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A "SECOND OPINION" ON THE ECONOMIC HEALTH OF THE AMERICAN MIDDLE
CLASS

Richard V. Burkhauser
Jeff Larrimore
Kosali I. Simon

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ABSTRACT

Researchers considering levels and trends in the resources available to the middle class traditionally measure the pre-tax cash income of either tax units or households. In this paper, we demonstrate that this choice carries significant implications for assessing income trends. Focusing on tax units rather than households greatly reduces measured growth in middle class income. Furthermore, excluding the effect of taxes and the value of in-kind benefits further reduces observed improvements in the resources of the middle class. Finally, we show how these distinctions change the observed distribution of benefits from the tax exclusion of employer provided health insurance.

Richard V. Burkhauser
Cornell University
Department of Policy Analysis & Management
125 MVR Hall
Ithaca, NY 14853-4401
and NBER
rvb1@cornell.edu

Jeff Larrimore
Joint Committee on Taxation
1625 Longworth House Office Building
Washington, D.C. 20515
jeff.larrimore@mail.house.gov

Kosali I. Simon
School of Public and Environmental Affairs
Indiana University
Rm 359
1315 East Tenth Street
Bloomington, IN 47405-1701
and Cornell University
and also NBER
simonkos@indiana.edu

I. INTRODUCTION

The most basic measure of the economic resources available to the average American—median household income—has been consistently tracked by the US Census Bureau since 1967 using yearly data from the March Current Population Survey (CPS). While median income has fallen during economic downturns and risen with recovery within all business cycles, yearly gains have historically more than offset yearly losses so that it has risen from peak-to-peak over each business cycle. That is, the real, inflation-adjusted income of middle class households as measured by median household income has consistently grown over time controlling for short-term market conditions. However, this was not the case over the peak years (2000-2007) of the first business cycle of the 21st Century (DeNavas-Walt, Proctor, and Smith 2008, Table 1).

This highly visible measure of the decline in the real economic resources available to middle class Americans is often discussed alongside research using IRS administrative records by Piketty and Saez (2003) and Saez (2009) showing that the fraction of market income going to the top 10 percent of tax units is at its highest level since at least 1917. Together, these findings suggest that the middle class is not sharing proportionately in the fruits of American economic growth. Such concerns have manifested into the popular press (see, e.g. Johnson 2007, Piketty and Saez 2007, Goldman 2008, Lahart and Evans 2008, Leonhardt 2008), and have led to calls for policies that would increase the share of income growth going to the middle of the income distribution. For instance, when forming the White House Task Force on Middle Class Working Families in 2009, President Obama stated that “middle class Americans have been working harder, yet not enjoying their fair share of the fruits of a growing economy” (Obama, 2009).

In this paper, we offer a second opinion on the extent to which middle class Americans have failed to benefit from economic growth over the past three business cycles (1979-2007).

Using cross-sectional data to capture the economic resources available to individuals at the same point in the distribution over time, we find that the evidence of a middle class decline is far from clear, and that such results are highly sensitive to how available resources are measured.¹ Thus, we will argue that the apparent failure of the median American to benefit from economic growth can largely be explained by the use of an income measure for this purpose which does not fully capture what is actually happening to the resources available to middle class individuals.

Researchers considering long term income trends have traditionally based their analyses on one of two data sources. The first, used by Piketty and Saez (2003) and others, is IRS tax record data. These IRS tax records contain information on the pre-tax, pre-transfer cash income of tax units - the group of individuals who file a tax return together and their child dependents. These data, occasionally supplemented with income estimates for non-filing tax units, provide an excellent measure of the distribution of market income among tax units.

The second data source, reported each year by the Census Bureau (DeNavas-Walt, Proctor, and Smith 2008), comes from the annual March CPS. These data contain information on the pre-tax, post-transfer cash income of households excluding capital gains. In addition to the taxable income reported on tax records, this CPS-based measure also includes the value of all public transfers (including welfare, Social Security, and other government provided cash assistance) received by the household, much of which is not taxable. Thus, the CPS-based income definition is intended to capture resources coming from cash income regularly received by the household, regardless of whether it comes from market-based activities. It excludes, however, some irregularly received income such as capital gains from investments or home

¹ An alternative measure of how middle class Americans have fared over time is to use panel data that actually follows the same individuals over time. Such longitudinal analyses are not possible with the March CPS data. For an example of this type of analysis see Auten and Gee (2009).

sales, non-cash government transfers, and employer provided in-kind compensation.

The distinctions between tax units and households as sharing units or between the resources counted within them as income are somewhat abstract and may appear to be trivial. As a result, literatures that differ in their income measurement or sharing units are often viewed interchangeably. Indeed, it is often the case that an individual's tax unit and household unit are exactly the same. A tax unit typically consists of an adult, his or her spouse, and any dependent children. Such a tax unit would include all members of "traditional family arrangement" households. However, there are increasingly exceptions to such traditional households. For example, cohabiters, roommates who share expenses, children who move back in with their parents or older parents who live with their adult children will contain more than one tax unit.

If measures of the level and trend in the shared resources of middle class individuals were insensitive to the choice of sharing unit, then these differences would be immaterial. However, we will show that the choice of sharing unit and which of its resources are counted will make a substantive difference in measures of the resources available to middle class Americans, as will controlling for the number of people in the sharing unit. Furthermore, the inclusion of taxes and transfers, in addition to the value of employer provided health insurance benefits, Medicare and Medicaid further impacts the observed trend in resources available to the middle class.

Several earlier papers have recognized the importance of income definitions in evaluating economic resources. For example, Karoly (1994) shows how family income inequality is impacted by her choices of taxes and income transfers included. Similarly, Meyer and Sullivan (2009b) show how pre-tax and post-tax income definitions impact measures of poverty in their argument that consumption based measures would more precisely capture poverty trends. Additionally, both the European Union and the OECD use a post-tax post-transfer based poverty

measure rather than a pre-tax post-transfer measure because the former more closely mirrors personal consumption (d'Ercole and Förster Forthcoming).

Others have recognized the importance of including the value of in-kind compensation in measures of market income, since cash compensation alone does not provide a complete measure of payment for work. For example, Pierce (2001, 2007) used the Employment Cost Index (ECI) data to consider how levels and trends in labor compensation change when employer contributions to fringe benefits (including health insurance) are included. Chung (2003) extends this insight by merging data from the ECI into the CPS. Additionally, previous research by Burkhauser et al. (Forthcoming, a) demonstrates how choices of income definitions impact measures of income inequality at the top of the income distribution, and Meyer and Sullivan (2009a) consider similar questions for income inequality measured using 90/10 ratios.

Here, we expand on this previous research by using March CPS data to report the median resources of Americans as well as the growth in those resources by quintile over the last three business cycles (1979-1989, 1989-2000, and 2000-2007) using different assumptions regarding the sharing unit, tax treatment of income, and the various sources of income included in our resource measure. When we analyze median income in the CPS data using tax units, we find that the pre-tax pre-transfer income (the market income) of the median tax unit decreased over the 2000-2007 business cycle. This is the case whether we focus solely on those tax units who file a return or all tax units regardless of whether they file a return. Potentially more disturbing, the median pre-tax pre-transfer income of all tax units (filers and non-filers) only increased by 3.2 percent in real terms over the entire period between 1979 and 2007. These results are consistent with the view that the typical American has not gained much from economic growth over the last 30 years.

