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ABSTRACT

Using Census Bureau estimates of the market value of in-kind transfers and Current Population Survey (ASEC-CPS) data over the period 1979 to 2007, Burkhauser et al. (2012b) construct measures of income and its distribution. We extend their work forward to 2016 and back to 1967 using ASEC-CPS data and decennial Census data for 1959. With this newly linked data set, we provide a fresh look at the twenty-year period 1959 to 1979 that encompasses the inauguration of New Frontier and Great Society programs as well as the first survey-based look at levels and trends in income and its distribution from 1959 to 2016. We find that the dramatic decline in the market income of the middle class (measured as the median American tax unit or the mean value of the middle quintile of American tax units) began in 1969. However, we find that this decline was more than offset by government tax and transfer programs—especially in-kind transfers. Conventional measures of median income and income inequality that exclude the market value of in-kind transfers will substantially understate the impact of government policies in offsetting the stagnation of median market income growth and the rise in market income inequality since 1969.

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1. Introduction

Using public use ASEC-CPS (Annual Social and Economic Supplement to the Current Population Survey) data stretching over three business cycles (1979-1989, 1989-2000 and 2000-2007), Burkhauser, Larrimore, and Simon (2012b) were the first to systematically show the sensitivity of measures of income and its distribution to the types of income included in the data, the sharing unit over which the data were collected, and the unit of analysis considered by the researcher.[1] In this paper, we extend the analysis of Burkhauser et al. (2012b) back to 1959 (capturing the business cycles of the 1960s and 1970s) and forward over the current business cycle to 2016.[2]

Because the Census Bureau did not begin to estimate the market value of in-kind government transfers in general, and Medicare, Medicaid, and employer-sponsored health insurance (ESI) in particular, until 1979, doing so is the first contribution of this paper.[3] We first use public use ASEC-CPS data (income years 1967-2016) to create common yearly source of income categories, including estimates of the market value of in-kind transfers, back to 1967. We create analogous series using the decennial Census for the years 1960, 1970, 1980, and 1990 (income years 1959, 1969, 1979, and 1989) and reassuringly show they yield similar values to those found using ASEC-CPS data for 1969, 1979 and 1989. We then couple our decennial Census-based 1959 values to our ASEC-CPS values from 1967-2016 to create common yearly

[1] We define a business cycle peak year as the peak in our median market income of tax unit series since it is capturing market income. These years usually correspond to the last full year of macroeconomic growth as defined by the NBER and identified in our figures but are the second to last full year of macroeconomic growth before the recessions of early 1990s and 2000s. This measure is similar to that used by Armour, Burkhauser, and Larrimore (2014) and Daly and Valletta (2006). In all cases, our findings are not sensitive to using the last full year before a recession.

[2] We use the Consumer Price Index Research Series (CPI-U-RS) (Stewart and Reed 1999) for all estimates related to ASEC-CPS data. We do so because this is the standard deflator used in the income inequality literature.

[3] We produce the market value of Medicare/Medicaid for 1967-1978. These values are consistent with those produced by the Census Bureau thereafter. We created a similar market value of employer-provided health insurance series for 1959 and from 1967-1978. See the Appendix for additional details on all these health insurance series.

source of income categories including estimates of the market value of in-kind transfers, back to decennial Census income year 1959.

Using this newly created data set, we then show that choice of income sources, sharing unit and the unit of analysis substantially change our measures of how the American middle class fared both absolutely and relative to the rest of the income distribution over a period stretching from near the end of the Eisenhower Administration in 1959 to the end of the Obama Administration in 2016.[4]

Using either of our most restrictive income definitions—labor earnings or market income—and a tax unit as both our sharing unit and our unit of analysis (choices researchers using tax record-based data are forced to make—e.g. Piketty and Saez 2003) the resources available to the middle class (measured as the median American tax unit or the mean value of the middle quintile of American tax units) peaked in 1969 and trended downward thereafter. While these yearly values fell and rose within all subsequent business cycles, with the exception of the business cycle of 1989-2000 these values were lower at the end than at the beginning of each cycle.

In contrast, as we broaden our income definition to the disposable size-adjusted household income (including both cash and some in-kind transfers) of persons—the measure of income most commonly used in the survey data-based literature—middle class Americans have made peak-to-peak gains over all completed business cycles since 1959 including the 2000-2007 business cycle. In 2016, this disposable income measure finally returned to its peak year 2007 pre-Great Recession high at the start of the current, on-going business cycle. However, this is a

[4] "Middle class" is a term of art that potentially has many definitions. Here we focus only on two: the median of the total United States population and the mean of its middle quintile. Other measures are possible. Our main results based on our coupled ASEC-CPS and Census data are not sensitive to using the mean value of the middle quintile.

lower bound measure of the importance of government tax and transfer policies for the growth in the median American's disposable income. When we include the market values of Medicare, Medicaid, and ESI in our upper bound measure of the median American's disposable income, we find even greater growth.

Disaggregating the United States population into quintiles we show similar differences in the pattern of income growth between 1959 and 2016 based on the choice of income sources, sharing unit, and unit of analysis. Focusing only on the market income of tax units, the rich got richer, the poor got poorer and the income of the middle class stagnated.[5]

However, these results change dramatically once we use more comprehensive measures of income that are more consistent with Haig-Simon principals.[6] When we adjust for government taxes, include cash and in-kind transfers, but exclude the value of Medicare, Medicaid, and ESI benefits—thus creating a lower bound measure of disposable income—we find that all five quintiles have experienced gains of more than 100 percent since 1959 with the highest gains among the top and bottom quintiles. When we include the market values of Medicare, Medicaid and ESI, the former two of which are programs that only began in 1966, in our upper bound measures of disposable income, the bottom quintile of the income distribution registers the greatest gains since 1959 and there are much smaller differences in gains across the other quintiles.

[5] We use the top 5 percent throughout this paper rather than the top 1 percent used in the tax record based income inequality literature due to under coverage of top incomes in the public use ASEC-CPS data, a problem it shares with all other survey based data sets. See Burkhauser et al. (2012a) which uses the restricted access ASEC-CPS for more details.

[6] The "gold standard" Haig-Simon income definition measures yearly income of an individual as equal to their consumption plus their net change in wealth. This standard is used by both the Canberra Group (2011) and the OECD (d'Ercole and Forster 2012) in their conceptualization of income. Poor data on consumption generally constrains researchers from operationalizing this definition. A more comprehensive measure of income that includes taxes and in-kind transfers comes closer to meeting this standard however than the market value of tax units measure based on tax record data alone. See Larrimore, Burkhauser, Auten, and Armour (2019).

We find similar results when we focus on the single most common scalar measure of income inequality, the Gini Coefficient. For all business cycle peak years and for 2016, using either of our most restrictive income definitions—labor earnings or market income—and a tax unit as both our sharing unit and our unit of analysis, Gini values are highest (most unequal) but fall as we increasingly take into account government taxes and transfers. We conclude that measures of median income and income inequality that exclude the market value of in-kind transfers will substantially understate the impact of government policies in offsetting the stagnation in median market income and the rise in market income inequality since 1969.

2. Alternative Measures of the Economic Well-Being of the Middle Class

Economic growth in gross domestic product, measured in either aggregate or per capita terms, indicates a nation's progress in producing goods and services. How this progress translates into resources for the middle class, however, depends on how these gains in output are distributed across the population. Household survey data are the usual source for monitoring income and its distribution—at the household, family, and individual levels. Each year the Census Bureau uses household survey data to derive its official statistics on income and poverty.[7] Household survey data are also the basis for cross-national comparative studies and are the source for most other distributional analyses, such as those done by the Organisation for Economic Cooperation and Development (OECD 2008, 2011, 2015). The definitions that underlie the way that household surveys ask income questions provide best-practice measures of personal living standards. The "income-sharing" unit that researchers choose when using these data is virtually always the household (all persons living in the dwelling), and the "income definition" is disposable (post-

[7] See Semega, Fontenot, and Kollar (2017) for income year 2016, the last year of data used in this paper.

tax, post-transfer) income, adjusted for differences in household size and composition using an equivalence scale.[8]

The "unit of analysis" is the individual (regardless of age). Hence, median income is based on the equivalized income assigned to each person in the population. Gottschalk and Smeeding (1997), d'Ercole and Förster (2012), and the Canberra Group (2011) make the case for this standard methodology.[9]

A long-standing challenge to survey-based estimates is that they do not provide a complete picture of the income distribution and its trends because survey estimates fail to fully capture the highest incomes. In contrast, the tax-based data used in the top income shares literature do a much better job of capturing the highest incomes. (For the seminal article on U.S. top incomes, see Piketty and Saez 2003; for a review of this literature, see Atkinson, Piketty, and Saez 2011.)

This tax data benefit is gained at the cost of being constrained to use the definitions of income and income-sharing unit mandated by each country's tax administration (definitions that differ from the survey-based ones) and being restricted to summary inequality measures that do not incorporate differences across the full income range (i.e., top income shares). However, because we are primarily focusing on the middle class and are using a median rather than a mean

[8] Size-adjusted household income accounts for economies of scale in household consumption by dividing household income by the square root of household size. This income measure is commonly used in U.S. and cross-national studies of inequality (see, e.g., Gottschalk and Smeeding 1997; Atkinson and Brandolini 2001; Burkhauser et al. 2011), as well as by the OECD in its official measures of income inequality and poverty (d'Ercole and Förster 2012). It also closely matches the adjustments for household size implied by the Census Bureau's poverty thresholds (Ruggles 1990). This measure assumes that income is shared equally among all household members, so each member receives the same amount for personal consumption.

[9] The International Expert Group on Household Economic Statistics (Canberra Group) was convened as an initiative of the Australian Bureau of Statistics under the auspices of the United Nations Statistical Commission. Its report was largely adopted as the standard for measuring household income by the International Conference of Labour Statisticians. In 2011, the United Nations Economic Commission for Europe provided an updated reference, outlining its latest standards and recommendations.

income measure to track changes in middle-class income, under coverage of income at the very top of the distribution is unlikely to affect the results on median income we report. In addition, survey data allow us to consider various definitions of income and sharing units, and to consider different units of analysis. This is not possible when using tax record–based data.

Likewise, those using tax record–based data in the standard labor economics literature are forced to focus on the median wage earnings of workers or tax units. As a result, they do not account for the fact that many workers live in households that share labor earnings as well as other resources, which can lead to a misrepresentation of the distribution of income available to all Americans. The set of seven measures of median income from the survey- and tax-based literatures we discuss in the next section are all derived, as noted above, from data contained in the unrestricted, public-use ASEC-CPS and decennial Census. These are the most common cross-sectional, survey-based, sources of data for those interested in measuring the incomes and income distributions of Americans. The ASEC-CPS contains a detailed questionnaire on the sources of income for household members and is commonly used to evaluate levels and trends of income and income inequality (see, e.g., Gottschalk and Danziger 2005; Daly and Valletta 2006; Blank 2011; and Burkhauser et al. 2011).

Drawing on previous work, we use the public-use ASEC-CPS to construct estimates of household income building on income series from Burkhauser et al. (2012b) and Armour et al. (2014), and supplemented with cell-means from Larrimore et al. (2008) to address top-coding of high sources of income in households. With these data we extend the ASEC-CPS household income series created in Larrimore, Burkhauser, and Armour (2015) back to 1959—the last business cycle peak year before major increases in government cash and in-kind transfers related to both the maturing of Social Security (Old-Age, Survivor and Disability Insurance) and the

launch of New Frontier and Great Society programs in the 1960s—and forward to include the current business cycle through 2016.

To do so, we must address two important breaks in the ASEC-CPS data during this period. The first is the well-known break in the data that occurs between income years 1992 and 1993, caused by a redesign of the survey questions covering income sources. We follow Larrimore et al. (2015) and adjust for this break by assuming that the entire decrease in median income between 1992 and 1993 is caused by the improvement of ASEC-CPS data collection efforts, and therefore we adjust median income in 1992 and in all preceding years by the same percentage, resulting in no change in measured median incomes between 1992 and 1993. (See: Atkinson, Piketty, and Saez, 2011; Burkhauser et al., 2012a; and Armour et al. 2014 for examples of this correction method.)

The second break occurs for income year 2013. In that year the ASEC-CPS used past years' methods for one part of the survey population and a new method for the other part, to test the impact of the new method on outcomes. We use the median value based on these new methods for 2013 and adjust median income in all preceding years by the ratio of median values in 2013 based on the new and the old methods, similar to our adjustment for the break between 1992 and 1993.

The modern ASEC-CPS series begins in 1968 (income year 1967). We use these data to estimate the labor earning and market income of tax units back to 1967, utilizing methods that are consistent with those in the tax-record-based inequality literature. However, we then contrast our findings with alternative definitions of income using methods that are consistent with those in the household-survey-based literature.[10] Because many major Great Society programs began

[10] We extend our ASEC-CPS series back to 1967 rather than to 1965 or earlier even though ASEC-CPS data does exist for these years. We do so because sample sizes are smaller and because income questions in these years are

before 1967, including Medicare and Medicaid, this is not an ideal year to begin a study of the importance of government taxes and transfers on household income. Furthermore, to separate trends in income growth from variations introduced by business cycles, previous studies have compared peak years in the business cycle. Since 1967 is not a peak year in the business cycle, the earliest year in a series beginning in 1967 that we can consistently compare with subsequent peak years is 1969.

