

# Deconstructing Income and Income Inequality Measures: A Crosswalk from Market Income to Comprehensive Income<sup>†</sup>

*By* PHILIP ARMOUR, RICHARD V. BURKHAUSER, AND JEFF LARRIMORE \*

AEA Continuing Education Program  
ASSA Course: Microeconomics of Life Course Inequality  
San Francisco, CA, January 5-7, 2016

Much of the debate over the distributional fairness of fiscal policy is discussed in the context of the current US income distribution and how it has changed over time. Given the importance of income statistics in such debates, there is a surprising lack of consensus 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 pretax or posttax basis? Should cash transfer payments like those from Social Security or Unemployment Insurance be included? What about in-kind benefits such as employer-provided health insurance, Medicare, Medicaid, or food stamps? 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 is derived from data availability, with research based on IRS tax records concentrating on pretax, pre-transfer cash market income of tax units and research based on March CPS data focusing on pretax, posttransfer cash income of households excluding capital gains.

While data availability concerns are unavoidable, 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 one's consumption plus his or her change in net wealth in that year. Such a definition nicely links consumption, which is fundamentally related to well-being, with measures of income.

Burkhauser, Larrimore, and Simon (2012) and Congressional Budget Office (CBO) (2012) provide recent efforts to broaden income definitions toward more comprehensive income measures.<sup>1</sup> Burkhauser, Larrimore, and Simon (2012) show that moving from a Piketty and Saez (2003) pre-tax, pretransfer cash market income of tax unit measure to a posttax, posttransfer size-adjusted income of households 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 they exclude nonhealth in-kind benefits and do not address capital gains. In contrast, the CBO (2012), using data from both the IRS and CPS, includes food stamps, housing subsidies, and school lunches in its income measure. But most importantly the CBO also includes taxable realized capital gains based on the IRS data. When doing so, they observe markedly faster income growth at the top of this income distribution.



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 available on tax returns. Here we will provide an alternative measure of capital gains more consistent with the income principles laid out by Haig-Simons. 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 realized gain. In comparison, since individuals can choose when to realize capital gains for tax purposes through the timing of transactions, taxable realized capital gains *include*, in current income, asset appreciation that may have occurred years or decades earlier. Hence, income recorded as taxable capital gains this year may not be due to increases in net worth this year. Additionally, taxable realized capital gains *exclude* accrued gains from assets that are not recorded on this year's tax returns, either because the asset was not sold, was held in a tax-sheltered account, or is on a tax-exempt asset (e.g., most primary housing).

Here we crosswalk from a Piketty and Saez (2003) market income definition to the more comprehensive Burkhauser, Larrimore, and 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 CBO's observed increase in income inequality. We then show that shifting from taxable realized capital gains to a yearly accrued measure of capital gains, more in the spirit of the Haig-Simons definition of income, produces markedly different results.

# **I. Data and Methods**



The public-use March CPS, enhanced with cell-means from Larrimore et al. (2008) to overcome topcoding of high incomes, is our primary data. The CPS questionnaire directly captures all cash income, including transfer income, excluding capital gains. Additionally, the CPS provides values or imputations for certain in-kind benefits, including food stamps, housing subsidies, and school lunches. We include these values in our computation.

The Census Bureau also imputes an ex ante insurance value of health insurance for all covered persons. But they then assume that families that cannot meet basic food and housing requirements value Medicare or Medicaid benefits (but not employer-provided benefits) at zero. Following Burkhauser, Larrimore, and Simon (2012) and CBO (2012), we use the ex ante insurance value for all individuals. For high income individuals, the census imputed values are used. For low income individuals, we follow the census imputation formula but ignore the census decision to replace with a zero the value of government provided insurance.

While the CPS captures most income, it does not inquire about tax credits or liabilities or capital gains. We supplement the CPS with imputed and matched data for these values. To impute tax credits and liabilities, we divide households into tax units using the procedure described in Burkhauser et al. (2012). We then estimate federal and state income tax liabilities and payroll taxes based on the tax laws in effect in each year using NBER TaxSim 9.0.

For capital gains, we impute both taxable realized capital gains and yearly accrued capital gains. Taxable realized capital gains are imputed by first ranking all tax units into percentiles of taxable income in the CPS data in each year. We assign tax units a probability of filing a tax return by percentile, using the distribution of nonfilers from the Joint Committee on Taxation (JCT) 2007 Individual Tax Model (see JCT 2011). Since the distribution of nonfilers is not available annually, we assume it remains constant over time. We impute taxable capital gains for imputed filers in the CPS as the mean gains reported on the tax returns of individuals in the same percentile of the taxable income distribution of filers from IRS data. Nonfilers are assumed to have no taxable realized capital gains.

We implement a similar matching procedure for yearly accrued capital gains with the Survey of Consumer Finances (SCF) data. Doing so, we obtain, for each percentile of the distribution from the SCF, the mean total assets and their allocation in taxable and nontaxable accounts. Following Smeeding and Thompson (2011) we impute accrued capital gains from stocks as the appreciation in the Dow-Jones Industrial Average (DJIA) in the year, times the assets held in stocks and mutual funds. We impute accrued capital gains from bonds as the ten-year Treasury bond rate in the year times the assets held in bonds. This approach is limiting in that it assumes that all individuals receive the same rate of return for the same asset class, which may not be true of some high-wealth investors. However, it is broadly consistent with observations that over 90 percent of returns in actively managed mutual funds—which are overseen

by high-knowledge investors—are due to asset class allocations and general market movements rather than market timing or specific security selection (Brinson, Hood, and Beebower 1986; Xiong et al. 2010).