But when we broaden the sharing unit to the household, account for economies of scale in household consumption, and recognize that the payment of taxes or the receipt of tax credits as well as government transfer income and in-kind benefits all impact the economic resources available to individuals, we find the story changes. Specifically, when using our broadest measure of available resources—post-tax, post-transfer size-adjusted household income including the ex-ante value of in-kind health insurance benefits—median income growth of individual Americans improves to 36.7 percent over the period from 1979 and 2007, and by 4.8 percent between 2000 and 2007. Similarly, these choices impact the observed distribution of income and the extent to which incomes at the top of the distribution are growing faster than those of the middle and lower classes.

Once illustrating the extent to which these differences impact income trends, we continue by providing an example of why such a broader measure of available economic resources is of value in considering the distributional impacts of public policy. We do so by showing how the distribution of benefits from the tax exclusion of employer provided health insurance differs when they are measured across the not-size-adjusted income of tax units and the size-adjusted household income of individuals—two common approaches to capturing such policy effects. Using our broader measure of household-based income we show that the value to the middle class of the tax exclusion of employer provided health insurance benefits is greater than that observed when focusing on tax units-based income. We conclude that researchers would be well-served by using this broader measure of income and sharing unit when considering the distributional impacts of public policy proposals.

II. DATA

To explore the trend in the available resources of middle class Americans over the past

30 years, we use the public use March CPS data set supplemented with cell-means to overcome topcoding of high incomes in the March CPS (Larrimore et al. 2008 provides details on the cell-mean series). One limitation of the CPS data that remains even with cell-means to overcome topcoding is a change in survey methods between 1992 and 1993 that limits comparability across these years (See Ryscavage 1995 and Jones and Weinberg 2000 for details on this redesign). Thus, in all series the changes in income between 1992 and 1993 are suppressed and assumed to be zero given the trend-break resulting from redesign. The approach used in this analysis to overcome this break in the CPS data is similar to that used by Burkhauser et al. (Forthcoming, a) and Atkinson, Piketty and Saez (2011). Since incomes are being compared across years, all income is adjusted for inflation to 2008 dollars using the CPI-U-RS (Stewart and Reed 1999).²

While the March CPS is commonly used for measuring levels and trends in income and its distribution in the United States, it does not directly inquire about tax credits, tax liabilities, or about the value of in-kind compensation such as employer or government provided health insurance. To overcome these limitations, we impute this information for each individual to supplement the income data in the March CPS.

To impute tax credits and liabilities, marital status, state of residence, age, number of dependents, detailed income information, and other factors for each tax unit is entered into NBER TaxSim 9.0 (Feenberg and Coutts 1993), which uses these data to estimate federal and state income tax liabilities including Social Security and Medicare payroll taxes. Since the March CPS samples households, they are divided into tax units prior to imputing tax liabilities. This division is performed using the procedure described in Burkhauser et al. (Forthcoming, a) which mirrors the Piketty and Saez (2003) definition of potential tax units. All single individuals age 20

² A more detailed discussion of this issue as it relates to this paper is contained in a data appendix available upon request from the authors.

and over, married couples, and divorced or widowed individuals are considered independent tax units.³ Never-married children under the age of 20 are considered dependents and are assigned to the tax unit of their parent or guardian.⁴

Along with tax credits and liabilities, we also consider the ex-ante value of in-kind health insurance benefits. While the March 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. Using the type of coverage and information about the individual's employer, we impute the ex-ante value of employer contributions to health insurance and the value of public health insurance from outside sources. The value of employer contributions for health insurance comes from the cell means of employer contributions from the Medical Expenditure Panel Survey Insurance Component (MEPSIC). This includes the employer contribution for single and family plans separately, by state, year and firm size.⁵ Medicaid or Medicare insurance is valued at the average cost reported per person from administrative data. Note that employer insurance, Medicare and Medicaid is consistently valued at its ex-ante insurance value and not its ex-post fungible insurance value. (See Burkhauser and Simon 2010 for a more complete description of the procedures for determining the ex-ante value of health insurance).

III. METHODS

Using the March CPS data supplemented with the health insurance and tax data described

³ Given that many students are dependents even if they file their own tax return, we replicated our analysis assuming that students aged 20-24 were part of their parents' tax unit rather than independent tax units. These results, which are largely unchanged, are contained, along with a more detailed discussion of our methods for calculating them, in a data appendix available upon request from the authors.

⁴ In the small number of cases where never-married individuals under age 20 live in a household without a parent or guardian, we assigned 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.

⁵ Available at http://www.meps.ahrq.gov/mepsweb/survey_comp/Insurance.jsp

above, we calculate income distributional statistics for sixteen series, which are based on four different income definitions, two sharing unit definitions, and two methods of size-adjusting income for different size tax units and households. The income definitions, sharing unit definitions, and size-adjustment methods are as follows:

Pre-tax, pre-transfer (market) income. This income series considers total market income of the sharing unit excluding realized and unrealized capital gains. Specifically, it includes income from wages and salaries, self-employment, farm income, interest, dividends, rents, trusts, and retirement pension income but excludes public transfers which are not included in market income. These CPS-based income sources closely match the taxable income sources Piketty and Saez (2003) include in their analysis of IRS tax return data.

Pre-tax, post-transfer income. This is the income measure the Census Bureau uses in its household income series. It adds cash transfers to the income measure used in the previous series. This includes income from welfare transfer programs such as AFDC/TANF as well as from social insurance programs such as Social Security and Workers' Compensation. It excludes, however, transfers directly tied to the tax system such as the Earned Income Tax Credit. It also excludes any in-kind government transfers, such as the value of Medicare or Medicaid insurance.

Post-tax, post-transfer income. This income measure further broadens the income definition by incorporating tax credits and liabilities. The tax credits and liabilities are imputed using NBER TaxSim 9.0 and the procedure described in the previous section.

Post-tax, post-transfer income plus health insurance. This income measure partially accounts for the fact that not all resources come in the form of cash compensation. While the cost of employer or government provision of in-kind benefits may be less than their value to the recipients, they have positive value and should be considered in a fuller measure of available

economic resources. The most important employer provided non-cash compensation is the ex-ante value of employer contributions to employee health insurance premiums. Since we consider post-transfer income, in addition to including the ex-ante value of employer provided health insurance we also include the ex-ante value of government provided health insurance via Medicaid and Medicare. If these health insurance policies were not provided and individuals opted to purchase coverage on the open market, the cost would be higher now than it was 30 years ago. Thus, it is appropriate to view the value of these benefits as increasing over time (Cutler, 2004) even if some individuals would prefer to receive additional cash compensation or transfers rather than receiving increasingly expensive health insurance benefits. It is for this reason that we include the ex-ante value of these non-cash benefits in this final income series.

Tax unit sharing unit. For each series with the tax unit as the sharing unit, individuals living in a tax unit are assumed to only share their economic resources with other members of that tax unit and with no one else living in their household. The procedures discussed previously, which mirror those used by Piketty and Saez to determine the number of potential tax units, are used here to impute tax units.