For these reasons, we create a second set of income series using the decennial Census of 1960. This corresponds to income year 1959, which is a peak year in the business cycle. Thus, we can make comparisons between peak years 1959 and 1969 and thereby capture the importance of in-kind transfers including the insurance value of Medicare and Medicaid during the 1960s. To establish that the Census-based data points in 1959 can reasonably be combined with those of our ASEC-CPS income series, we repeat the process for the 1970, 1980, and 1990 decennial Censuses that can be directly compared to data for the same years in the CPS, and find that the ASEC-CPS and Census values are similar.

We briefly describe the seven measures we will use to document median income trends below. In all cases we will compare trends in real median income using the Consumer Price Index Research Series (CPI-U-RS).[11] We more fully discuss the details of our sources of income imputations in these series in the Appendix.

considerably less detailed. This makes it more difficult to establish income categories consistent with those beginning in 1967.

[11] We do so since the CPI-U-RS is the standard deflator used in the survey-based income inequality literature. However, we test the sensitivity of our results using the Personal Consumption Expenditures (PCE) price index that is a chain-type (or Tornqvist) price index, so it does not systematically overstate inflation like the CPI-U and its variations, which are Laspeyres indices. Again, we use this price index rather than the Chained-CPI-U, which only begins in 2000, because it has been available since 1947. See Appendix figure 1A at the end of this paper which shows that though this deflator slightly increases real growth in median income, our main findings are not sensitive to this deflator choice.

Labor Earnings of Tax Units. The first measure is the *labor earnings of the median tax unit*. This income measure only looks at one source of market income, labor earnings (i.e., wages and salaries, self-employment income, and farm income), and uses the tax unit as both its sharing unit and its unit of analysis.[12] Such a measure is in the style of the tax record–based literature because labor earnings are a component of market income and the sharing unit is the tax unit. Tax units are not explicitly defined in the ASEC-CPS or the decennial Census, and so we assign tax units using the same assumptions from Piketty and Saez (2003).

Important in its own right, we also use this measure of median income as an additional check on the comparability of our decennial Census and ASEC-CPS series. We do this because these data sets ask similar questions with respect to the labor earnings of tax units. This is not the case with respect to the market income of tax units, necessitating some imputation (see the Appendix for details).

Market Income of Tax Units. The second is the *market income of the median tax unit.* A major new international literature based on data from administrative tax records of rich countries traces the share of income held by the very top part of the income distribution of these countries back to the early part of the 20th century. However, for the United States, this literature's measure of income is limited to taxable market income (wages, interest, dividends, etc.) of tax units. See Atkinson et al. (2011) for a review of this international literature and Piketty and Saez (2003) for the first effort to measure top U.S. income shares in this way.

[12] There are a substantial number of individuals who report large negative farm income values, especially in earlier years when a larger share of workers were self-employed farmers. These individuals to some degree cause the mean values to be low in the lowest quintile and our estimates of growth in mean income in this quintile to be volatile. But this is not the case for the rest of the distribution. When we restrict farm incomes to be non-negative, we generate nearly identical results outside of the lowest quintile. However, the results for the bottom quintile remain fairly volatile. This is largely due to a much larger number of non-working tax units in this quintile that results in a low base level of income such that even small or moderate income variation produce large percentage changes.

We follow Piketty and Saez (2003) and define market income to include gross income from wages and salaries, farm income, self-employment and business income, retirement income from pensions, dividends, interest, rent, and alimony. These sources of income are summed across individuals in a tax unit within each ASEC-CPS household, without adjusting for number of persons in a tax unit. Our unit of analysis, therefore, is the tax unit. While some of these separate sources of income are combined in earlier ASEC-CPS years, each is included in some questions back to 1967. Some of these sources of income are not specifically included as decennial Census questions. In particular, in earlier years, retirement and pension income, dividends, interest, rent, and alimony are grouped as "other" income, a category that also includes some non-market sources of income such as Social Security. Some of these sources are covered separately in later years while other sources continue to be grouped as "other" income. As a result, imputation of these sources varies, both across decennial Census and ASEC-CPS surveys and over time within the decennial Census. See the Appendix for details.

Although the level of median income of this measure is likely to be greater than one that looks at labor earnings alone, its trend will depend on the relative growth of other sources of market income.

Household Size-Adjusted Labor Earnings of Persons. The third is the *household size-adjusted labor earnings of the median person*. Consistent with the survey-based literature, this measure of median income expands the sharing unit from the tax unit to the household and makes the unit of analysis the person. We adjust this measure's household income using the square root of the number of people in the household and assume equal sharing across household members. This size adjustment is common in U.S. and international research studies of median

income trends and inequality (for example, see Ruggles, 1990; Gottschalk and Smeeding, 1997; Atkinson and Brandolini, 2001; d'Ercole and Förster, 2012).

Burkhauser et al. (2012b) first showed that because the number of tax units within households has grown over time, while the number of people in those households has fallen, these demographic characteristics will tend to increase this measure of median income over time relative to a tax unit–based measure of labor earnings.

Household Size-Adjusted Market Income of Persons. The fourth is the *household size-adjusted market income of the median person*. In the same manner as discussed above this measure of median income expands the sharing unit from the tax unit to the household and makes the unit of analysis the person. For the same reasons as discussed above this measure of median income will increase over time relative to a tax unit–based measure of market income.

Household Size-Adjusted Pre-Tax Post-Transfer Income of Persons. The fifth is the *household size-adjusted pre-tax post-transfer income of the median person*. While the Census Bureau reports the *pre-tax, post-transfer income of households* in the first figure of its annual report (Semega, Fontenot, and Kollar 2017), the Census Bureau uses this household size-adjusted median income measure in its more sophisticated discussions of income trends. To calculate this income measure it adds government cash transfers to the income measure used in the previous series. These programs include: Aid to Families with Dependent Children and its successor, Temporary Assistance for Needy Families, as well as social insurance programs such as Social Security and Workers' Compensation. This measure excludes, however, transfers directly tied to the tax system, such as the Earned Income Tax Credit (EITC). It also excludes any in-kind government transfers, such as food and housing assistance, and the market value of Medicare or Medicaid insurance.

Because this measure adds government cash transfers but does not subtract government taxes, its level of median income will be greater than one that looks at market income alone, but its trend will depend on the relative growth of other sources of government cash transfers to market income.

As with market income, the income categories covering these income sources are less granular in earlier ASEC-CPS surveys. However, when aggregated, the various categories are still covered by some questions in the ASEC-CPS back to 1967. This is also the case with respect to the decennial Census. Therefore, unlike our measure of market income, it is not necessary for us to impute any decennial Census income sources to align them with the ASEC-CPS for this measure of income. The reason is that while the different income categories are grouped by survey questions, the groups all align with the income sources included as pre-tax post-transfer income. For example, retirement, investment, and public assistance income are all grouped under a single question in the 1960 decennial Census. This mixes market sources of income with government transfers, but all three sources of income are included in a pre-tax post-transfer measure of income. As a result, this is our most comparable income series over all our years since it requires no income source or tax unit imputations.

Household Size-Adjusted Post-Tax Post-Transfer plus In-Kind Transfer Income of Persons. The sixth measure is the *household size–adjusted post-tax, post-transfer income (including some in-kind transfers) of the median person*. This lower bound disposable income measure more fully captures the importance of government tax and transfer policies for the resources of the median person. It uses NBER's TaxSim 9.3 (Feenberg and Coutts 1993) to estimate Federal and State taxes and liabilities, including Social Security and Medicare payroll taxes. In addition, it captures the market value of some in-kind transfers. The Census Bureau

reports or imputes the value of SNAP (the Supplemental Nutrition Assistance Program—food stamps), housing subsidies, and school lunches on an annual basis beginning in 1979. We use these values in our estimates. All are now generally recognized as important resources that are primarily available to low-income households, and the Census Bureau now includes them as resources in its Supplemental Poverty Measure (Garner and Short 2012). Larrimore et al. (2015) use this measure in their analysis. Because it both adds government in-kind transfers and tax credits (e.g., the EITC) but subtracts taxes, the level of median income of this measure could be higher or lower than the Census Bureau's median (pre-tax, post-cash transfer) income values as well as median market income alone. Its trends will depend on the relative growth of net government transfers to market income.

We discuss the details of how we extend these tax and in-kind series back to 1967 in the Appendix. Our decennial Census series does not provide a measure of in-kind transfers in 1959 or in any other Census year. This is not a problem for the years in which we have ASEC-CPS values of these transfers. But in our analysis we effectively assume that there were no federal in-kind transfer programs in 1959 with the exception of housing subsidies and ESI, which we impute.[13]

Household Size-Adjusted Post-Tax Post-Transfer plus In-Kind Transfer Income (including Medicare, Medicaid, and ESI) of Persons. The seventh measure is the *household*

[13] This is only approximately correct. While the Food Stamp Act of 1964 launched the food stamps program, there was a pilot program from 1961-1964. Housing benefits began with the Housing Act of 1937, but benefits were small prior to the Department of Housing and Urban Development Act of 1965. For instance, total outlays were $80 million in 1959, rose to $327 million in 1966, and to over $1 billion by 1970 in 2016 dollars (See OMB 2016). Likewise, the school lunch program began in 1946 and was expanded and modified several times in the 1960s. The National School Lunch Program (NSLP) is somewhat larger, with expenditures of $236 million in 1960 and $591 million in 1970 (USDA 2013). The relatively small size of the benefits in these programs suggests attempting to estimate their exact value in 1959 would only minimally impact our estimates. A predecessor program to Medicare/Medicaid (Kerr-Mills) began in 1961, but there were otherwise no Medicare or Medicaid benefits in 1959. By 1967, the first year for which we have ASEC-CPS estimates, the programs' combined expenditures were over $20 billion in 2016 dollars.

size–adjusted post-tax, post-transfer income plus in-kind transfers (including the market values of Medicare, Medicaid and ESI) of the median person. Burkhauser et al. (2012b) were the first to use the market value of health insurance in a disposable income measure, in order to show the growing importance of access to health insurance for explaining differences between survey- and tax record–based analyses of income and its distribution. The Congressional Budget Office (CBO), in 2012, was the first government agency to include the market values of both government- and employer-sponsored health insurance (ESI) in their measure of income (CBO 2013). Larrimore et al. (2015) use this same fuller measure of income in an appendix table for the period 1979-2012.[14] Lyons (2015)—as well as Burkhauser, Larrimore, and Lyons (2017)—show its importance for estimating the income of working age people with disabilities.

Here we use it to measure after-tax income (including the market values of Medicare, Medicaid, ESI and other in-kind transfers) and its distribution across American households back to 1959—just before the major expansions of government tax and transfer programs associated with the New Frontier and Great Society programs of the 1960s.[15] Due to the rapid growth in government-provided health insurance and ESI, this upper bound value of the disposable income of the median American will be greater than all other measures in levels and trends, particularly

[14] A small academic literature has begun to include the market value of health insurance in its measures of income. See Burtless and Svaton, 2010; Burkhauser, Larrimore and Simon, 2013; Burtless and Milusheva, 2013; CBO, 2013; Sommers and Oellerich, 2013; Armour, Burkhauser, and Larrimore, 2014, and Kaestner, R. and Lubotsky, D. 2016). But because this literature has been dependent on Census Bureau measures of the market value of health insurance, its analyses only go back to 1979.

[15] Fox et al. (2015) estimate U.S. poverty rates back to 1967 using income concepts from the Supplemental Poverty Measure (SPM). Hence, they also subtract taxes from gross income and include the market value of some in-kind transfers as resources and in their threshold measures. However, the SPM ignores the market value of government and employer-sponsored health insurance (ESI) in its measures of household resources and thresholds. Although the SPM provides a consistent relationship between the resources counted as income and included in its poverty thresholds, it fails to capture Medicare, Medicaid, and ESI's growing importance. Instead of treating the market value of health insurance as a resource, it subtracts medical out-of-pocket expenses from total household resources.

in the bottom half of the income distribution where receipt of the government-provided insurance sources is concentrated.

In constructing this measure, we note that in-kind benefits in the form of health insurance, like all other in-kind benefits, have value to individuals—otherwise government actors would have a strong incentive to replace Medicare and Medicaid benefits with cash transfer programs or lower taxes, and employers would have an incentive to replace ESI with higher wages. Measures that exclude Medicare, Medicaid, and ESI as resources undervalue their worth by effectively placing a zero value on this form of health insurance. This exclusion understates not only the level of household resources but also their trend, as the costs of Medicare, Medicaid, and ESI have substantially increased in real terms and as a share of all government transfers to households.

Following the approach of Armour et al. (2014), Burkhauser et al. (2012b) and the CBO (2012, 2013), we include the market value of Medicare, Medicaid, and ESI in this measure of income back to 1979 based on the Census Bureau's imputed value of health insurance, although we use the full market value rather than just its fungible value.

For government-subsidized health insurance (Medicare and Medicaid), the Census Bureau determines, by state and risk class back to 1979, the average government cost of providing Medicare and Medicaid to those persons reporting that they have this insurance. The two risk classes for Medicare are aged and disabled. The four risk classes for Medicaid are aged, blind and disabled, nondisabled children (less than 21), and nondisabled adults (21-64).[16] Thus,

[16] The Medicare and Medicaid risk classes reflect the channel through which benefits were accessed. The Medicare risk class "aged" applies to all persons on Medicare aged 65 or older. The Medicare risk class "disabled" applies to all persons accessing Medicare benefits through the SSDI program. The Medicaid risk class "children" applies to children accessing Medicaid benefits through either traditional Medicaid or a state's Children's Health Insurance Program (CHIP). The Medicaid risk class "adults" applies to all adults under the age of 65 accessing Medicaid benefits. The Medicaid risk class "aged" applies to all persons accessing Medicaid aged 65 or older. Lastly, the

the imputed average cost of government-provided health insurance varies by state and by the government insurance pool through which beneficiaries access it.