We use the same technique to match homeowners in the CPS to homeowners in the SCF to obtain an estimate of house values by income percentile. Also following Smeeding and Thompson (2011), 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. Unlike Smeeding and Thompson (2011), however, for this measure and for our capital gains from investments, we use the single-year level of appreciation rather than an average across multiple years.



## **II. Results**

Panel A of Table 1 reports income growth by quintile for alternative income definitions over the period from 1979 to 2007. These years are each peak income years of business cycles, which avoids conflating business cycle effects with long-term trends.

The first column reports mean income growth by quintile and for the top 5 percent of the distribution using a Piketty-Saez style market income of tax unit income measure. Using this measure, 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.

Column 2, which is in line 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. Finally, in keeping with traditional CPS-based inequality research, it focuses on the individual as the unit of analysis and adjusts for household size to reflect returns to scale of larger households.<sup>2</sup> 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 market income growth. This is partially because government transfers are primarily directed to otherwise low income individuals. But it also reflects that cohabiting couples or adult children living with their parents share resources of others in their household.

The third column adds several of the most important sources of in-kind employer- and government-provided benefits: health insurance, food stamps, housing subsidies, and subsidized school lunches. We also net out taxes paid from income, reducing income for those with positive tax liabilities and increasing it for those receiving refundable credits such as the Earned Income Tax Credit (EITC). This inclusion of taxes and in-kind benefits increases income growth throughout the distribution, but more among the bottom two quintiles. As a result, income growth between 1979 and 2007 is 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 between them and the bottom quintile is much smaller than the gap using the cash market income of tax unit measure of income.



The final columns report results adding alternative measures of capital gains to yearly income. Column 4 uses the CBO (2012) approach of incorporating taxable realized capital gains. When doing so, we approximate their income growth patterns. Since the majority of realized capital gains are accrued by individuals with greater asset levels and greater incomes, income growth accelerates for the top quintile.

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 about the same. However, including taxable realized capital gains in this way will confound asset appreciation from earlier years but declared in this year, with capital gains actually accrued in this year. Hence, it artificially delays the receipt of some capital gains from when they would be counted under Haig-Simons principles. Additionally, it almost completely ignores housing capital gains and gains occurring in tax-sheltered accounts. These shortfalls of the taxable capital gains measure distort the importance of capital gains from a Haig-Simons perspective. To more closely reflect Haig-Simons capital gains, the final two columns present income growth including yearly accrued capital gains for the relevant years in Table 1.

TABLE 1—MEAN INCOME GROWTH BY QUINTILE

	Tax unit unadjusted cash market income	Household size-adjusted pretax, post- transfer cash income	Household size- adjusted posttax, posttransfer 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
<i>Panel A. Quintile income growth 1979–2007</i>						
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 percent	37.9	48.7	68.9	136.7	—	—
<i>Panel B. Quintile income growth 1989–2007</i>						
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 percent	9.9	12.7	16.8	52.2	9.3	–1.4

*Notes:* Author calculations based on March CPS data merged with SOI tax return data, Survey of Consumer Finance data, Medical Expenditure Panel Survey data, and NBER TaxSim results. Accrued capital gains are unavailable prior to 1989 due to availability of Survey of Consumer Finance data.

Since the SCF data prior to 1989 are not comparable with SCF data thereafter, in panel B we report income growth for just the two business-cycle period from 1989 to 2007. For this shorter period, we still see that when looking solely at market income of tax units, the rich get richer, the poor get poorer, and the middle class stagnate. When we broaden the income definition, as before, income growth across quintiles narrows. Furthermore, 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.

However, when we use our two accrued capital gains measures, either excluding housing (column 5) or including housing (column 6), a markedly different picture emerges than when using taxable realized gains. Income growth slows in all but the bottom two quintiles in column 5 and across all quintiles in column 6. But with these income measures, it is the top quintile that shows the slowest growth since 1989.



Our two accrued measures of capital gains are sensitive to the years chosen, since they reflect the volatile nature of accrued capital gains. The appreciation of the DJIA in 1989 was a substantial 27 percent, compared to a more tempered 6.4 percent in 2007. However, our observation of lower accrued capital gains for 2007 than for 1989 is not an anomaly, and is consistent with long term asset appreciation trends. The inflation-adjusted average annual growth in the DJIA was 8.2 percent in the 1980s business cycle and 11.2 percent in the 1990s business cycle, compared to only 1.1 percent in the 2000s business cycle.<sup>3</sup> Since stock appreciation is a primary source of capital gains, much of the recent taxable realized capital gains of high-income individuals is a residual of asset appreciation from earlier periods rather than current accruals in capital gains.



## **III. Conclusion**

Those who reference research findings on the levels and trends in income and its distribution when debating public policies should pay close attention to the assumptions underlying the alternative measures of income we consider here. If income and its distribution were invariant across these measures, the choice of 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 asked. For those focusing on taxable income of tax units, then 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 comprehensive reinforces the view of rising inequality, but it does so by including a measure of capital gains that, by definition, misstates their timing and misses capital gains in housing or in tax-sheltered accounts. When, instead, we use a measure of capital gains more in line with Haig-Simons principles, the evidence of rising inequality over the past two business cycles dissipates as the top of the distribution no longer demonstrates faster growth than that of the middle class.