Not all Americans file a tax return.⁶ This is an important issue that Piketty and Saez (2003) address in the literature using IRS data to examine the distribution of the market income of tax units. While Auten and Gee's (2009) finding that 91 percent of adults age 25-64 file a tax return illustrates that this problem may be less significant than some believe, focusing only on filers is likely to impact median income levels and trends. Thus, to more closely approximate the entire US population, we consider both filing and non-filing tax units. Because the CPS is a

⁶ This is a common problem for researchers using IRS administrative tax records which Auten and Gee (2009) overcome to a large degree by directly accessing IRS tax records and supplementing them with Social Security administrative records data. But, even they must make some assumptions about the population not captured in either data set.

random sample of the entire population, it naturally includes both filers and non-filers.

Nevertheless, given the uncertain importance of non-filers in tax return based research, we will briefly discuss a series that excludes non-filers. The filers-only series uses the Census Bureau imputation of filing status to restrict the sample to tax units where at least one member is expected to file a tax return. However, since the Census Bureau did not impute filing status until after 1993, this series is only discussed for the most recent business cycle which is the only one for which filing status imputations are available for the entire period.

Household sharing unit. For each series with the household as the sharing unit, all individuals living in the same household are assumed to share economic resources. Thus, rather than aggregating income to the tax unit it acknowledges sharing of resources within a household and aggregates income up to the household level. That is, the private income of all tax units within a household are combined.⁷ Similar to the tax unit income series for filers and non-filers, it includes all households regardless of the filing status of the individuals in the household.

Non-size-adjusted income of sharing units. Income series that are not specified as size-adjusted measure income at the sharing-unit level and treat sharing-units of all sizes equally. For example, a single-individual in a household making \$50,000 per year is considered as having the same resources as individuals in a four-person household where household income is the same \$50,000 per year. These non-size-adjusted income series match the approaches used by Piketty and Saez (2003) for tax units and the Census Bureau's household income series for households (DeNavas-Walt, Proctor, and Smith 2008).

Size-adjusted income of persons. This measure moves from the sharing unit to the

⁷ For an example of shifting from the tax unit to the household as the sharing unit to measure the impact of tax changes on economic well-being, see Elmendorf, Furman, Gale, and Harris (2009). This procedure is embedded in the Urban Institute/Brookings Institution Tax Simulation Model.

individual as the unit of analysis. In doing so, it acknowledges that the resources available to any person in a sharing unit, given some level of income, vary with the number of persons sharing that income. That is, a household with a single individual making \$50,000 per year will have access to more resources and can maintain a higher standard of living than a person in a household with the same \$50,000 of income but more people.

Following the customary procedure in the income inequality literature, sharing unit income is deflated using an equivalence scale to account for economies of scale by person by dividing sharing unit income by the square-root of the sharing unit's size (see e.g. Atkinson and Brandolini 2001; Gottschalk and Danziger 2005; Smeeding, Rainwater, and Burtless 2006; and Burkhauser et al. Forthcoming, b).⁸ This size-adjusted income series is commonly used by CPS based inequality researchers in the international literature. Auten and Gee (2009) also recognize the importance of using the individual as the unit of analysis in their work using IRS tax record data but use the tax unit rather than the household as the sharing unit.

Using each combination of income definition, sharing unit definition, and size-adjustment method described above, we first track the growth in the economic well-being of middle class Americans over the past 30 years by measuring changes in the median income of the entire population. We then narrow our focus to six series which encompass some of the most widely used of these definitions to look in more detail at income trends over each peak-to-peak business

⁸ Dividing by the square-root of the household size is the most commonly used case of the economies of scale size-adjustments proposed by Buhmann, et al. (1988) where size-adjusted income = total income / size ^{α} , with $\alpha=1$ implying no economies of scale (per capita income) and $\alpha=0$ implying infinite economies of scale (the implicit assumption of those who do not adjust for size). Dividing by the square root of household size ($\alpha=0.5$) closely matches the adjustments for household size implied by official Census Bureau poverty thresholds (Ruggles 1990).

cycle since 1979.⁹ By comparing peak-year to peak-year of each business cycle, we are able to focus on long-term trends in income devoid of cyclical economic conditions.

There are, of course, numerous factors such as increases in education, the aging of the population, and the influx of immigrants which will impact income trends in the cross-sectional data we observe. While it is important to know which of these factors account for these income trends, our focus is on the sensitivity of measured income trends to alternative choices of sharing unit and income definition rather than the underlying causes of these trends.¹⁰

IV. RESULTS

Median Income. The first measure we consider of the trend in the economic resources of the middle class is the median income of all Americans. Table 1 provides a matrix of the 29 year (1979-2007) median income growth using each possible combination of income definition, sharing unit definition, and size-adjustment method described above.

In the upper-left corner of the matrix is the pre-tax, pre-transfer (market) income of tax units, which most closely matches the definitions used by Piketty and Saez (2003). When using this definition, we observe a total increase in median income of just 3.2 percent in real terms over the 29 year period. Going down the first column, the income definition broadens but the sharing unit remains the tax unit and there are no adjustments for the number of people in the tax unit. Here, the observed median income growth improves to 6.0 percent for pre-tax, post-transfer income, 9.5 percent for post-tax post-transfer income, and 18.2 percent for post-tax post-transfer

⁹ Peak years of business cycles are defined here based on peaks in median income, which generally lag macroeconomic growth. However, results are not sensitive to reasonable adjustments to the choice of peak years used in the analysis.

¹⁰ Burkhauser and Larrimore (2011) analyze the factors accounting for declines in median pre-tax, post-transfer size-adjusted household income over the first years of the last four recessions. To our knowledge no researchers have considered how the observed impact of such factors differs across income definitions, sharing units, or size-adjustments, which may be a valuable area for future research.

income including the ex-ante value of health insurance (all in inflation-adjusted terms). Thus, just broadening the income definition to recognize the growth of transfer income, decline in taxes and increase in tax credits, and the fact that an increasing portion of middle class compensation comes in the form of non-cash benefits increases median tax unit income growth by over 5.5 times from 3.2 percent to 18.2 percent.

Moving from Column 1 (non-size-adjusted tax unit income) to Column 2 (non-size-adjusted household income), we see that using the tax unit as the sharing unit also limited measured income growth. For each income series, household median income growth is between 9 and 11 percentage points greater than for tax units. For instance, simply shifting from a tax unit to a household sharing unit almost quadruples market income growth from 3.2 to 12.5 percent. Results using the market income of tax units are largely the basis for the view that those at the top of the income distribution have become wealthier while the income of middle class Americans has stagnated since 1979. However, the perspective portrayed in Column 1 of Table 1 is much gloomier than the one in Column 2 where the sharing unit is shifted to the household.

Panels A and B of Table 2 provide an explanation for these differences. Over the past three business cycles, the proportion of households with only one tax unit households declined from 80.3 to 76.2 while the proportion with three or more tax units increased from 3.9 to 5.6 percent. Two major factors precipitated this shift in the number of tax units living in the same household: (a) an increase in the number of cohabiters and other unrelated individuals living in separate tax units but sharing the same dwelling, and (b) an increase in related individuals living in separate tax units but in the same dwelling, such as adult children living with their parents. The 4.1 percentage point drop in one tax unit households (Panel A of Table 2) is analogous to the 4.2 percentage point drop in households containing only one unrelated tax unit (Panel B of Table

2). However, the growth in three or more tax unit households originated largely from increases in related tax units—as evidenced by the much smaller increase in three or more unrelated tax unit households. Because the number of multiple tax unit households increased for both these reasons, measures of median income based on the tax unit will report smaller income growth than measures of median income at the household level that recognize that shared resources occur beyond the tax unit.