In determining the values of Medicare and Medicaid for individuals who qualify for both programs (dual eligible), we follow the Census Bureau's approach and estimate the value of their health insurance as the combined cost of insurance from each program. This assumes that the total value of the insurance dual-eligible individuals receive is not only greater to them than the value for those insured under only one of these programs, but is greater by the average cost of the other program. This may overstate this value to the degree that there is overlap in coverage. However, it might understate it to the degree that dual-eligible individuals have higher than average medical expenses relative to those who are only covered by one program. Therefore, this value still may be less than the cost dual-eligible individuals would incur if they purchased equivalent insurance in the market.[17]

Prior to 1979, the ASEC-CPS contains no information on the value of health insurance benefits, and no direct information on coverage of health insurance from any source. Thus, to calculate income under this definition we must impute both receipt and market value of insurance for Medicare, Medicaid, and ESI. See the Appendix for details on this procedure. The Census Bureau ceased reporting the market values of Medicare and Medicaid coverage after the 2014 survey. Therefore, these sources are calculated for the income years 2014-2016 based on methodology published by the Census Bureau.

Medicaid risk class "disabled" applies to all persons accessing Medicaid benefits due to their qualification for SSI benefits. (See Burkhauser et al., 2017 for a more complete discussion of this issue.)

[17] Given the Affordable Care Act of 2010, this may no longer be the case, since insurance companies, beginning January 1, 2014, are no longer permitted to adjust their premiums based on pre-existing conditions. However, for the years in this study prior to 2014 insurers could deny insurance to those with pre-existing conditions and/or charge such individuals higher premiums. (See Burkhauser et al. 2017 for a more complete discussion of this issue.)

3. Trends in Median Income 1959-2016

The earliest starting point for ASEC-CPS-based income measures that include both in-kind transfers and taxes is 1979, since this is the first year that the Census Bureau provides measures of in-kind transfers. As can be seen in Figure 1, using our estimates of in-kind transfers and taxes allows us to extend all seven of our income series back to 1967 using ASEC-CPS data, and to 1959 using decennial Census data. It reports trends for these seven measures of real median income, normalized to 100 percent in 1979.

The trends found over 1979-2007 are well known in the literature and replicate those found by Burkhauser et al. (2012b), Armour et al. (2014), and Larrimore et al. (2015), and extends them to 2016 for all measures. We denote NBER defined business cycles by shading recession years. Note that, although the total population we include in each of our seven trend lines is the same, the median person in that population will not be the same person because the income sources and sharing unit we use to capture income differ.[18]

There are a number of similarities in the trends of five of our seven measures of income. The median values of the five income measures that use the household as their sharing unit and the person as their unit of analysis are greater at the ending peaks of the 1980s and the 1990s business cycles than at their starting peaks. During both cycles, median income falls from its pre-recession high to a trough (with the year varying by measure). However, in both cycles, we find

[18] The median individual for each measure will also change year-to-year. For instance, substantial shifts in the composition of the population, such as through the immigration of low-skill workers or the aging of the population into retirement, may increase the share of the population living in households with low labor earnings, reducing the household size–adjusted labor earnings of the median person even when, over the same period, the median earnings of employed individuals is rising. Alternatively, the increase in the share of persons living in two- or three-labor earner households may reduce the share of the population living in households with low labor earnings, increasing the household size–adjusted labor earnings of the median person, even when over the same period the earnings of employed individuals is falling.

that strong post-recession growth increases median income well above its initial prerecession business cycle high.

This is not the case for the growth in the *labor earnings of the median tax unit*. The median value of this measure is noticeably lower at the end of the 1980s business cycle than at the beginning. Although it recovers somewhat from its 1984 trough, it remains below its 1979 high in 1989. During the 1990s cycle, post-recession growth is strong enough to lift it above its pre-recession high, but it only manages to return to just above its 1979 pre-recession high in 2000, well below the other five household size-adjusted measures of income in 2000. Those focusing on the growth in the labor earnings of the median tax units will greatly understate the actual increase in labor earnings available to the median American during this period because that median American lives in a household that may contain more than one tax unit. The same is true for using growth in the labor earnings of the median worker to make inferences about the labor earnings available to the median American.

As can also be seen in Figure 1, growth in *the market income of the median tax unit* is above the growth in the labor income of the median tax unit in all years. Nevertheless, it is still substantially below the median income of the five measures that use the household as their sharing unit and the person as their unit of analysis.

These five measures all take into consideration the fact that workers live in households, not in tax units or by themselves, and that these household members share their individual labor earnings. Some also include other sources of market income, as well as the net returns of government taxes and transfers. All show substantially higher growth in the resources available to the median American over these first two post-1979 business cycles than do either the labor earnings or market income of the median tax unit.

The inconsistency of tax unit measures vis-à-vis the other five measures continues during the 2000-2007 business cycle. Both tax unit measures dramatically fall from 2000 to 2004. Although they then increase, both are substantially below their 2000 value by the end of the business cycle in 2007. Both measures then fall precipitously during the Great Recession and do not begin increasing until 2013. Since then, both have slowly recovered, but by 2016 they were still well below their value at the start the current business cycle, and even further below their 2000 business cycle peaks.

However, both these measures fail to recognize the social insurance value of living in a household—which is the pooling of income over all household members. Thus, sharp reductions in the income (labor earnings or other forms of market income) from one tax unit in a household are softened by the continued income from its other tax units. At the same time, the number of people living in each household falls during this period, so fewer people are sharing household resources. These are important distinctions.

Although our preferred measure of median labor earnings, *the household size–adjusted labor earnings of the median person*, also falls at the start of the 2000 business cycle, during the recovery years it increases and almost reaches its 2000 level by 2007. This measure then falls precipitously during the Great Recession and does not begin increasing until 2012. It then increases and is closer to its 2007 peak level by 2016 than is the flawed labor earnings of the median tax unit measure. More important, the pooling of labor earnings in households reduces the depth of the drop in median income in the years between the business cycle's pre-recession and post-recession peaks.

The *household size–adjusted market income of the median person* follows a very similar path within business cycles. Growth by the end of the 2000-2007 cycle was not enough to raise

median market income above its level in 2000. However, because nonwage market income has grown faster at the median during the current cycle, this measure of median income almost reaches its 2007 pre–Great Recession peak by 2016 and experiences a less severe drop in the years between 2000 and 2016.

The *household size–adjusted pre-tax, post-transfer income of the median person*, as used by the Census Bureau—which adds cash transfers to market income—closely follows the market income trends. Growth by the end of the 2000-2007 business cycle was not quite enough to raise it to its level in 2000, but government transfers offset market income declines during the cycle, so its interim-year declines were smaller. Because government transfers have grown faster than market income during the current cycle, this measure of median income finally exceeded its pre–Great Recession high by 2016, greatly offsetting market income declines in the interim years. What is less clear is the degree to which this observed growth in net government transfers for the median American had negative effects on their employment, and hence on measures of labor and market income in the previous series.[19]

The measure *household size–adjusted post-tax, post-transfer income (including some in-kind transfers) of the median person*—which is recommended by the OECD and is used by most European Union members—is also our preferred lower bound measure of median total income because it more fully takes into consideration both government taxes and transfers. Doing so shows how effective government tax and transfer policy has been in increasing the median income of Americans and in offsetting the decline in their market income during both the 2000-

[19] Mulligan (2012) finds that the expanded safety net programs over the Great Recession substantially increased the marginal tax on work. He concludes that this caused at least half the drop in hours worked between 2007 and 2009. Moffitt (2015) presents a counterpoint to Mulligan's analysis, arguing that Mulligan overestimates the marginal tax rates faced by workers moving from the social safety net to employment and that the actual rates imply much smaller reductions in labor supply as a result. Similarly, Moffitt's review of the literature on the labor supply effects of individual programs suggest much weaker labor supply responses to these changes, although Moffitt acknowledges that these effects are generally estimated outside recession periods.

2007 business cycle and the present cycle. Although the growth of median income during the first two cycles is much greater than during the last two, this fuller measure of income shows growth over all four business cycles since 1979. More important, it shows that government tax and transfer policies since 2000 have largely offset the interim-year declines in median market income during this period.

The measure *household size–adjusted post-tax, post-transfer income plus in-kind transfers (including the insurance value of Medicare, Medicaid, and ESI) of the median person*, our upper bound measure of disposable income, is somewhat controversial, because it adds the market value of health insurance provided by the government (i.e., Medicare and Medicaid) as well as by employers (ESI) to the previous measure. Because of the rapid growth in the value of health insurance provided by the government and employers since the mid-1980s, this measure's median income trends are considerably greater than all the other median income trends shown in Figure 1 through 2006. Median values then fall somewhat until 2009 and are flat through 2014, but exceed its previous high in 2015 and 2016.[20]

But how does our understanding of these trends from 1979 to 2016 change once we are able trace back our seven measure of median income back to 1959?

The labor earnings of the median tax unit rose substantially between the peak years of the 1959-1969 business cycle. However, 1969 would prove to be the second highest yearly value for this measure of income. Its business-cycle-peak year 1973 only barely exceeded its 1969 peak, and it then dropped substantially over the late 1970s and 1980s business cycles. While it did rise

[20] The Census Bureau discontinued its series on the market value of Medicare and Medicaid in 2014 (income year 2013). In addition, Burkhauser et al. (2017) argue that the Affordable Care Act's rules regarding community ratings of health insurance, which came into effect in 2014, by law reduced the cost of private market health insurance to persons with above-average expected healthcare costs. This, in turn, reduced the market value of Medicare and Medicaid to their beneficiaries because they are now eligible for this less expensive community-rated private market health insurance.

over the 1990s business cycle, returning to its 1979 level in 2000, it then fell over the 2000-2007 business cycle and remained far below its 2007 peak in 2016, nine years later.

The market income of the median tax unit also rose substantially between the peak years of the 1959-1969 business cycle. However, this peak was not surpassed until the final growth years of the 1990s business cycle before falling substantially over the 2000-2007 business cycle, and remained far below its 2007 peak in 2016. Hence, the secular decline in both the labor earnings and market income of the median tax unit found in studies beginning in 1979, and therefore first observed over the two peak years of the 1980s business cycle, was in fact an extension of a secular decline in both these measures beginning in 1969.

However, once we look at labor earnings and market income within a household sharing unit and focus on the household size-adjusted income of the median person, our findings are more consistent with those based on our other three measures of income using a household sharing unit and the person as the unit of analysis. All five measures increase over the 1959-1969 business cycle. But unlike the two measures using the tax unit as sharing unit and unit of analysis, all five measures increase over the two business cycles of the 1970s as well. However, unlike subsequent business cycles, differences in trends over these three business cycles are much smaller across these five measures, especially compared to the trend since 1999, as discussed earlier.

Figure 1 shows that a measure of income that focuses solely on either the labor earnings or market income of tax units as a measure of the resources available to the median American from 1959 to 2016 will dramatically understate how important labor earnings and market income are to the median Americans household size-adjusted income. Rather than trending downward since their 1969 peak when measured at the tax unit level, labor earning and market income

sources increased over every business cycle from 1959 through 2000. Since then they fell slightly over the 2000-2007 business cycle, fell precipitously during the Great Recession and its aftermath, and still had not reached their 2007 levels by 2016. But this is a far more optimistic story than the one told by those who focus on the labor earnings or market income of tax units since 1959.

Figure 1 also shows that the growth in the redistribution of market income via government tax and transfer policies dating back to the Great Society has not only mitigated the cyclical decline in the median American's household size-adjusted market income during recessions but has, more importantly, mitigated the secular stagnation of median labor and market income since 2000.

4. Trends in the Distribution of Income

The importance of taxes and transfers over this entire period can be seen in more detail in Table 1. Row 1 (Panel A) reports cumulative median income growth, controlling for inflation (CPI-U-RS), for the entire period of our data from 1959 through 2016 for each of our income definitions based on values underlying Figure 1.

In the rest of the rows, it shows how cumulative income growth has varied over the entire income distribution. It does so by estimating cumulative mean income growth for each quintile and the top 5 percent, for each of our income definitions. (As discussed in footnote 5 data limitations in the public use version of the ASEC-CPS prevent us from capturing the top 1 percent.) However, since 2016 is not a peak year in a business cycle, and thus the interpretation for income growth ending in that non-peak year also contains cyclical effects (the cyclical effects of the Great Recession and its aftermath between 2007 and 2016), we will primarily focus on

trends in income growth between business cycle peak years 1959 through 2007. Those values are reported in Table 1 (Panel B). As discussed earlier in the text and in footnote 19, the quintile composition is not constant across measures—that is, persons may switch quintiles for different measures of income.

As was the case in Figure 1, the first two columns in Table 1 present the growth in labor earnings and market income of tax units. The remaining five columns use the household as the sharing unit and the person as the unit of analysis.

Growth in the first two columns in Table 1 (Panel A) is consistent with growth estimates by Piketty and Saez (2003), Atkinson et al. (2011), and others who focus on tax units without adjusting for the number of persons in those tax units. When focusing solely on either labor earnings or market income of tax units in Panel A, the rich get richer, the poor get poorer, and median income has been mostly stagnant since 1959. Mean market income among the top 5 percent of tax units increased by 155.0 percent (1.66 percent annual rate) between 1959 and 2016 while declining by 75.5 percent (2.43 percent annual decrease) for those in the bottom quintile and increasing by only 24.3 percent (0.38 percent annual increase) for those in the middle quintile. Note that this mean value of the middle quintile is close to the 23.0 percent growth (0.36 percent annual growth) in the median value from the entire distribution of market incomes in the second-column of Panel A that we also use in showing trends in middle class income in Figure 1.

