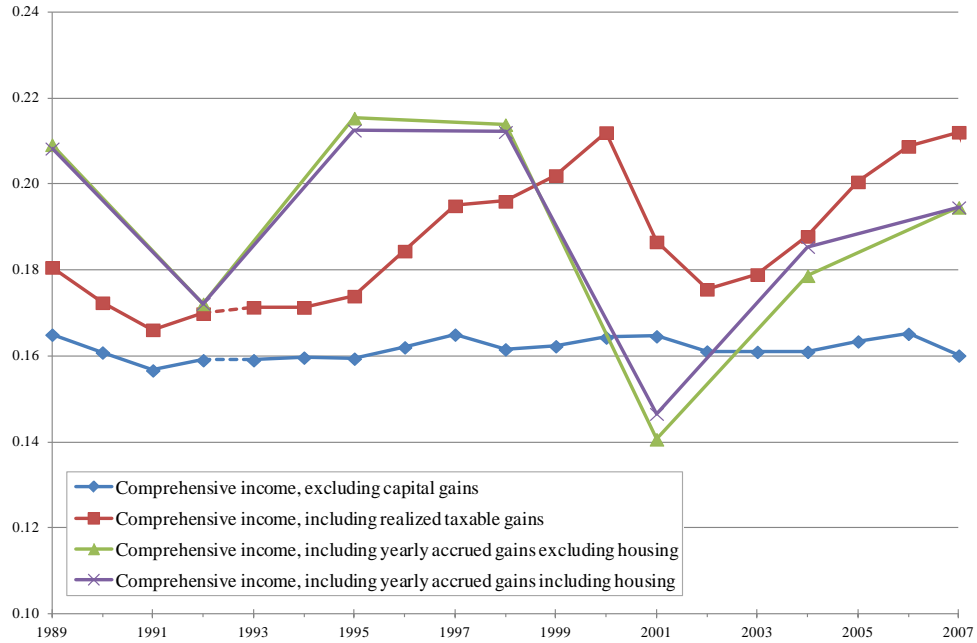BASED ON THE INTEREST RATE ON 10-YEAR TREASURY BILLS

FIGURE 3. TOP 5 PERCENT INCOME SHARE USING VARIOUS COMPREHENSIVE INCOME DEFINITIONS, 1989-2007

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

Notes: (1) Survey of Consumer Finance Data is only available on a triennial basis, so results are displayed only for the years where that data is available. (2) Due to revisions to Census 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.
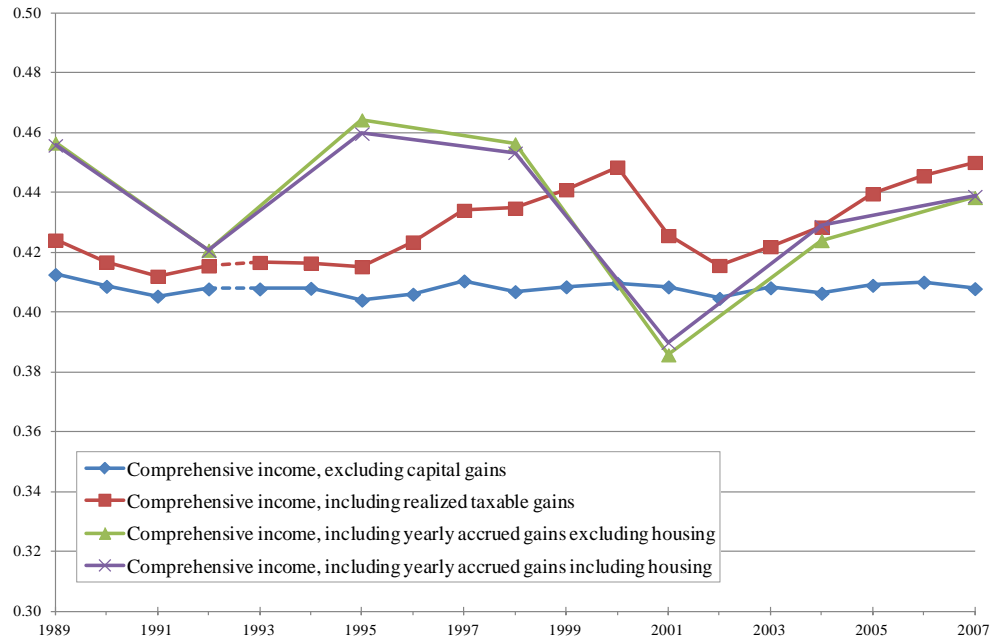
FIGURE 4. TOP QUINTILE INCOME SHARE USING VARIOUS COMPREHENSIVE INCOME DEFINITIONS, 1989-2007

Source and Notes: See Figure 3