A criticism of each series discussed so far is that they make no adjustment for the fact that the number of persons per household (and tax unit) has declined over the past three business cycles (Panels C and D of Table 2). This results in household resources being shared over fewer people so holding sharing unit income constant increases the available resources per person.

The third and fourth columns of Table 1 account for the change in sharing unit size over the period of our analysis by making the individual the unit of analysis and scaling available income based on the size of the tax unit and household respectively. When doing so, median tax unit income growth increases between 11 and 15 percentage points (comparing Column 1 to Column 3) and median household income growth increases between 8 and 10 percentage points (comparing Column 2 to Column 4). With the most inclusive income definition, recognizing the sharing of resources between all individuals in a household, and recognizing the economies of scale in household consumption, median income growth was 36.7 percent (Row 4 of Column 4) over the past 3 business cycles. This figure is over 10 times the 3.2 percent growth (Row 1 of Column 1) observed in the initial series considering only the market income of tax units without adjusting for tax unit size. In summary, broadening the income definition; capturing households rather than tax units; and adjusting for the household and tax unit size each broadly increase measured median income growth over the past three business cycles.

We now turn to the trend over each separate business cycle and focus on just six income series which encompass some of the most commonly used income and sharing unit definitions, as well as two of our broader measures. The importance of each intermediate change should not be viewed as absolute since the stacking-order matters for the importance of each. For example, as demonstrated in Table 1, size-adjusting has a larger impact if performed on tax unit income rather than the household income. Rather, these measures are chosen for additional emphasis given their widespread use in the IRS- and CPS-based income distribution literatures and thus provide valuable information for comparing results based on these popular methods.

The first series, which is not shown in Table 3 since it only became available in 1993, is the pre-tax, pre-transfer (market) income of tax units that file a return. In this series we observe that median income fell by 2.7 percent in the 2000-2007 business cycle. Column 1 of Table 3 adds non-filers to the sample and reports their pre-tax, pre-transfer (market) income. This series most closely matches Piketty and Saez (2003) tax unit sample. As can be seen from Panel A of Table 3 which presents this information as the total median income change over each business cycle, the median pre-tax pre-transfer tax unit income of the entire population of tax units declined even more (5.5 percent) in the 2000-2007 business cycle.

Column 2 of Table 3 adds cash transfer income to the income definition and allows income to be shared across all members of a household rather than only within a tax unit. This series approximates the one the Census Bureau reports in their annual P-60 reports (DeNavas-Walt, Proctor, and Smith 2008).¹¹ When doing so, the real median income decline in the most recent business cycle shrinks from 5.5 percent (Column 1) to 1.2 percent and the total growth

¹¹ Our results do not exactly match the Census P-60 reports because the Census Bureau implements certain smoothing techniques (not included in the publicly provided data) to the CPS data prior to producing their report. Additionally, the Census P-60 report does not account for the 1992-93 CPS trend break, since the report is designed as an annual snapshot rather than as a source of long-term trends.

over the past three business cycles quadruples from 3.2 percent (Column 1) to 15.2 percent.

Column 3 of Table 3 presents the most common income definition in the CPS-based inequality literature. This series, household size-adjusted pre-tax post-transfer income of the median person, rose by 23.6 percent over the three business cycles—well above the 3.2 percent increase for the median market income of tax units—and fell by only 0.1 percent in the 2000-2007 business cycle.

Columns 4 and 5 of Table 3 provide our series with broader income definitions than have traditionally been used in the literature. In Column 4, it is evident that including taxes and measuring post-tax post-transfer size-adjusted household cash income results in even faster median income growth. The gains in median net of tax income are most significant over the 1980s business cycle but occurred over all three periods. Median income now rises by 29.3 percent over the entire period and by 1 percent between 2000 and 2007. Declines in tax rates over the past 30 years together combined with the rise of numerous credits have substantially positively impacted the median person's net of tax income.

Finally, Column 5 of Table 3 adds the ex-ante value of employer and government provided health insurance to the post-tax post-transfer size adjusted household income of people. Because this data is only available for the last two business cycles, we conservatively assume the ex-ante value of employer and government provided health insurance increased at the same rate as all other post-tax, post-transfer household income over the 1979-1989 business cycle. However, in both the 1989-2000 and 2000-2007 business cycles, accounting for health insurance payments further increased median income growth. While the 2.2 percent increase in median income growth from the increased value of health insurance was dwarfed by the overall 16.6 percent growth in income in the 1990s, accounting for the increased fraction of middle class

compensation received in the form of health insurance in the 2000s results in median income growth increasing from 1 to 4.8 percent from 2000 to 2007. Hence at least part of the recent decline in the economic resources of the median American observed previously is the result of a shift in the way compensation and government transfers have been provided over the last two decades as more compensation and transfers have come in the form of in-kind benefits.

Panel B of Table 3 reports the annualized median income growth in each business cycle to account for the different lengths of each business cycle. However, the patterns discussed above with respect to Panel A of Table 3 are the same. For instance, an anemic growth rate of 0.12 percent (Row 4, Column 1) in the market income of tax units over the entire period increases by 10 times to 1.31 percent (Row 4, Column 5) for the post-tax post-transfer household size-adjusted income including the ex-ante value of health insurance of persons. Likewise, an annual drop of 0.75 percent over the 2000-2007 business cycle in the market income of tax units (Column 1) is transformed into an annual increase of 0.68 percent in Column 5.

Quintile incomes. While median income is a straightforward measure of how the average American is faring, it is also valuable to use a measure of the middle class that allows one to compare growth in the middle of the distribution to growth in the two tails.¹² We do so below by comparing income trends for each quintile of the population.

Table 4 shows the growth in mean income within each quintile of the distribution for each of our primary income series, holding the boundaries of the middle quintiles constant in real terms over each of the last three business cycles. We also provide the mean income of the top 10 and the top 5 percent of the distribution as well as the Gini coefficient for the entire distribution.

¹² An alternate approach for evaluating the extent to which economic gains are captured by the middle class is to compare median income growth in the CPS to GDP growth, productivity growth for non-farm businesses, or mean per-capita income growth from the National Income and Products Accounts. For a flavor of this approach, and a discussion of some of its challenges, see Gordon (2009).

During the 1980s business cycle (Panel A), the relative income growth across the five quintiles of the distribution follows almost the same pattern in each income series. In each series income growth is more rapid for the third and fourth quintiles than for the first two quintiles; and the top quintile of the distribution showed the fastest growth. Income growth in the top 5 percent of the distribution is the greatest of all. This result is consistent with earlier findings that income inequality rose rapidly during the 1980s and that inequality growth occurred throughout the distribution (Piketty and Saez 2003, Burkhauser et al. Forthcoming, b).

Ostensibly the first income series, which only considers market income, is an outlier across the five measures. That is, using this first series, it appears that over the 1980s the poorest two quintiles actually become poorer—i.e. they experienced negative growth. However, when in-cash government transfers and taxes are included and adjustments are made for household size (Column 4), these negative values become positive, albeit at very low levels. Unlike that seen for the first column considering only market income, the broader measures of income used in the other columns suggest that while income growth was highest in the top quintile, it was substantial in the third and fourth quintiles and at least positive in the bottom two quintiles.