Part of the slow growth in both the labor earnings of tax units and the market income of tax units captured at the median and more generally for the mean value of each of the bottom four quintiles of those measures of income is the result of comparing 1959 with 2016. The former is a peak year while the latter is the most recent year of our data, but one in which this part of the income distribution (using these two measures of income) is still recovering from the

Great Recession. In contrast, the top income quintile (and the top 5 percent) had fully recovered from the Great Recession by 2016 and the mean value of these two measures of income exceeded their mean values in 2007.

Hence, growth rates for all but the top quintile are higher when peak year 1959 is compared with peak year 2007, as can be seen in Panel B. But even when we control for this difference in the timing of recovery with the current business cycle and focus on 1959-2007, the differences in growth in these two measures of income are still dramatic across the distribution. The lowest quintile has negative growth in market income, while the growth in the middle quintile is quite small over this 48-year period. The poorest got poorer, the growth of the middle three quintiles of the income distribution is dramatically lower than the top quintile and the rich captured here as the top 5 percent.

But as Table 1 also shows, when we broaden our measure of income across the remaining columns in Panels A and B to those used in the standard survey-based income and income inequality literatures, the growth in median income and in the mean value of the bottom four quintiles dramatically increases relative to the top quintile.

Growth in median market income between 1959-2007 increases from 36.2 percent (column 2) in Panel B (the stagnation of the middle class) to 92.4 percent (column 4) when we expand our sharing unit to the household from the tax unit, make the unit of analysis the person rather than the tax unit, and adjust our sharing unit's income to account for the number of people in the household. All the other columns of Panel B show the result of adding additional sources of income. Median income growth increases to 100.8 percent when other cash income including government transfers are added to market income (column 5). Median income growth increases to 126.4 percent in our lower bound measure of disposable income (column 6) when we subtract

taxes and add income from in-kind transfers (but not the values of Medicare, Medicaid, and ESI). Finally, median income growth increases to 141.2 percent in our upper bound measure of disposable income when we add the market values of Medicare, Medicaid, and ESI (column 7).

For the bottom quintile income growth reverses from a decrease of -20.4 percent to an increase of 34.9 percent when we more properly capture market income using our preferred household sized-adjusted income of persons measure, and jumps to 108.9 percent when looking at pre-tax post-transfer income—an increase greater than that found in the second and third quintiles. When taxes and in-kind transfers (but not Medicare, Medicaid or ESI) are included, income growth in the bottom quintile increases to 188.1 percent—an increase greater than that found in all other quintiles and the top 5 percent. The growth rate rises to 246.8 percent when we add the market values of Medicare, Medicaid and ESI, far greater than the increases found in all the other quintiles as well as the top 5 percent. While this last comparison is controversial since it assigns the full market values of Medicare and Medicaid as well as ESI to income, even when we effectively assign a value of zero to this major in-kind transfer in our lower bound measure of median disposable income in column 6, growth in the bottom quintile from 1959-2007 was greater than for all other quintiles.

Furthermore, when using this lower bound disposable income measure we can see the importance of government taxes and transfers in redistributing market income gains across the income distribution. While growth in the mean value of the income of the top 5 percent (165.4 percent) was higher than growth in the mean value of four of the five quintiles, mean income in all five more than doubled over this period and in fact the bottom quintile had the largest increase in average income, albeit off a much lower base level. And unlike our measures of labor earnings and market income of tax units, the median income and the mean income in all five

quintiles as well as the top 5 percent are greater in 2016 than they were in 2007. Hence, even using the lower bound measure of disposable income, not only did the rich get considerably richer between 1959 and 2016, but so did the rest of the population.

Gini Coefficient Trends. The single most common scalar measure of income inequality is the Gini Coefficient. Using our seven measures of income in Table 2 we report Gini values for peak years of all business cycles over the period 1959-2007 as well as for the most recent year of our data 2016. For all business cycle peak years and for 2016, Gini values are highest (most unequal) when we use our most restrictive income definitions—labor earnings or market income—and a tax unit as both our sharing unit and our unit of analysis and fall as we increasingly take into account government taxes and transfers.

This is reassuring since one of the goals of government tax and transfer policy is to transfer market income from Americans living in higher income households to Americans living in lower income households, and this occurred in all years. But what our new data set now shows is how Gini value trends have changed across each of these income measures since 1959. Focusing solely on the market income of tax units or the household size-adjusted market income of persons, Gini values increase over the period from 1959 to 1979—0.488 to 0.495 and 0.411 to 0.419 respectively. However, the reverse is the case when government in-cash transfers are taken into account. Gini values fall from 0.392 to 0.366. Gini values decline even more when using our preferred lower and upper bound measures of disposable income which fell from 0.362 to 0.304 and 0.350 to 0.288 respectively. Since 1979, income inequality has increased over all business cycles peak to peak years regardless of how we measure income. However, it is also the case that over the entire period from 1959 to 2007, income inequality has risen less, the fuller the measure of income chosen. As discussed previously, the current business cycle began in 2007 and is not

yet complete since median income continued to grow from its business cycle trough up through 2016, our last year of data. Over the period 2007 through 2016 income inequality has also grown but it is still the case that this growth is slowest in our fuller measures of income.

Our results with respect to the distribution of income in these last three sections are largely consistent with the findings of Moffitt (2015) and Fox et al. (2015). Moffitt (2015) focuses on government spending on both in-cash and in-kind welfare programs. He found significant growth in the early 1970s, slow growth in the late 1970s to the mid-1980s, and higher growth from the late 1980s onward. Fox et al. (2015) compare U.S. poverty rates back to 1967 using income concepts from the Supplemental Poverty Measure (SPM) that uses a measure of income similar to our lower bound disposable income measure of income, and comparing this measure to the Official Poverty Measure that excludes in-kind transfers. Our findings show that these are roughly the periods during which in-kind transfers including Medicare, Medicaid, and ESI (which neither Moffitt 2015 nor Fox et al. 2015 include in their analyses), largely mitigated income inequality in market income.

5. Mean (per capita GDP) and Median Income Growth since 1959

A new literature attempts to capture the long-term relationship between aggregate measures of growth using National Accounts data—e.g., per capita Gross Domestic Product (GDP/N)—and the real income of the median person (median real GDP). This literature argues that median real GDP is a more appropriate measure of the resources available to the average person than is a measure of mean income like GDP/N that can rise even when most of the income growth accrues to the top end of the distribution. While median real GDP may be conceptually appropriate, operationally it is not possible to directly capture median real GDP using National Accounts data

alone. To solve this problem, researchers have turned to either survey or administrative tax record data or some combination of the two to capture trends in median income. But it is critical that the sources of income used in the National Accounts match those used in the survey or administrative tax record data or "like is not compared to like." (See: Nolan, Roser and Thewissen, forthcoming for a review of this literature).[21] Piketty, Saez, and Zucman (2018) create the first comprehensive "distributional national accounts" by starting with tax return microdata, adding in income sources covered in survey data such as in-kind transfers, and distributing items in the national accounts that are not included in microdata across tax units. By including these sources of income, they attempt to create estimates that are consistent with macroeconomic growth, and find a dramatic rise in income inequality consistent with their prior work using the market income of tax units.

Gordon (2016 Table 18.4) uses such a measure of median income derived from survey data in his estimates of median real GDP from 1975 to 2012. This measure is based on CBO estimates using ASEC-CPS data statistically matched to income from tax record data. But while the CBO has been including the market value of Medicare and Medicaid in its measures of income since 2012, these values are not included in previous years. More problematic, for earlier years Gordon estimates median real GDP using top income data from the World Top Income Database (Alvaredo et al., n. d.). However, these data contain information on the taxable market income of the median tax unit as it comes from the series developed by Piketty and Saez (2003).

In Figure 2 we use our new survey-based data set to show the problem of comparing trends in real GDP/N to trends in real market income of the median tax unit. We first compare

[21] Atkinson et al. (2015) use data from EU-SILC country surveys from 2004 to 2011 to demonstrate the problems of replicating National Accounts measures of mean income with survey data. To the degree that the survey data captures mean income based on National Accounts concepts of income, it allows researchers to compare such a measure with a median income measure, which can be captured in survey data.

growth in GDP/N from 1959 to 2016 taken from the Bureau of Economic Analysis to growth in the real market income of the median tax unit based on the same ASEC-CPS and decennial Census data that underlies the values reported for this income measure in Figure 1.[22]

We normalize these two trends to 1.00 in 1959 to show differences in growth. Between 1959 and 1969 the market income of the median tax unit increased at approximately the same rate as real GDP/N. But since then GDP/N has increased substantially while the market income of the median tax unit has trended downward.

But this picture changes when we compare it to our lower and upper bound measures of the median American's disposable income—household size-adjusted disposable income excluding and including the market values of Medicare, Medicaid, and ESI of persons— in Figure 1, measures more in line with GDP/N than the market income of the median tax unit. While growth in real GDP/N has outpaced both of these fuller measures of the median Americans household size-adjusted disposable income, the difference is much less than when GDP/N is compared to the market income of the median tax unit, especially since 1973.

6. Summary and Conclusion

Using Census Bureau estimates of the market value of in-kind transfers and Current Population Survey (ASEC-CPS) data over the period 1979 to 2007, Burkhauser et al. (2012b) construct measures of income and its distribution. Here we extend their work forward to 2016 and back to

[22] Between 1959 and 1969 real GDP per capita increased from $22,321 to $30,566 (36.9 percent) while the real median market income of tax units rose from $30,628 to $39,806 (40.9 percent) in 2018 dollars. But since then the increase in real mean GDP has substantially outpaced the growth in median market income of tax units. Both series were adjusted using the CPI-U-RS. When we instead use the PCE index to adjust both series (See Appendix Figure 2A), the qualitative conclusions are identical, but measured GDP per capita grows slightly faster as the PCE measures inflation to be lower than the CPI-U-RS, particularly after 1980. The same is the case for our measurements of tax unit or household income when comparing the two different indices.

1967 using ASEC-CPS data and couple it with decennial Census data for 1959. With this newly linked data set, we provide a fresh look at the twenty-year period from 1959 to 1979 and show that the choice of income sources, sharing unit, and the unit of analysis substantially change our understanding of how the American middle class fared both absolutely and relative to the rest of the income distribution over a period stretching from near the end of the Eisenhower Administration in 1959 to the end of the Obama Administration in 2016.

Focusing solely on the market income of tax units which is the most common measure of income in the tax-based income inequality literature (e.g. see Atkinson, Piketty and Saez, 2011 for a review of this literature) we find that over the business cycle of 1959-1969 cumulative real market income of the median tax unit rose substantially and the Gini coefficient of this measure of income fell as a growing economy "lifted all boats."

This result is more pronounced when using our broader measures of income. The launch of New Frontier and Great Society programs during this business cycle, which were heavily tilted toward the bottom part of the income distribution, as well as the maturing of Social Security led to even larger increases for the bottom of the income distribution and a reduction of overall income inequality. However, since 1969 the growth in the median market income of tax units has trended flat or downward. Researchers focusing on this narrow measure of economic wellbeing since 1969 will find that the rich got richer, the poor got poorer and the income of the middle class stagnated.

Consistent with accepted standards in the survey-based literature this dismal picture dramatically changes when we: broaden our measure of income to include government taxes and transfers; expand our sharing unit to include all members of the household; make the person our unit of analysis; and adjust household income to account for the number of persons in the

household. After doing so, we show that between 1969 and 1979, rather than declining, income increased for the median American and Gini coefficients continued to fall.

Thus by extending our survey-based data set back to the business cycle peak year 1959 and using it as the starting point for our study of median income and income inequality we are able to demonstrate that the stagnation of the market income of the median tax unit effectively began in 1969 as did the increase in Gini coefficients for that measure of income.

However, we also show that government tax and transfer policies have transformed a 23.0 percent cumulative increase (0.36 percent annual rate) in the market income of the median tax unit between 1959 and 2016 into a lower bound 130.4 percent or an upper bound 153.7 percent increase (1.47 and 1.65 percent annual rate, respectively) when we more fully account for taxes and transfers, and use the proper sharing unit and unit of analysis. Doing so we show that while over this period the rich got substantially richer, so did poor and middle class Americans.

Measures of median income and income inequality that exclude the market value of in-kind transfers will substantially understate the impact of government policies in offsetting the stagnation in median market income and the rise in market income inequality since 1969.

References

Achenbaum, W. A. (1986). *Social Security: Visions and Revisions A Twentieth Century Fund Study*. Cambridge: Cambridge University Press

Alvaredo, F., Atkinson, A. B., Piketty, T., Saez, E., and Zucman, G. (n.d.) *WID – The World Wealth and Income Database.* Accessed at: http://www.wid.world/ (May 25, 2016).

Armour, P., Burkhauser, R. V., and Larrimore, J. (2014). "Levels and Trends in U.S. Income and its Distribution: A Crosswalk from Market Income towards a Comprehensive Haig-Simons Income Approach." *Southern Economic Journal*, 81(2): 271–293.

Atkinson, A. B., Guio, A-C, and Marlier, E. (2015). "Monitoring the Evolution of Income Poverty and Real Incomes over Time." *Centre for Analysis of Social Exclusion*, Number 188 (March).

Atkinson, A. B., and Brandolini, A. (2001). "Promises and Pitfalls in the Use of Secondary Data Sets: Income Inequality in OECD Countries as a Case Study." *Journal of Economic Literature*, 39(3): 771–779.

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

Blank, R. (2011). *Changing Inequality*. Berkeley: University of California Press.

Bureau of Economic Analysis, NIPA Table 7.1. Accessed at: http://www.bea.gov/iTable/index_nipa.cfm (May 25, 2016).

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

Burkhauser, R. V., Larrimore, J., and Simon, K. (2013). "Measuring the Impact of Valuing Health Insurance on Levels and Trends in Inequality and how the Affordable Care Act of 2010 Could Affect Them." *Contemporary Economic Policy*, 31(4): 779–794.

Burkhauser, R. V., Larrimore, J., and Simon, K. I. (2012b). "A 'Second Opinion' on the Economic Health of the American Middle Class." *National Tax Journal*, 65(1): 7–32.

Burkhauser, R., Larrimore, J. and Lyons, S. (2017). "Measuring Health Insurance Benefits: The Case of People with Disabilities." *Contemporary Economic Policy*, 35(3): 439–56.

Burtless, G., and Milusheva, S. (2013). "Effects of Employer-Sponsored Health Insurance Costs on Social Security Taxable Wages." *Social Security Bulletin*, 73(1): 83–108.

Burtless, G., and Svaton, P. (2010). "Health Care, Health Insurance, and the Distribution of American Incomes." *Forum for Health Economics & Policy*, 13(1). DOI: 10.2202/1558-9544.1194.

Canberra Group. (2011). *Handbook on Household Income Statistics, 2nd ed*. Geneva: United Nations Economic Commission for Europe.

[CBO] Congressional Budget Office. (2012). *The Distribution of Household Income and Federal Taxes, 2008 and 2009*. Washington, DC: U.S. Government Printing Office.

[CBO] Congressional Budget Office. (2013). *The Distribution of Household Income and Federal Taxes, 2010*. Supplemental data. Accessed at: http://www.cbo.gov/publication/44604.

[CMS] Center for Medicare and Medicaid Services. (2005). "Key Milestones in Medicare and Medicaid History, Selected Years: 1965-2003." *Health Care Financing Review.* 27(2):1-3.

Collinson, R., Ellen, I. G., and Ludwig, J. (2016). “Low-Income Housing Policy”. In R. A. Moffitt (ed.), *Economics of Means Tested Transfer Programs in the United States*. Chicago, IL: University of Chicago Press for the NBER, Vol. 2. pp. 59-126.

Daly, M., and Valletta, R. (2006). “Inequality and Poverty in United States: The Effects of Rising Dispersion of Men’s Earnings and Changing Family Behaviour.” *Economica*, 73(289): 75–98.

d’Ercole, M. M., and Förster, M. M. (2012). “The OECD Approach to Measuring Income Distribution and Poverty: Strengths, Limits and Statistical Issues.” In D. J. Besharov and K. A. Couch (eds.), *European Measures of Income and Poverty: Lessons for the U.S.*, New York: Oxford University Press, pp. 27–58.

Feenberg, D., and Coutts, E. (1993). “An Introduction to the TAXSIM Model.” *Journal of Policy Analysis and Management*, 12(1): 189–94.

Fox, L., Garfinkel, I., Kaushal, N., Waldfogel, J., and Wimer, C. (2015). “Waging War on Poverty: Historical Trends in Poverty using the Supplemental Poverty Measure.” *Journal of Policy Analysis and Management*, 34(3): 567–592.

Garner, T., and Short, K. (2012). “The Supplemental Poverty Measure: A Joint Project between the Census Bureau and the Bureau of Labor Statistics.” Interagency Technical Working Group.

Gordon, R. (2016) *The Rise and Fall of American Growth: The U.S. Standard of Living since the Civil War*, Princeton NJ: Princeton University Press.

Gottschalk, P. and Smeeding, T. (1997). “Cross-National Comparisons of Earnings and Income Inequality.” *Journal of Economic Literature*, 35(2): 633–687.

Hoynes, H., Schanzenbach, D. W. and Almond, D. (2016). "Long-Run Impacts of Childhood Access to the Safety Net." *American Economic Review*, 106(4): 903-934.

Kaestner, R. and Lubotsky, D. (2016). "Health Insurance and Income Inequality." *Journal of Economic Perspectives* 30(2): 53-78.

Kramer. F. D. (1988). *From Quality Control to Quality Improvement in AFDC and Medicaid.* National Academy Press. Washington, DC.

Larrimore, J., Burkhauser, R. V., and Armour, P. (2015). "Accounting for Income Changes over the Great Recession: The Importance of Taxes and Transfers." *National Tax Journal*, 68(2): 281-318.

Larrimore, J., Burkhauser, R., Auten, G. and Armour, P. (2017). "Recent Trends in U.S. Top Income Shares in Tax Record Data Using More Comprehensive Measures of Income, Including Accrued Capital Gains." NBER Working Paper 23007. Cambridge, MA: National Bureau of Economic Research.

Larrimore, J., Burkhauser, R. V., Feng, S., and Zayatz, L. (2008). "Consistent Cell Means for Topcoded Incomes in the Public Use March CPS (1976–2007)." *Journal of Economic and Social Measurement*, 33: 89–128.

Lyons, M. (2015). *Health Reform, Physician Market Power, and Income Disparity*. Ph.D. diss., Cornell University.

Mittag, N. (2019). "Correcting for Misreporting of Government Benefits." *American Economic Journal: Economic Policy*. 11(2): 142-164.

Moffitt, R. A. (2015). "The Deserving Poor, the Family, and the U.S. Welfare System." *Demography*, 52(3): 729–749.

Moon, M. (1993). *Medicare Now and in the Future*. Washington DC: Urban Institute Press.

Mulligan, C. (2012). *The Redistribution Recession: How Labor Market Distortions Contracted the Economy*. New York: Oxford University Press.

Nolan, B., Roser, M., and Thewissen, S. (forthcoming). GDP per Capita versus Median Household Income: What Gives Rise to Divergence over Time. *Review of Income and Wealth*.

[OMB] Office of Management and Budget. (2016). Table 12.3 – Total Outlays for Grants to State and Local Governments, by Function, Agency, and Program: 1940-2017. Accessed at: https://www.whitehouse.gov/omb/budget/Historicals.

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

Piketty, T., Saez, E., and G. Zucman. (2018). "Distributional National Accounts: Methods and Estimates for the United States." *Quarterly Journal of Economics*, 133(2): 553–609.

[OECD] Organization for Economic Cooperation and Development. (2008). *Growing Unequal? Income Distribution and Poverty in OECD Countries*. Paris: OECD Publishing.

———. 2011. *Divided We Stand: Why Inequality Keeps Rising*. Paris: OECD Publishing.

———. 2015. *In It Together: Why Less Inequality Benefits* All. Paris: OECD Publishing.

Rowland, D. (2005). "Medicaid at Forty." *Health Care Finance Review*, 27(2): 63-77.

Ruggles, P. (1990). *Drawing the Line: Alternative Poverty Measures and their Implication for Public Policy*. Washington, DC: Urban Institute Press.

Ruggles, S., Flood, S., Goeken, R., Grover, J., Meyer, E., Pacas, J. and M. Sobek. IPUMS USA: Version 9.0 [1960, 1970, 1980, 1990]. Minneapolis, MN: IPUMS, 2019. https://doi.org/10.18128/D010.V9.0

Semega, J., Fontenot, K. and Kollar, M. (2017). “Income and Poverty in the United States: 2016.” U.S. Census Bureau, Washington.

Sommers, B. D., and Oellerich, D. (2013) “The Poverty-Reducing Effect of Medicaid.” *Journal of Health Economics*, 32(5):816–832.

Stewart, K., and Reed, S. (1999). “Consumer Price Index Research Series Using Current Methods, 1978–98.” *Monthly Labor Review*, 122(6): 29–38.

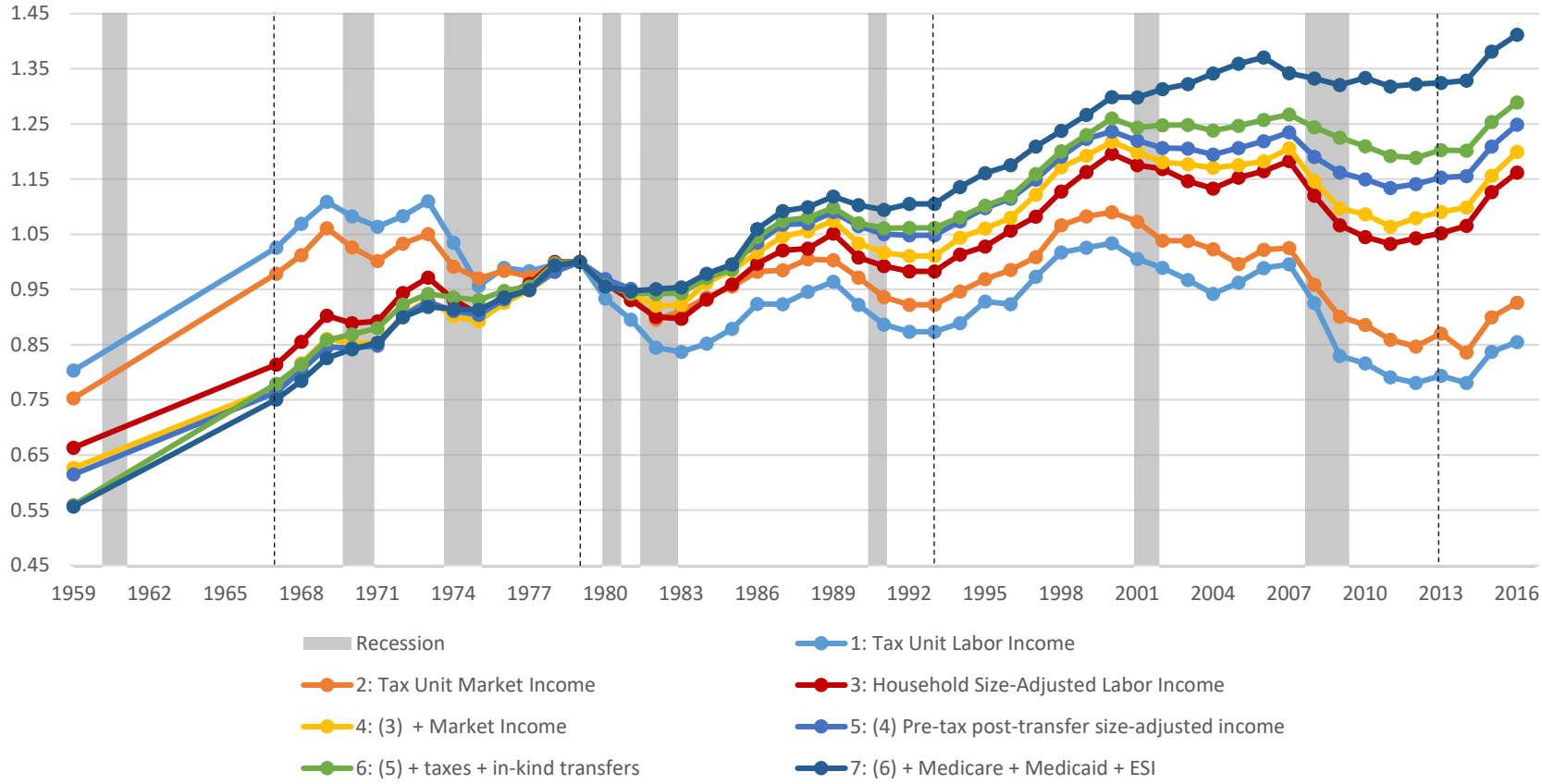
U.S. Census Bureau (1973). Statistical Abstracts of the United States, 1967-1978. Accessed at: https://www.census.gov/prod/www/statistical abstract.html.

U.S. Census Bureau (2000). Historical National Population Estimates, 1900-1999. Accessed at: http://www.census.gov/popest/data/national/totals/pre-1980/tables/popclockest.txt.

U.S. Department of Agriculture (2013). National School Lunch Program Fact Sheet. Accessed at: http://www.fns.usda.gov/sites/default/files/NSLPFactSheet.pdf.

U.S. Department of Agriculture (2014). National Level Annual Summary Tables: FY 1969-2014. Accessed at: http://www.fns.usda.gov/pd/child-nutrition-tables.