To show how the different growth pattern in Panel A translates into overall changes in inequality, in the bottom two rows we report the Gini coefficients for 1979 and 1989. Not surprisingly, the absolute values of the Gini coefficients for Column 1 are the highest since this measure only includes market income and uses the tax unit as its sharing unit. Expanding the sharing unit to the household and including government transfers (Column 2) reduces inequality, as does accounting for household size (Column 3), taking account of taxation (Column 4) and including the ex-ante value of employer and government provided health insurance (Column 5).

These patterns changed dramatically during the 1990s business cycle. Growth occurred in

mean income in all quintiles across all five measures. It was higher in the bottom quintile than the other quintiles across all measures and even greater than in the top 5 percent in all but one measure. But like the 1980s business cycle, the middle quintiles made the most significant gains in terms of mean income growth when shifting to measures that better capture sharing units, household size, government taxes and transfers, and health insurance. Comparing Column 1 with Column 5 shows that economic growth is higher in all five quintiles, but the two lowest quintiles actually experienced the greatest growth over this period with the top three quintiles growing at about the same rate. Additionally, while income inequality (measured by the Gini coefficient) continued to grow in the private sector as shown in Column 1, during the 1990s business cycle income inequality actually fell overall in Columns 4 and 5 when government tax and transfer programs are considered and the value of health insurance is included.

A similar picture emerges for the most recent business cycle. When only considering private income at the tax unit level, the top quintile of the distribution saw the smallest decline in their incomes (-1.6 percent for the top quintile, compared to -4.9 percent for the middle quintile and -43 percent for the bottom quintile). However, adjusting for household size and including transfers, taxes, and health insurance compensation changes, results in income growth instead of declines in all quintiles. This growth is balanced across the distribution with the middle three quintiles (e.g. 4.9 percent for the middle quintile) displaying more rapid growth than either the top (3.1 percent) or bottom (2.2 percent) quintiles. This more complete income measure also shows a slight decline in inequality of 0.002 Gini points rather than the 0.010 increase observed using tax unit market income. Hence, even during the weak growth years of the 2000-2007 business cycle, when this fuller measure of economic resources is used the middle class did not fall behind. They experienced similar increases in real income as the top quintile, but mostly in

the form of the increased value of their employer health insurance.

Finally, Panel D illustrates the change in income for each quintile over the entire 29 year period. Due to the previously observed rapid growth in top incomes in the 1980s, under all five income series the top quintile had greater income growth than the other four quintiles and the top 5 percent had the greatest income growth. Hence income inequality rose as measured by the Gini coefficient across all income series. But importantly, in contrast to tax unit market income measures of income where the bottom two quintiles get poorer and only the top quintile gets noticeably richer, each of the other series shows income growth throughout the distribution. Once taxes and health insurance are taken into account, each of the quintiles of the distribution are shown to have sizable growth over the 29 year period—with the slowest growth being a 26.4 percent increase in mean incomes for the bottom quintile of the distribution. Growth in the middle quintile is 36.9 percent, dramatically greater than their 2.2 percent growth in private market income when measured at the tax unit level.

Hence these more inclusive measures of access to economic resources suggest that income inequality increased in the United States not because the rich got richer, the poor got poorer and the middle class stagnated, but because the rich got richer at a faster rate than the middle and poorer quintiles and this mostly occurred in the 1980s. Growth was substantial in all quintiles once the influence of government tax and transfer policy as well as the shift in compensation from wages to health insurance provided by employers and the shift to increased in-kind health insurance by government is more fully recognized.

V. IMPACT ON PUBLIC POLICY DEBATES

Thus far, we have focused on how sensitive income measures are to changes in sharing unit and income definitions. However, these choices are also important when considering the

impact of policy changes. The importance of income definitions for understanding policy debates should be self-evident. Taxes and transfers have a real impact on the well-being of individuals paying the taxes and receiving the transfers, which is why proposed changes to them are often controversial. Since these incomes and expenses impact Americans' available resources, we should include their effects in the statistics used to evaluate the success of public policies. By considering post-tax, post-transfer income including the value of health insurance, we can better capture the effect of program changes on people's economic resources.¹³

Less obvious, but similarly important, is how the sharing unit influences the observed distribution of benefits of a given policy change. Although the distinction is often overlooked, this choice and the choice of whether to adjust for the size of the sharing unit can have profound effects on where individuals fall in the income distribution and consequently on the distribution of benefits of policy changes. While an individual's location in the income distribution is positively correlated across sharing unit measures, this correlation is not perfect. Some low-income individuals in one distribution will be reported as having high-income in the other depending on which sharing unit measure is employed.

Table 5 illustrates the extent to which the distributions of "not size-adjusted tax unit income" and "size-adjusted household income" differ—even when the income definition (post-tax, post-cash transfer including the ex-ante value of health insurance) is the same. If individuals in each of the quintiles in the tax unit distribution fell in the same quintiles of the household unit distribution, they would all lie on the diagonal of Table 5. This is not the case. Just 57 percent of individuals in the bottom quintile of the tax unit income distribution are also in the bottom

¹³ A fuller measure of resources would also include irregularly received income such as capital gains from investments or home sales as well as other non-cash government transfer income and employer provided non-wage compensation not available in the CPS data analyzed here. For this reason, it may be beneficial for the Census to more rigorously attempt to capture these income sources.

quintile of the household income distribution (11.5 percent of the 20 percent of individuals in this quintile). The other 43 percent live in households with income above the bottom quintile. Overall, only 46 percent of all individuals are in the same quintiles of both distributions.

The different alignments of the distribution based on the sharing unit subsequently influence the perceived economic progressivity of public policies. To illustrate this general statement, we provide the example of who currently gains from the tax exemption for employer provided health insurance. A similar analysis could be performed for any policy including restructuring Social Security benefits, changing tax rates, or scaling back tax deductions and credits.

Table 6 provides the relative mean benefit from the tax exemption of employer provided health insurance by quintile across both the not-size-adjusted tax unit income distribution and the size-adjusted household income distribution respectively. In both cases, we normalize the mean benefit of the entire population to 100 to focus on the relative benefits across the distribution. When we focus on the tax unit, it appears that the value of the health insurance tax exemption is largely concentrated among the top of the distribution while the bottom of the distribution received little benefit—the average individuals in the top quintile received 94.2 percent above the mean benefit in the population while the average individual in the bottom quintile received just 1.2 percent of the mean benefit in the population. Thus, the average individual in the top quintile receives 166 times the benefit of the average individual in the bottom quintile.

Although the relative size of the mean benefit is still highest near the top of the distribution when we consider size-adjusted household income, the spread is less extreme. Using this income series, the top quintile of the distribution receives 40.9 percent above the mean benefit and those in the bottom quintile receive 18.1 percent. Thus, using this series, the mean

benefit going to the top quintile is less than 8 times that going to the bottom quintile. More generally, the values of the mean benefit in the 2nd and the 3rd quintile also rise substantially and the size of the benefit in the 4th quintile is now greater than the benefit in the highest quintile.

Table 7 provides insight into why the spread of benefits differ across these series. In this table, individuals are divided into cells based on their location in the joint distribution of not-size-adjusted tax unit income and size-adjusted household income. Each cell contains the mean benefit from the health insurance tax exemption relative to both the population mean when using not-size-adjusted tax unit income and size-adjusted household income.