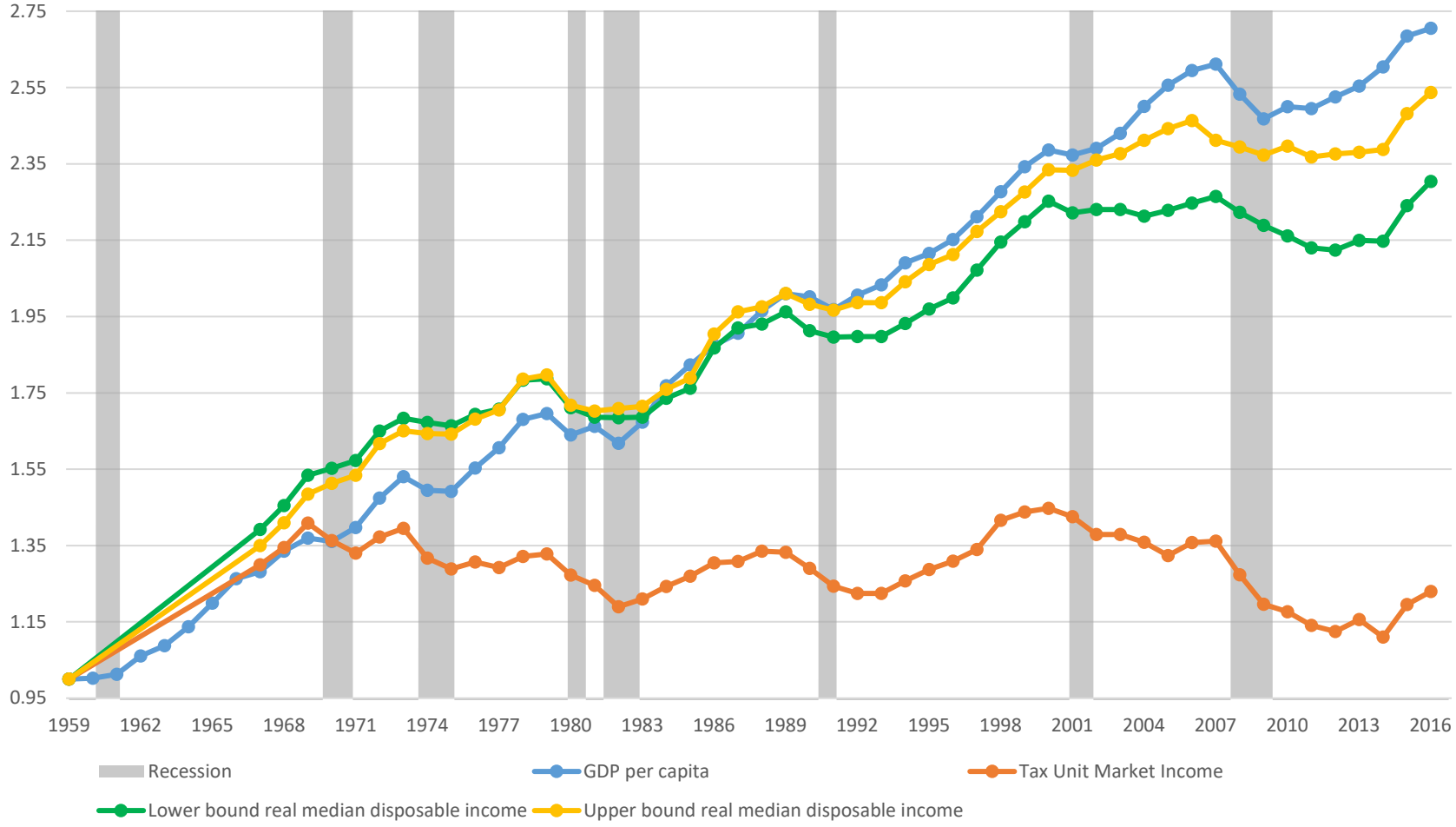
Figure 1. Alternative Measures of Median Income Normalized to 1979 Levels (1959-2016)



Sources: Authors' calculations using the ASEC-CPS, NHEA, White House Budget Historical Tables, Statistical Abstracts of the U.S., Census Bureau population estimates, USDA SNAP Data Tables and Child Nutrition Tables, BLS CPI for Medical Care in U.S. City Average, CMS Medicare Enrollment Data, MACPAC Medicaid Enrollment Data, Kramer (1988), Collinson et al. (2016), Hoynes et al. (2016). Taxes calculated using NBER TaxSim.

Notes: Median income trends normalized to one in 1979 with NBER recession dates in gray. In keeping with previous work (Armour et al., 2014; Burkhauser et al., 2012b; Larrimore et al., 2015), "Series 1: Tax Unit Labor Income" measures the size-unadjusted labor income of tax units. Series 2 adds market income. In series 3-7 we adjust for persons in the household using the square-root of household size. Vertical dashed lines signify breaks in the data due to start of our use of ASEC-CPS data with our new imputations in 1967; start of standard ASEC-CPS data in 1979; and assumption that all changes in income between 1992 and 1993 and between 2013 and 2014 were due to the change in CPS survey methods with prior years adjusted accordingly.

Figure 2. Trends in Real GDP per Capita, Real Taxable Market Income of the Median Tax Unit and Real Disposable Household Size-Adjusted Income (Lower and Upper Bound) of the Median Person Normalized to 1959



Sources: Market income of the median tax unit and the upper and lower bound household size-adjusted disposable income of the median person are from authors' calculations using ASEC-CPS and the 1960 decennial Census. Income per-capita from the Bureau of Economic Analysis NIPA Table 7.1. All series adjusted using CPI-U-RS.

Notes: Income series reported here are the same as in Figure 1 except with values normalized to income year 1959.

Table 1. Income Growth for 1959-2016 and 1959-2007 using Alternative Measures of Income by Quintiles

					Household Size-Adjusted Post-Transfer		
	Labor Income of Tax Units (1)	Market Income of Tax Units (2)	Household Size-Adjusted Labor Income of Persons (3)	Household Size-Adjusted Market Income of Persons (4)	Pre-Tax Income of Persons (5)	Post-Tax Income + In-Kind Income of Persons (6)	Post-Tax Income + In-Kind Income + Medicare + Medicaid + ESI of Persons (7)
Panel A:							
Median	6.4%	23.0%	75.1%	91.3%	103.1%	130.4%	153.7%
Q1	-52.7%	-75.5%	-61.3%	18.0%	109.0%	183.8%	262.0%
Q2	-4.7%	20.7%	35.5%	63.3%	88.5%	119.7%	157.6%
Q3	8.6%	24.3%	75.7%	91.9%	103.8%	130.4%	154.5%
Q4	41.6%	54.0%	103.4%	116.2%	120.4%	145.1%	162.2%
Q5	110.6%	121.2%	149.8%	160.4%	157.2%	164.7%	175.7%
Top 5%	146.7%	155.0%	190.6%	193.4%	184.9%	179.3%	186.8%
Panel B:							
Median	24.0%	36.2%	78.2%	92.4%	100.8%	126.4%	141.2%
Q1	-75.7%	-20.4%	-30.9%	34.9%	108.9%	188.1%	246.8%
Q2	21.0%	47.9%	45.7%	68.2%	85.3%	116.5%	144.9%
Q3	28.5%	37.1%	78.0%	93.4%	101.0%	126.7%	141.9%
Q4	56.4%	63.7%	99.5%	113.5%	115.4%	140.0%	149.1%
Q5	108.5%	119.2%	135.5%	148.0%	144.0%	154.0%	155.7%
Top 5%	134.5%	142.2%	168.6%	173.9%	164.9%	165.4%	163.5%

Sources: Authors' calculations using ASEC-CPS, NHEA, White House Budget Historical Tables, Statistical Abstracts of the U.S., Census Bureau population estimates, USDA SNAP Data Tables and Child Nutrition Tables, BLS CPI for Medical Care in U.S. City Average, CMS Medicare Enrollment Data, MACPAC Medicaid Enrollment Data, Kramer (1988), Collinson et al. (2016), Hoynes et al. (2016). Taxes calculated using NBER TaxSim.
Notes: Panel A: 1959-2016, Panel B: 1959-2007.

Table 2. Gini Coefficients for Business Cycle Peaks (1959-2007) and 2016

					Household Size-Adjusted Post-Transfer		
	Labor Income of Tax Units (1)	Market Income of Tax Units (2)	Household Size-Adjusted Labor Income of Persons (3)	Household Size-Adjusted Market Income of Persons (4)	Pre-Tax Income of Persons (5)	Pre-Tax Income + In-Kind Income of Persons (6)	Pre-Tax Income + In-Kind Income + Medicare + Medicaid + ESI of Persons (7)
1959	0.507	0.488	0.423	0.411	0.392	0.362	0.350
1969	0.496	0.479	0.409	0.401	0.363	0.319	0.308
1973	0.519	0.498	0.430	0.419	0.366	0.320	0.306
1979	0.532	0.495	0.443	0.419	0.366	0.304	0.288
1989	0.566	0.523	0.479	0.451	0.401	0.346	0.326
2000	0.595	0.558	0.505	0.480	0.436	0.369	0.342
2007	0.603	0.568	0.509	0.485	0.439	0.376	0.342
2016	0.635	0.594	0.532	0.502	0.448	0.384	0.341

Sources: Authors' calculations using the March ASEC-CPS, NHEA, White House Budget Historical Tables, Statistical Abstracts of the United States, Census Bureau population estimates, USDA SNAP Data Tables and Child Nutrition Tables, BLS CPI for Medical Care in U.S. City Average, CMS Medicare Enrollment Data, MACPAC Medicaid Enrollment Data, Kramer (1988), Collinson et al. (2016), Hoynes et al. (2016). Taxes calculated using NBER TaxSim.
Notes: Gini values are for all business cycle peaks and the final year of the Obama administration.

APPENDIX

The major data tasks of this paper are to use data from the yearly CPS-ASEC and the decennial Census to first, create seven income series for 1959 and for all years from 1967 through 1978 that are consistent with those developed by Burkhauser et al. (2012b)—using the CPS-ASEC for 1979-2012—and second, to extend these series to 2016.[23] While the CPS-ASEC includes estimates of the values of in-kind transfers, including school lunches, food stamps, housing subsidies, Medicare and Medicaid, and employer-sponsored health insurance (ESI), for the years 1979-2013 (survey years 1980-2014), this is not the case for prior years. Furthermore, beginning in 2014 the CPS-ASEC stopped providing estimates of the market value of Medicare and Medicaid, although it continued to include other sources of in-kind income. Since 1992 CPS-ASEC surveys include some estimates of federal tax liability and credits; however these are not available in most years and do not include estimated state and payroll tax liabilities in earlier years. No information on in-kind resources or taxes and credits are available in the 1960 Census. Hence, to consistently build the seven income series over all the years we use in the text, we must impute both the receipt and market value for these missing resources in our data set. Below we discuss the construction of the decennial Census and CPS series we use in the text with our major focus on the imputed components of our seven income measures.

Comparing Decennial Census-based and CPS-based Income Measures

The seven income series we use in the text require us to subdivide total income into subsets based on the source of that income. The CPS-ASEC asks more detailed questions

[23] Both the Census and the CPS-ASEC collect data on income during the calendar year prior to the survey. Thus, the 1960 Census covers income year 1959, and the 1968-2017 CPS covers income years 1967-2016. This appendix refers to the year during which the income was received, excepting when references are regarding specific survey years (e.g. the 1960 Census or 1968 CPS) or unless otherwise noted.

regarding sources of income than does the decennial Census data so we must make some imputations to construct a decennial Census data series-based equivalent in four of the income series we use in the text.[24] The income series requiring imputations in the Census data are (1) Market Income of Tax Units; (2) Household Size-Adjusted Market Income of Persons; (3) Household Size-Adjusted Post-Tax Post-Transfer Income of Persons; and (4) Household Size-Adjusted Post-Tax Post-Transfer Income plus Medicare, Medicaid, and ESI of Persons.[25] Since there is no CPS-ASEC data for income year 1959, we make our imputations for the 1960 Census data (income year 1959) using the 1968 CPS data (income year 1967) for any sources of cash income, and using the 1980 CPS data (income year 1979) for income from in-kind transfers.

Using the 1968 CPS data, it is straightforward to measure (1) since the CPS from 1968 on contains separate questions for: a) wage and self-employment income, b) business income, c) farm income, d) Social Security, e) dividends, interest, and rent, f) welfare or public assistance, g) unemployment and workmen's compensation, h) alimony, i) private pensions, and j) anything else. While the 1960 decennial Census contains separate questions for a, b, and c, it lumps all other income into a single "all other income" question. Hence, it combines all these other sources of income into a single category.

We add categories (a, b, c, e, h, and i) in the 1968 CPS to estimate market income. This is not possible in the 1960 decennial Census, however, since (e, h, and i) are grouped with (d, f, g,

[24] These Census surveys cover income years 1959, 1969, 1979, and 1989. Only 1959 is included in the income series in the main text. The other Census years are used to demonstrate the compatibility of our CPS and Census estimates.
[25] "Household" refers to all individuals who occupy a house, apartment, or group of rooms constituting a housing unit, regardless of their relationships with each other. Aside from the two tax-unit measures (labor- and market-income of tax units), all our measures are aggregated to include the resources from all household members. However, for several resources, for example ESI and foods stamps, we impute receipt for families rather than households, as this is the level at which eligibility would be determined and because this is consistent with the estimates of these benefits in the CPS survey since 1980. A family is a group of related (by blood or marriage) individuals within a household. In some cases a household and a family are equivalent, but many households have multiple families or unrelated individuals. But as mentioned, while resources may be imputed to families, they are aggregated to households when estimating our income series.

and j). Both the decennial Census and CPS ask increasingly detailed questions in later years, but the decennial Census questions are always relatively less detailed, and even in the 1990 decennial Census some sources of market income, specifically alimony, are still grouped in the "other income" category. Therefore, it is necessary to impute the proportion of "other income" in the Census that should be included in market income for individuals in each decennial Census year.

To do so, we construct a separate definition of income in the CPS that includes all of the income sources in the "other income" category for the decennial Census in the same year except for the 1960 Census when we use the 1968 CPS. We then follow a procedure similar to the HBAI-SPI2 adjustment in Burkhauser et al. (2016). We start by ordering individuals in the CPS for the relevant year by earned income (the sum of wage, farm, and self-employment and business income). We then assign them to percentiles, and within each percentile in the CPS calculate the fraction of the "other income" category that comes from the CPS categories that should count as market income. We match these percentiles to the individuals in the equivalent percentiles in the Census, and use the estimated fractions to assign individuals in the Census an appropriate amount of their "other income" when estimating market income.

This imputation performs well for the higher income quintiles, but less so in lower-income quintiles, and especially the lowest quintile. This problem results from substantial heterogeneity in the composition of low-income tax units and households relative to those in higher income quintiles. Specifically, low-income units have large shares of those who have low market income because they are relatively young, and those who have low market income because they are past retirement age. However, these groups have rather different amounts and

sources of other income, and so estimates assigning the same fraction of other income to both groups perform less well when we compare our decennial Census series to the CPS.

To address this issue, we take the imputation one step further. In addition to estimating the fraction of other income by earned-income percentiles, we split this imputation into three separate groups: young (< 20 years), middle (> 19 and < 65 years), and old (> 64 years). In doing so, the relevant fraction of other income is estimated from a population that has more consistently similar sources of other income. While the decennial Census estimates of mean incomes for the first quintile are still less accurate than those for higher income quintiles, the estimates are significantly more accurate than those estimated using only earned income percentiles.

To evaluate our efforts to recreate our CPS income series using the decennial Census, we compare the overlapping years of the two data sets (1969, 1979, and 1989) in Appendix Table 1A. We use five different income measures to compare the series: (1) size-adjusted earned income of tax units, (2) size-adjusted market income of tax units, (3) size-adjusted market income of households, (4) size-adjusted pre-tax post-transfer income of households, and (5) size-adjusted post-tax post-transfer income of households. We compare both the median and mean of each measure for each year.

While there are random differences due to sampling, we expect some of the measures to be more similar than others. In particular, we would expect measure (4): size-adjusted pre-tax post-transfer income of households to be the most similar across data sets as it is the only series for which no imputations are necessary. Both the decennial Census and the CPS are household surveys, so there is no estimation of analysis units. Furthermore, all of the questions in both surveys regarding income sources counted in pre-tax post-transfer income are grouped such that

no imputation is necessary.[26] Thus, we expect measure (4) to be the closest. Measures (1), (2), and (5) all require imputation of tax units, and measures (2) and (3) require imputing sources of market income in the decennial Census.

Panel A compares the medians of the five measures across the two data sets. For each year the estimates of each data set are shown, followed by the percentage difference between the decennial Census estimate and the CPS. As expected, measure (4) is the most consistently similar of the series overall, with the decennial Census estimates slightly overestimating the CPS estimates, but by a difference of 1.0 percent or less in all three years. The other measures have larger differences between the CPS and the decennial Census measures, but the differences are smaller than 4 percent, with a few exceptions: measures (1) (the labor income of tax units) and (3) (the market income of households) in 1979, and measure (2) (the market income of tax units) in 1989. This is not unexpected as all three of these measures involve some of the most important imputations: the imputation of market income or of tax units themselves.

Panel B compares the means of each measure. While the mean deviations are slightly larger, size-adjusted pre-tax post-transfer income of households is still overall the closest measure, with the largest deviation being a 2.1 percent underestimate of the CPS measure in 1979. Measure (3), the market income of households, now has the largest difference of 5.1 percent in 1979, but otherwise the results are largely similar to those of Panel A. Overall, it is encouraging that our Census series relatively accurately replicates the measures of our CPS series, thereby supporting our use of the 1960 Census to create an initial point for the series.

[26] Reported incomes may also differ across the two surveys if there are systematic differences in peoples' responses due to, for instance, answering more questions in the CPS survey about more specific sources of income.

Estimating Taxes

Similar to Armour et al. (2014) we impute tax liabilities using NBER Taxsim 9.3 based on the year and state of residence for each tax unit within a household. Tax units are assigned using the procedure from Armour et al. (2014), as described in Burkhauser et al. (2012b) and Piketty and Saez (2003). Married couples, divorced or widowed individuals, and single individuals over the age of 20 are all considered their own tax unit, as are never-married children under 20 who live alone.

Estimating tax liabilities and credits is straightforward for 1979-2007, the years considered by Armour et al. (2014), as well as years after 2007. However, estimating taxes in earlier years poses additional challenges that require additional assumptions. Specifically, NBER Taxsim does not estimate state taxes prior to 1977, and the CPS does not uniquely identify all 51 states prior to 1976. Smaller states are grouped as several states in some cases; for instance, between 1968 and 1971 Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont are all assigned the same state code.

To address these issues, we use a procedure similar to Fox et al. (2015). We first compute each tax unit's state tax liability for the year 1977 for all households surveyed prior to 1977, regardless of the year the tax unit appeared in the CPS. Tax units for which a unique state is not identifiable are assigned to the state in the region with the largest population in 1977. These state tax liabilities are then deflated using the CPI-U-RS. Determining tax unit status of filers versus non-filers is also a difficulty. We follow Burkhauser et al. (2012b) and include all tax units regardless of filing status as it is not possible to differentiate between filers and non-filers prior to 1993. For a discussion of median income analyzing only filers after 1993, see Burkhauser et al. (2012b). As with imputations for income sources using the CPS for years prior to 1979, this

simple tax model is a first approximation and subject to greater noise than the NBER model used for more recent years.

Imputing Medicare Receipt and Value

The primary data contribution of this paper is providing the first estimates of the value of government- and employer-provided health insurance at the household level for 1959-1978. This process consists of two steps: first imputing whether a family or individual is covered by Medicare, Medicaid, or ESI, and second imputing the (ex-ante) value of health insurance conditional on source and receipt.

We assign Medicare receipt to all individuals age 65 or older starting in 1967 since Medicare was almost universal for these eligible adults, even in the early years of the program. Beginning in 1973 Medicare eligibility was extended to nearly 2 million additional individuals that were under age 65 but had been receiving Social Security Disability Insurance (DI) for at least two years. The CPS only reports receipt of Social Security benefits and does not distinguish between Old-Age Insurance (OAI), Survivors Insurance (SI), and Disability Insurance (DI), nor does it provide information on how long benefits have been received.

Because OAI cannot be received before age 62, we assume that only those under the age of 62 who report receiving Social Security benefits for the years 1973-1978 were potentially receiving Medicare. However, we exclude widows age 60 or 61 because post-1965 they could be receiving Social Security through DI or through SI (Achenbaum 1986). We also cannot distinguish those receiving OAI and DI who are age 62-64 and assume no one in this age group is receiving DI.[27]

[27] Questions related to a person's disability were not asked in the CPS until 1980.

Our imputation will overstate the number of Medicare recipients to the extent that individuals age 65 or older have not enrolled in the Medicare program, for instance because they are still working and have private health insurance, or for individuals under age 62, because they have been receiving DI for less than 24 months and hence are not yet eligible for Medicare. We understate Medicare participation for those aged 62-64 whose Social Security benefits are from DI and for widows' age 60-61 who are also receiving DI. In practice, simply assigning Medicare receipt to all individuals who report Social Security income, are under age 62 and are not widows age 60-61 overstates the number of Medicare enrollees based on a disability in the administrative data.

We correct this imputation by probabilistically assigning receipt of Medicare to only a subset of individuals between 18 and 61 who receive Social Security income and are not widows age 60-61. To estimate the probability of Medicare receipt in the years 1967-1978 for such individuals, we predict the probability of receipt for this same group of individuals in 1979 (CPS survey year 1980), which contains receipt of both Social Security income and Medicare, using a probit model. The outcome is whether or not an individual received Medicare coverage, and the predicting variables are the individual's age, race, sex, educational attainment, and marital status. Using these predicted probabilities for the years 1967-1978, we probabilistically assign Medicare receipt such that the number of recipients imputed to receive Medicare due to DI receipt is equal to the number of such recipients in administrative data. We adjust these administrative totals downward in every year by the fraction of DI Medicare recipients captured in 1979. This approach for assigning receipt of Medicare receipt probabilistically according to the estimated probabilities, rather than to the individuals estimated to be most likely to receive coverage, follows the approach recommended by Mittag (2019).

To estimate the market value of Medicare receipt for the years 1967-1978, we first obtain the market values of Medicare from the CPS in 1979, separately by state and risk class (aged or disabled). We assign these market values to the corresponding imputed recipients for 1967-1978 after deflating the 1979 values by the ratio of average per-recipient expenditures in the target year relative to average per-recipient expenditures in 1979. These per-recipient averages are calculated using total spending and enrollees from the National Health Expenditure Accounts. As with estimating taxes, one obstacle in estimating the market value of Medicare by state is that some states are not uniquely identified prior to 1976. For these states and years, we assign a population-weighted average of the market value in each risk class for states within the same grouping based on 1970 Census population counts.

Estimating Medicaid Receipt and Value

Unlike Medicare, Medicaid is administered at the state level. In addition, its implementation was staggered across states. While Medicaid was created at the federal level in 1965, state-level programs were optional but incentivized by matching federal funds.[28] By 1966, 25 states had implemented Medicaid. By 1972 all but one had done so.[29] Medicaid receipt was initially closely linked to receipt of cash welfare, and from income year 1967 and on, the CPS includes "Welfare or public assistance" as a source of income. Additionally, SSI was added as a separate income category in 1976.[30] In any year after a given state implements Medicaid, we

[28] States had substantial flexibility in designing their Medicaid programs, but were required to cover children in low-income families with single parents on welfare as well as those receiving aid from state programs for the elderly, blind, and disabled. Many states had programs to cover these individuals prior to the implementation of the federal Supplemental Security Income (SSI) program in 1974. Because states who chose to expand were required to cover both these groups, enrollment in Aid to Families with Dependent Children (AFDC) and SSI automatically made individuals eligible for Medicaid in expansion states (CMS 2005, Rowland 2005).
[29] Arizona first implemented a Medicaid program in 1982.
[30] Before 1976, the CPS includes AFDC, SSI, payments from state-based old-age assistance programs, or state payments to the blind or disabled prior to the implementation of SSI. After 1976, receipt of public assistance and SSI are reported separately.

assign coverage to all members of a family receiving welfare or public assistance, but exclude adults who did not themselves receive AFDC or SSI payments.

Imputing Medicaid receipt is also complicated by the state-level program implementation combined with non-unique identifiers for some states in pre-1976 CPS samples. For respondents in these states, it is not possible to identify the year in which they would first have been able to obtain coverage. To assign Medicaid receipt to respondents in states that were not uniquely identified, we assign receipt probabilistically, with the assignment probabilities in each year created using the population share of the states in the grouping that had implemented Medicaid in that year using the 1970 Census population.

We estimate the market value of Medicaid receipt using the average value by risk class in each state for income year 1979 (CPS survey year 1980), again weighted by population shares for states that are not uniquely identified. We form risk classes based on age but not disability status because the CPS contains insufficient information to identify disabled individuals in these early years.[31] The 1979 Medicaid market values are then scaled down to the years from 1967-1978 using the ratio of average per-recipient expenditures in that year to average per-recipient expenditures in 1979 as measured using the National Health Expenditure Accounts and administrative counts on the number of Medicaid recipients, analogous to our procedure for estimating the value of Medicare receipt.

Estimating Employer-Sponsored Health Insurance (ESI)

Imputing receipt of private health insurance is more difficult than for Medicare and Medicaid because private coverage is neither universal nor based on uniform eligibility criteria, and no questions were asked relating to coverage in the CPS prior to 1980. We predict receipt of

[31] Implicitly this assigns all individuals imputed to receive Medicaid a market value that is an average of the market value for the disabled risk class and the non-disabled risk class for individuals in their age group.

employer-sponsored health insurance (ESI) to family units with at least one working member in years prior to income year 1979 using a probit model estimated using the 1980 CPS. The outcome variable is whether any family member received ESI. The predicting variables are the age, sex, race, educational attainment, marital status, and full- versus part-time work status of the family head, total family income, and the number of workers in the family. Following Mittag (2019), receipt is probabilistically assigned according to the estimated probabilities, rather than to the families estimated most likely to receive coverage, until the number of covered individuals equals our estimate of the number of people with ESI coverage each year.

We are unaware of administrative counts or other estimates of the number of ESI recipients in years prior to 1979. To estimate the number of ESI recipients, we divide ESI expenditures recorded in the NHEA for 1959 through 1979 by our estimate of the average value of ESI per-recipient in those years. In each year, we reduce the total expenditures by the ratio of estimated benefits captured in the CPS in 1979 to the amount reported in the NHEA in 1979 so that our series captures a consistent fraction of ESI spending. We estimate the average, per-recipient value of ESI benefits from 1979 and deflate this amount to prior years using the medical expenditures CPI. Dividing the adjusted NHEA expenditure totals by these estimates of per-recipient ESI benefits provides a first approximation of the total number of recipients in each year. We then use it to estimate the number of imputed recipients in each year. The use of the medical expenditures CPI may understate growth in the real value of ESI benefits as this implicitly assumes the real value of these benefits was constant between 1959 and 1978.

We estimate the value of receiving ESI coverage using a linear model estimated on the subsample of ESI recipients in the 1979 where the value of ESI benefits received is the outcome and the predicting variables are the number of adults in the family, the number of children, and

the family's state of residence. We then use these estimates to predict the value of ESI benefits for those imputed to be covered by ESI from 1967-1978. The value for each individual person is then deflated according to the health expenditures CPI in each year relative to 1979. As with other in-kind benefits, we assign a population-weighted average value of ESI to families in states that are not uniquely identified in the CPS.