Among individuals along the diagonal where the quintile of both income distributions is the same, the ratio of mean quintile benefit to mean population benefit is similar for both series. This is not the case for individuals in quintiles off the diagonal (i.e. those who switch quintiles depending on which unit of measurement is employed). Individuals below the diagonal are in a higher quintile for household income than they are for tax unit income. This can occur, for instance, when low-income grown children live with their higher income parents. For these individuals, the relative mean benefits from tax-deductible employer provided health insurance observed for household units exceeds that observed for tax units. This is particularly evident among individuals in the bottom quintile of tax units, where almost no benefits are observed at the tax unit level but substantial benefits may be observed at the household level. Thus, by missing the benefits for these individuals, using tax units augments the perceived disparity in the tax advantage of exempting employer provided health insurance across the distribution. In contrast, above the diagonal there is less of a distinction between the two series as even individuals in the bottom quintiles of the household income distribution are still receiving benefits from the income exclusion. Therefore, an exclusive focus on the tax unit obscures the

fact that within low income quintiles there is a range of benefits and some households at the bottom of the distribution do, in fact, receive substantial benefits from this policy.

VI. CONCLUSIONS

Much of the previous research on income and its distribution is based on the types of income captured in the data and the sharing unit over which it was summed, without fully considering the implications of those choices. In this paper, we demonstrated that such choices can substantially change the view of how the average American has fared over the past three business cycles (1979-2007) and who benefits from public policy choices going forward. When using the most restrictive income definition – pre-tax, pre-transfer tax unit cash (market) income—the resources available to the middle class have stagnated over the past three business cycles. In contrast, once broadening the income definition to post-tax, post-transfer size-adjusted household cash income, middle class Americans are found to have made substantial gains, and these increases are even larger when including non-cash income such as the ex-ante value of health insurance. Additionally, as we demonstrated using the example of the benefits of the tax exclusion of employer provided health insurance, these measurement decisions impact the extent to which we view policy benefits as skewed towards the top or bottom of the income distribution or view them as distributed more widely to individuals of all incomes.

So which income series is superior? This depends on the research inquiry. For researchers interested in how middle class Americans are compensated for their time in the labor market, for example, it is more appropriate to use pre-tax, pre-transfer (market) income, although even here researchers who ignore the dramatic increase in the ex-ante value of employer health insurance will understate the returns to work in the United States and disproportionately do so for workers in middle class households. However, for those interested in the overall economic resources

available to individuals, it is more appropriate to consider income as broadly as possible.

In most cases, it is more important to know how a given policy impacts people arrayed by available resources within their sharing unit than how that policy impacts their market income. In such cases, researchers should broaden the definition of income to include taxes and non-cash benefits. This will more accurately reflect the total financial resources available to individuals. Additionally, they should do so across households rather than tax units and adjust for the number of people in those households. As we have demonstrated, doing so provides a markedly different picture of how middle class Americans have fared over the past several decades.

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Table 1: Comparing the total growth from 1979-2007 using each sharing unit, size-adjustment, and income series combination.

	Tax Unit	Household	Size-Adjusted Tax Unit	Size-Adjusted Household
Pre-tax, pre-transfer	3.2%	12.5%	14.5%	20.6%
Pre-tax, post-transfer	6.0%	15.2%	17.0%	23.6%
Post-tax, post-transfer	9.5%	20.2%	25.0%	29.3%
Post-tax, post-transfer + Health Insurance	18.2%	27.3%	33.0%	36.7%

Source: Public Use March CPS data.

Note: Changes in income between 1992 and 1993 are suppressed and assumed to be zero given the trend-break resulting from the CPS redesign in those years. See main text for details.

¹ Health insurance information not available prior to 1988. The rate of growth in the value of health insurance from 1979-1989 is assumed to match that of post-tax, post-transfer income.

Table 2: Trends in the size of tax units and households.

Panel A: Tax Units per Household						
	Tax Units (Thousands)	Households (Thousands)	Mean Tax Units per Household	Percent of Households with one, two, or more Tax Units		
				One	Two	≥Three
1979	98,958	79,399	1.25	80.3	15.8	3.9
1989	119,705	93,626	1.28	78.4	16.8	4.8
2000	137,810	106,512	1.29	77.1	18.0	4.9
2007	153,322	116,881	1.31	76.2	18.2	5.6

Panel B: Unrelated Tax Units per Household						
	Unrelated Tax Units (Thousands)	Households (Thousands)	Mean Unrelated Tax Units per Household	Percent of Households with one, two, or more Unrelated Tax Units		
				One	Two	≥Three
1979	83,690	79,399	1.05	95.3	4.2	0.5
1989	100,606	93,626	1.07	93.4	6.0	0.6
2000	117,146	106,512	1.10	91.2	7.9	0.9
2007	128,751	116,881	1.10	91.1	8.0	0.9

Panel C: Individuals per Tax Unit						
	Individuals (Thousands)	Tax Units (Thousands)	Mean Individuals per Tax Unit	Percent of Tax Units with one, two, or more Individuals		
				One	Two	≥Three
1979	217,965	98,958	2.20	36.3	28.6	35.2
1989	243,886	119,705	2.04	41.7	27.7	30.6
2000	271,359	137,810	1.97	45.0	26.9	28.1
2007	292,895	153,322	1.91	47.2	26.7	26.0

Panel D: Individuals per Household						
	Individuals (Thousands)	Households (Thousands)	Mean Individuals per Household	Percent of Households with one, two, or more Individuals		
				One	Two	≥Three
1979	217,965	79,399	2.75	22.7	31.2	46.1
1989	243,886	93,626	2.60	24.8	32.2	43.0
2000	271,359	106,512	2.55	26.2	33.2	40.6
2007	292,895	116,881	2.51	27.6	33.2	39.3

Source: See Table 1.

Table 3: Growth in median incomes using alternative income series

Panel A: Total median income growth in each business cycle					
	Tax unit Pre-tax Pre- transfer	Household Pre-tax Post- transfer	Household Size-adj. Pre-tax Post-transfer	Household Size-adj. Post-tax Post-transfer	Household Size-adj. Post-tax Post-trans. + Health Ins.
1979-1989	0.2%	6.6%	9.2%	12.0%	12.0% ¹
1989-2000	9.1%	9.3%	13.4%	14.4%	16.6%
2000-2007	-5.5%	-1.2%	-0.1%	1.0%	4.8%
1979-2007	3.2%	15.2%	23.6%	29.3%	36.7% ¹

Panel B: Annualized median income growth in each business cycle					
	Tax unit Pre-tax Pre- transfer	Household Pre-tax Post- transfer	Household Size-adj. Pre-tax Post-transfer	Household Size-adj. Post-tax Post-transfer	Household Size-adj. Post-tax Post-trans. + Health Ins.
1979-1989	0.02%	0.66%	0.92%	1.20%	1.20% ¹
1989-2000	0.82%	0.85%	1.22%	1.31%	1.51%
2000-2007	-0.79%	-0.17%	-0.02%	0.14%	0.68%
1979-2007	0.12%	0.54%	0.84%	1.05%	1.31% ¹

Source: See Table 1.