Estimating Food Stamps, School Lunches, and Housing Subsidies

Our method of estimating the receipt and market value of food stamps for 1967-1978 is conceptually similar to Fox et al. (2015), in that we estimate a model of benefit receipt for a year in which data on benefits are available, and we then use these estimates to assign receipt of benefits to individuals for years in which benefit data are not available. We predict whether families (rather than households) receive food stamps in 1979 (1980 CPS survey) using a linear probability model where the outcome is whether any family member reports food stamp benefits. The variables we use to predict receipt include the numbers of adults and children in the family, the age, sex, race, and marital status of the family head, whether the family received cash welfare, and the family's total pre-tax cash income. We apply the estimates from 1979 to predict family receipt of food stamps from 1967-1978.

The food stamp program implementation varied across counties within states. However, the smallest geographic area identifiable for all observations in the CPS is the state. To account for varying implementation dates across counties within states, we scale each family's predicted probability of food stamp receipt based on the share of a state's population residing in counties that had implemented the program for each year. Information on county implementation dates are obtained from Hoynes et al. (2016). County population counts are from the 1970 Decennial Census. Similar to other programs' imputations, for families in states that are not uniquely

identified prior to 1976 we weight the share of population in counties with a food stamp program by the share of the population in each state in the group.

Based on these predicted family probabilities we assign receipt again following the probabilistic method from Mittag (2019) so that the imputed number of families receiving food stamps matches administrative counts for the number of enrollees in each year. This administrative count is the actual administrative total reported by the USDA beginning in 1969 (USDA 2014) and by Kramer (1988) for years prior to 1969, scaled by the ratio of food stamp recipients reported in 1979 to the administrative count of enrollees in 1979.

To estimate the value of food stamp benefits conditional on receipt, we estimate a linear model on the data for income year 1979 (1980 CPS survey) with the estimated family-value of food stamps as the outcome variable, and using the number of adults and children in the family interacted with family income as well as income squared and cubed as predicting variables. We then apply the estimates from this linear model to the predicted food stamp recipients in the CPS from 1967-1978 with the predicted values winsorized at the 5^{th} and 95^{th} percentiles. We scale the values for food stamp receipt so that the aggregate value in each sample year equals the total spending on food stamps recorded in administrative data, with the administrative totals adjusted in each year by the total fraction of benefits captured in 1979.

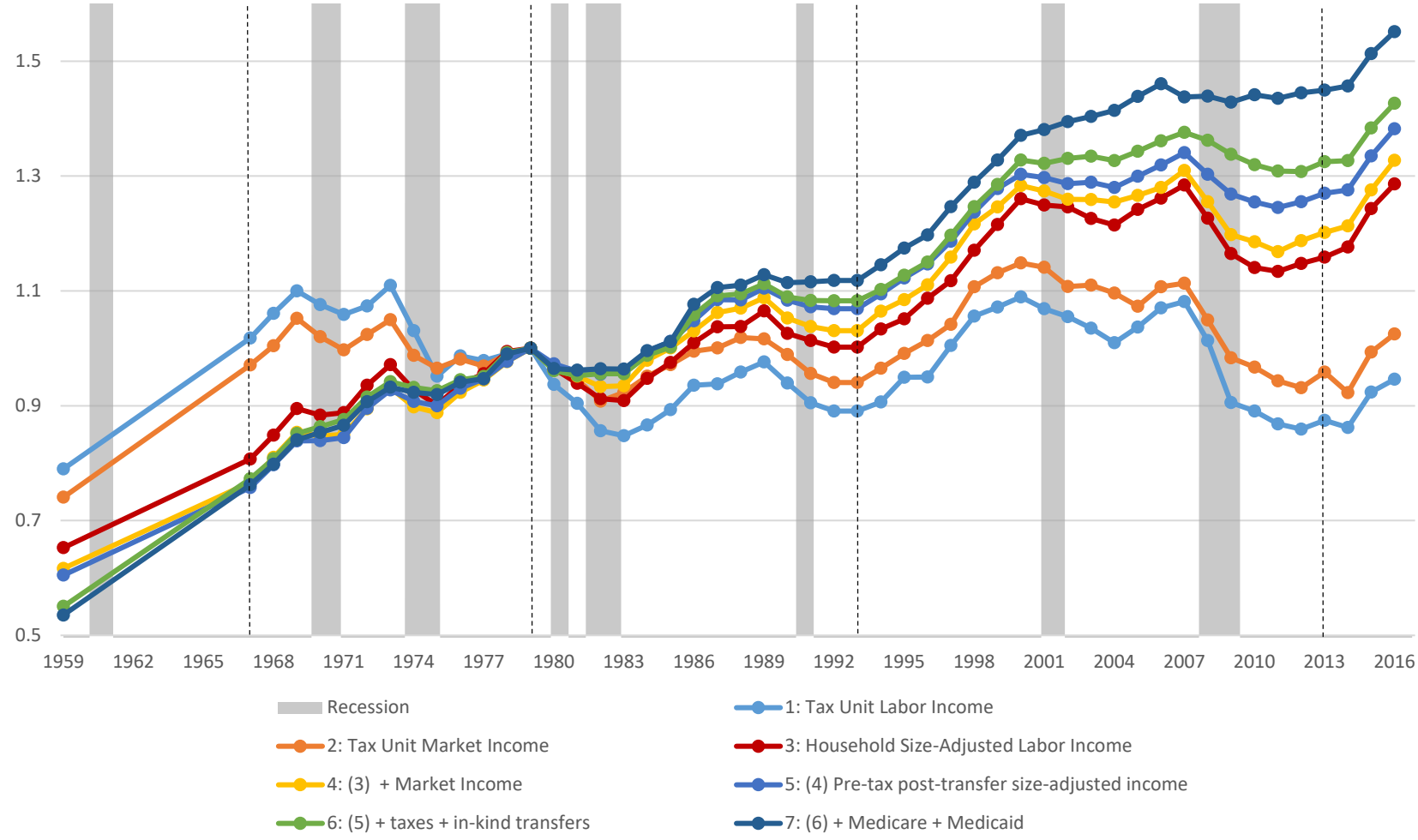
We use a similar method in our imputations for school lunches and housing with only minor differences. The school lunch program was available in all states from 1967-1978, and thus receipt probabilities are not scaled based on county implementation dates. Housing subsidy imputations are identical to imputations of school lunches except that our aggregate counts are of the number of covered families and not the number of individuals. Thus, we target the number of families covered in our CPS imputation to the administrative count of the number of families

covered, and scale these totals in each year by the ratio of CPS-to-administrative families measured in 1979 to maintain a constant share of families covered. In addition to 1967-1978, our imputation for housing benefits applies to our 1960 Census sample as well. Food stamp and school lunch benefits were insignificant or zero in 1960. Because the 1960 Census sample contains fewer income categories than the 1968 CPS, welfare receipt is not included in predicting housing subsidy receipt in 1960.

APPENDIX FIGURES AND TABLES

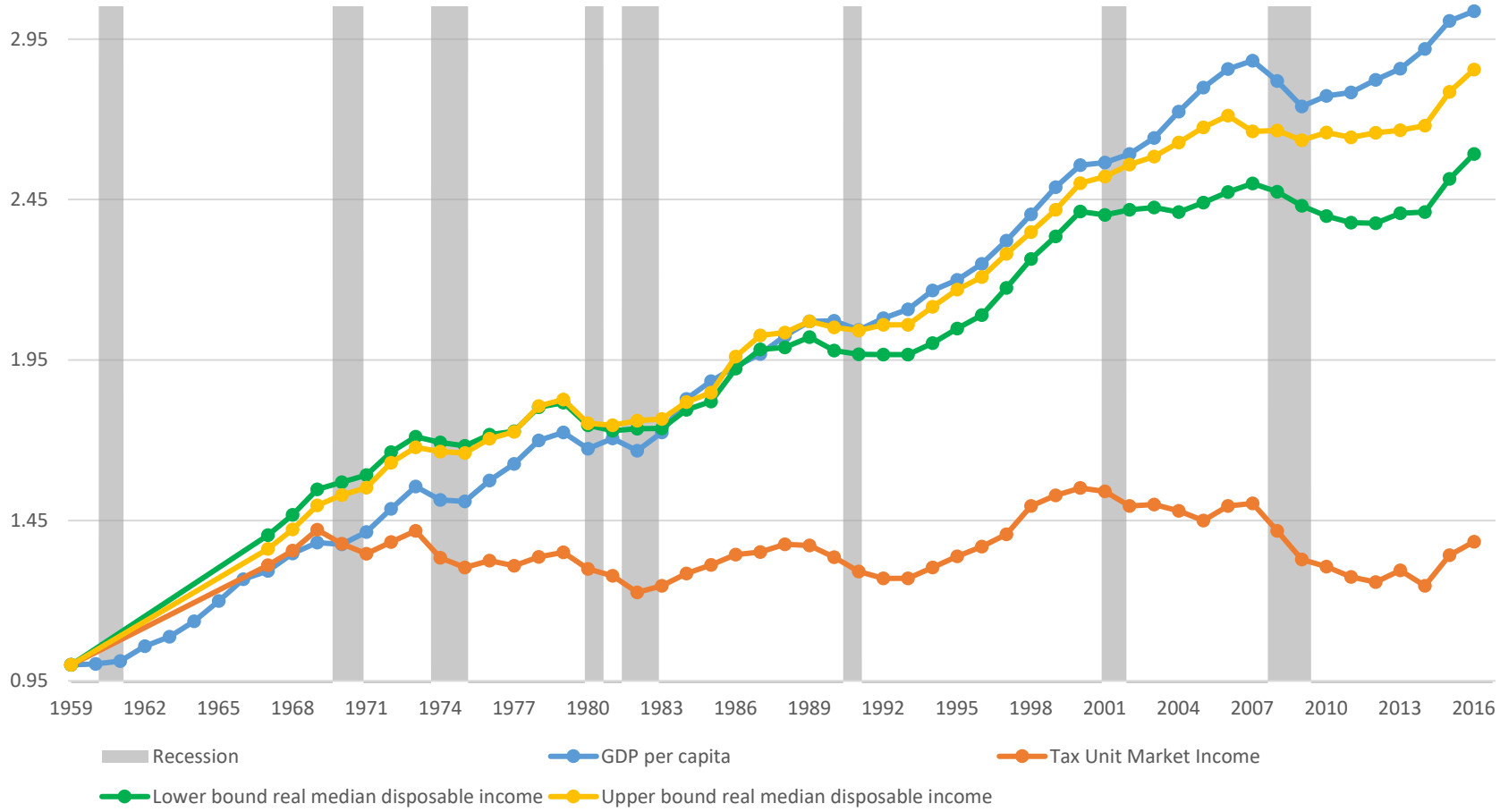
Appendix Figure 1A recreates Figure 1 using the PCE index instead of the CPI-U-RS to adjust for inflation. While overall growth is slightly higher since 1959 (because the PCE measures inflation as being slightly lower than the CPI), the qualitative results are essentially unchanged. Appendix Figure 2A repeats this exercise for Figure 2. Appendix Table 1A compares the CPS-based and decennial Census-based medians and means of each income series, for years in which both data sources are available.

Appendix Figure 1A. Alternative Measures of Median Income Normalized to 1979 Levels (1959-2016)



Sources: Data from Figure 1 combined with annual PCE series from BEA.

Appendix Figure 2A. Trends in Real GDP per Capita, Real Taxable Market Income of the Median Tax Unit and Real Disposable Household Size-Adjusted Income of the Median Persons Normalized to 1959



Sources: Median market tax unit income and the upper and lower bound median disposable income from authors' calculations using March CPS and the 1960 decennial Census. Income per-capita from the Bureau of Economic Analysis NIPA Table 7.1. All series adjusted using PCE.
Notes: Same series as in Figure 1 with values normalized to income year 1959.

Appendix Table 1A. Comparisons of CPS-based and Decennial Census-based Medians and Means (1969, 1979 and 1989)

	1969			1979			1989		
	CPS	Decennial Census	%	CPS	Decennial Census	%	CPS	Decennial Census	%
Panel A:									
Medians									
Tax Units									
Labor income	40,723	41,595	-2.1%	36,719	38,483	-4.6%	35,401	35,294	0.3%
Market income	43,157	42,809	0.8%	40,675	41,624	-2.3%	40,815	43,137	-5.4%
Size-adjusted households									
Market income	27,893	27,634	0.9%	32,411	31,113	4.2%	34,824	35,053	-0.7%
Pre-tax post-transfer	29,125	28,903	0.8%	34,431	34,088	1.0%	37,560	37,411	0.4%
Post-tax post-transfer	24,707	24,342	1.5%	28,720	28,450	0.9%	31,603	31,652	-0.2%
Panel B:									
Means									
Tax Units									
Labor income	44,950	46,443	-3.2%	44,732	46,895	-4.6%	47,475	48,128	-1.4%
Market income	49,378	49,304	0.2%	51,398	51,643	-0.5%	55,953	57,842	-3.3%
Size-adjusted households									
Market income	32,643	31,986	2.1%	37,543	35,727	5.1%	42,694	42,885	-0.4%
Pre-tax post-transfer	34,594	33,927	2.0%	40,472	39,658	2.1%	46,227	45,898	0.7%
Post-tax post-transfer	27,878	27,667	0.8%	31,566	32,050	-1.5%	36,391	37,412	-2.7%

Sources: Authors' calculations using the March CPS and the decennial Census. Taxes calculated using NBER TaxSim.
Notes: Percentage differences are the deviation of the decennial Census from the CPS.