Table 4: Quintile income growth by business cycle using each income series

Panel A: 1979-1989 business cycle income growth, by income quintile					
	Tax unit Pre-tax Pre-transfer	Household Pre-tax Post-transfer	Household Size-adj. Pre-tax Post-transfer	Household Size-adj. Post-tax Post-transfer	Household Size-adj. Post-tax Post-trans + Health Ins. ¹
Bottom quintile	-0.2%	5.0%	0.0%	0.4%	0.4%
2nd quintile	-5.0%	0.2%	-0.7%	1.0%	1.0%
Middle quintile	0.0%	6.3%	9.1%	11.7%	11.7%
4th quintile	4.0%	9.6%	12.9%	15.6%	15.6%
Top quintile	17.6%	19.7%	23.4%	28.1%	28.1%
Top 10%	21.8%	23.0%	19.7%	27.4%	33.7%
Top 5%	25.6%	26.3%	27.2%	32.0%	39.5%
1979 Gini	0.515	0.424	0.384	0.349	0.330
1989 Gini	0.547	0.451	0.423	0.394	0.372
Panel B: 1989-2000 business cycle income growth, by income quintile					
	Tax unit Pre-tax Pre-transfer	Household Pre-tax Post-transfer	Household Size-adj. Pre-tax Post-transfer	Household Size-adj. Post-tax Post-transfer	Household Size-adj. Post-tax Post-trans + Health Ins.
Bottom quintile	17.8%	10.6%	17.2%	20.4%	23.2%
2nd quintile	10.8%	8.3%	12.6%	15.2%	18.2%
Middle quintile	7.5%	10.7%	13.1%	14.5%	16.8%
4th quintile	10.7%	12.3%	13.3%	13.8%	15.5%
Top quintile	14.7%	14.0%	16.2%	14.8%	15.5%
Top 10%	15.0%	14.3%	14.0%	17.0%	15.2%
Top 5%	14.4%	13.8%	13.9%	16.6%	15.1%
1989 Gini	0.547	0.451	0.423	0.394	0.372
2000 Gini	0.556	0.459	0.427	0.390	0.364

Table 4 (continued):

Panel C: 2000-2007 business cycle income growth, by income quintile					
	Tax unit Pre-tax Pre-transfer	Household Pre-tax Post-transfer	Household Size-adj. Pre-tax Post-transfer	Household Size-adj. Post-tax Post-transfer	Household Size-adj. Post-tax Post-trans + Health Ins.
Bottom quintile	-43.0%	-5.8%	-6.2%	-4.8%	2.2%
2nd quintile	-10.2%	-3.9%	-2.9%	-1.2%	4.7%
Middle quintile	-4.9%	-2.0%	-0.4%	1.2%	4.9%
4th quintile	-2.5%	-0.1%	1.0%	2.3%	5.2%
Top quintile	-1.6%	-1.4%	-1.0%	1.5%	3.1%
Top 10%	-2.4%	-2.4%	-1.4%	-2.0%	1.3%
Top 5%	-4.0%	-4.0%	-4.0%	-3.4%	1.5%
2000 Gini	0.556	0.459	0.427	0.390	0.364
2007 Gini	0.566	0.462	0.430	0.396	0.362

Panel D: 1979-2007 income growth, by income quintile					
	Tax unit Pre-tax Pre-transfer	Household Pre-tax Post-transfer	Household Size-adj. Pre-tax Post-transfer	Household Size-adj. Post-tax Post-transfer	Household Size-adj. Post-tax Post-trans + Health Ins.
Bottom quintile	-33.0%	9.5%	9.9%	15.0%	26.4%
2nd quintile	-5.5%	4.3%	8.6%	15.0%	25.0%
Middle quintile	2.2%	15.3%	22.8%	29.5%	36.9%
4th quintile	12.3%	23.0%	29.2%	34.6%	40.4%
Top quintile	32.7%	34.6%	42.0%	49.4%	52.6%
Top 10%	36.7%	37.3%	34.6%	46.1%	56.0%
Top 5%	37.9%	38.0%	39.1%	48.7%	63.0%
1979 Gini	0.515	0.424	0.384	0.349	0.330
2007 Gini	0.566	0.462	0.430	0.396	0.362

Source and Notes: See Table 1.

¹ Health insurance information not available prior to 1988. The rate of growth in the value of health insurance from 1979-1989 is assumed to match that of post-tax, post-transfer income.

Table 5: Comparing the quintile distributions of the size-adjusted household income distribution and not size-adjusted tax unit income distribution (2007).

		Quintile of not-size-adjusted Tax Unit income					
		Bottom	2nd	Middle	4th	Top	Total
Quintile of size-adj. Household income	Bottom	11.5	7.1	1.4	0.0	0.0	20
	2nd	3.5	6.8	7.9	1.9	0.0	20
	Middle	2.2	3.3	6.5	7.4	0.6	20
	4th	1.7	1.7	3.1	7.7	5.8	20
	Top	1.2	1.1	1.2	3.1	13.5	20
	Total	20	20	20	20	20	100

Source: See Table 1.

Note: In both series the unit of analysis is the individual so each quintile contains 20 percent of individuals in the population and income is measured using post-tax, post-transfer income including the ex-ante value of health insurance benefits.

Table 6: Relative benefit of health insurance tax exclusion by quintile of the distribution in each income series in 2007 (Population mean benefit normed to 100 in each series)

		relative Health Insurance Tax exclusion benefit			relative Health Insurance Tax exclusion benefit
Quintile of not size-adj. Tax Unit income	Bottom	1.17	Quintile of size- adj. Household income	Bottom	18.08
	2nd	25.55		2nd	79.27
	Middle	101.95		Middle	116.93
	4th	177.12		4th	144.85
	Top	194.22		Top	140.88

Source: See Table 1.

Note: In both series the unit of analysis is the individual so each quintile contains 20 percent of individuals in the population and income is measured using post-tax, post-transfer income including the ex-ante value of health insurance benefits.

Table 7: Comparing relative benefits of health insurance tax exclusion by the joint quintile of the size-adjusted household income and not size-adjusted tax unit income distributions in 2007 (Population mean benefit normed to 100 in each series)

		Quintile of (not size-adjusted) Tax Unit income					
		Bottom	2nd	Middle	4th	Top	All
Quintile of size-adjusted Household income	Bottom	HH: 3.2 TU: 1	HH: 31.1 TU: 35.7	HH: 76 TU: 104.1	HH: N/A TU: N/A	HH: N/A TU: N/A	HH: 18.1 TU: 20.3
	2nd	HH: 25.5 TU: 1.3	HH: 31.7 TU: 28.4	HH: 124.5 TU: 145.6	HH: 162 TU: 226.4	HH: 119.8 TU: 225.9	HH: 79.3 TU: 88.3
	Middle	HH: 63.1 TU: 1.6	HH: 21.7 TU: 10.4	HH: 107.4 TU: 98.8	HH: 181.5 TU: 220.7	HH: 154.8 TU: 222.2	HH: 116.9 TU: 122
	4th	HH: 108.9 TU: 1.6	HH: 61.4 TU: 11.8	HH: 36.7 TU: 28.7	HH: 175.7 TU: 170.1	HH: 195.4 TU: 239.9	HH: 144.9 TU: 141.4
	Top	HH: 128.7 TU: 0.8	HH: 84.1 TU: 8.9	HH: 53.1 TU: 16.8	HH: 74.1 TU: 60.5	HH: 169 TU: 173.3	HH: 140.9 TU: 128
	All	HH: 27.1 TU: 1.2	HH: 62.2 TU: 25.6	HH: 113.2 TU: 101.9	HH: 144.6 TU: 177.1	HH: 153 TU: 194.2	

Source: See Table 1.

Note: HH is the ratio of the mean benefit to size-adjusted household income in the joint quintile to the mean benefit to size-adjusted household income for the population. TU is the ratio of the mean benefit to not-size-adjusted tax unit income in the joint quintile to the mean benefit to not-size-adjusted tax unit income for the population. In both series the unit of analysis is the individual so each quintile contains 20 percent of individuals in the population.

Data Appendix

March CPS data discontinuity in 1992-1993. After the 1993 March CPS (covering income year 1992), the Census Bureau implemented a series of changes to their data collection procedures. The most significant of these changes was a shift from paper to computerized data collection (See Ryscavage, 1995 and Jones and Weinberg, 2000 for details on the data collection changes that occurred during this year.) After the data collection redesign, the Census Bureau's collection procedures were believed to be superior to the earlier procedures, but the transition resulted in a blip in the income distribution trends. While this blip is particularly evident in the top 1 percent of the distribution (Burkhauser et al. Forthcoming, a), since the data collection changes were not unique to the upper tail of the distribution it cannot be ruled out that incomes lower in the distribution were effected as well.

To remove the impact of this blip on the results, median and quintile incomes prior to this year were scaled in all series. For example, median pre-tax, pre-transfer tax unit (market) income increased between 1992 and 1993 by 0.86 percent so the pre-tax, pre-transfer tax unit income was increased for all years prior to 1993 by 0.86 percent to eliminate this blip. Of course, this procedure cannot distinguish between the real income changes that occurred between 1992 and 1993, and those due to the data collection change—and it suppresses both types of changes. In all cases except for the bottom quintile income using the pre-tax, pre-transfer tax unit definition, the suppressed change was positive. Thus, to the extent that real changes are suppressed along with those due to the data collection change the income changes in the 1990s should be an underestimate of the true increases observed in the business cycle. This procedure matches that used by Atkinson, Piketty, and Saez (2011) to suppress this blip when considering long-term trends in top incomes in the CPS data.

Treatment of young-adult students in forming tax units. For the main text of the paper, we follow the procedures laid out in Piketty and Saez (2003) for predicting who will file a separate tax return, which assumes that all individuals age 20 and over represent their own tax unit. However, many individuals in their early 20s are students and therefore may be receiving income support from their parents to fit the definition of a dependent. Thus, in Appendix Table A1 we present median income growth using an alternate treatment of these individuals. In this approach, any single student age 20-24 is considered part of their parents' tax unit rather than as an independent tax unit. Prior to 1986, the Census Bureau did not ask if an individual was a student and simply asked whether the primary activity of that person in the previous week was attending school. As a result of this question change, there was an increase in the number of individuals considered students in 1986, which decreases the number of 20-24 year olds considered independent filers and increases median income growth between 1985 and 1986. Even with this potential upward bias, the median income growth using this alternate definition of a tax unit is only 1.2 percent above those from our primary tax unit definition for the 32 year period. Thus, our results do not appear to be overly sensitive to our treatment of students.

Size-adjusting tax units rather than households. Following the inequality literature, we focus on size-adjusted household income. However, it is also possible to keep the sharing unit as the tax unit and size-adjust the tax unit instead. This is done in detail in Appendix Table A1 for each business cycle to complement the size-adjustments of tax units for the entire 32 year period in Table 3. While using this approach results in slower median income growth than that using the household because it does not pick up trends in cohabitation and other shifts in the tax unit/household relationship discussed in the main text, it still finds much faster median income growth than that for non size-adjusted tax unit income. This is because the number of individuals

per tax unit has fallen over the past three business cycles (see Table 2 of the main text) so the same tax unit income will produce a higher standard of living now with the smaller tax units than it did 30 years ago. A third common definition is to size-adjust family income, with the family defined either as a nuclear family or as individuals related by blood or marriage (see, e.g. Karoly and Burtless 1995). This definition is a more inclusive sharing unit than the tax unit but is less inclusive than the household. As a result, it will produce income trends between those seen for the other two sharing units discussed.

Appendix Table A1: Growth in median incomes using an alternate tax unit definition where unmarried students, aged 20-24, are assumed to be in their parents tax unit rather than an independent tax unit.

Option 1 (growth in median incomes by business cycle)

Panel A: Total median income growth in each business cycle

	Tax unit	Household	Household	Household	Household	Household
	Pre-tax	Pre-tax	Pre-tax	Size-adj.	Size-adj.	Post-tax
	Pre-transfer	Pre-transfer	Post-transfer	Pre-tax	Post-tax	Post-transfer
				Post-transfer	Post-transfer	+ Health Insurance
1979-1989	0.8%	4.5%	6.6%	9.2%	11.9%	11.9% ¹
1989-2000	9.6%	10.0%	9.3%	13.4%	14.4%	16.5%
2000-2007	-5.5%	-2.2%	-1.2%	-0.1%	1.0%	4.8%
1979-2007	4.4%	12.5%	15.2%	23.6%	29.4%	36.7% ¹

Panel B: Annualized median income growth in each business cycle

	Tax unit	Household	Household	Household	Household	Household
	Pre-tax	Pre-tax	Pre-tax	Size-adj.	Size-adj.	Post-tax
	Pre-transfer	Pre-transfer	Post-transfer	Pre-tax	Post-tax	Post-transfer
				Post-transfer	Post-transfer	+ Health Insurance
1979-1989	0.08%	0.45%	0.66%	0.92%	1.19%	1.19% ¹
1989-2000	0.88%	0.91%	0.85%	1.22%	1.31%	1.50%
2000-2007	-0.79%	-0.31%	-0.17%	-0.02%	0.15%	0.68%
1979-2007	0.16%	0.45%	0.54%	0.84%	1.05%	1.31% ¹

Source: Public Use March CPS data.

Note: Changes in income between 1992 and 1993 are suppressed and assumed to be zero given the trend-break resulting from the CPS redesign in those years. See data appendix for details.

¹ Health insurance information is not available prior to 1988. The rate of growth in the value of health insurance from 1979-1989 is assumed to match that of post-tax, post-transfer income.

Appendix Table A2: Growth in Median Incomes using size-adjusted tax unit income rather than size-adjusted household income.

	Tax unit Pre-tax Pre-transfer	Tax unit Pre-tax Post-transfer	Size-Adj. Tax unit Pre-tax Post-transfer	Size-Adj. Tax unit Post-tax Post-transfer	Size-Adj. Tax unit Post-tax Post-trans + Health Ins
1979-1989	0.2%	2.7%	6.8%	9.7%	9.7% ¹
1989-2000	9.1%	7.5%	12.0%	13.7%	16.8%
2000-2007	-5.5%	-4.0%	-2.2%	0.2%	3.8%
1979-2007	3.2%	6.0%	17.0%	25.0%	33.0% ¹

Source and Notes: See Table 1

¹ Health insurance information is not available prior to 1988. The rate of growth in the value of health insurance from 1979-1989 is assumed to match that of post-tax, post-transfer income.