Consumption and Income Inequality in the United States since the 1960s

Bruce D. Meyer

University of Chicago, National Bureau of Economic Research, and American Enterprise Institute

James X. Sullivan

University of Notre Dame and Wilson Sheehan Lab for Economic Opportunities

Recent research concludes that the rise in consumption inequality mirrors, or even exceeds, the rise in income inequality. We revisit this finding, constructing improved measures of consumption, focusing on its well-measured components that are reported at a high and stable rate relative to national accounts. While overall income inequality rose over the past 5 decades, the rise in overall consumption inequality was small. The declining quality of income data likely contributes to these differences for the bottom of the distribution. Asset price changes likely account for some of the differences in recent years for the top of the distribution.

I. Introduction

The extent of inequality is an important factor in the debates on some of our largest policy issues including income tax policy, immigration, and globalization. Until recently, the debate over inequality relied almost

We thank Jeehoon Han, Michael Murto, and Matt Brown for their tremendously helpful research assistance. We have benefited from the comments of Robert Moffitt and seminar participants at the American Economic Association, Brookings Institution, Bureau of Labor Statistics, Canadian Economic Association Annual Meetings, the Consumer Expenditure Survey Data Needs Forum, Cornell University, the European Association of Labor Economists/Society of Labor Economics joint meetings, Indiana University–Purdue

Electronically published January 26, 2023

Journal of Political Economy, volume 131, number 2, February 2023.

https://doi.org/10.1086/721702

exclusively on earnings and income data. Official income statistics indicate that inequality has increased sharply. But these official statistics may not accurately reflect changes in economic well-being. They ignore taxes and transfers and rely on income that is badly reported in surveys. Even improved income measures reflect transitory changes and fail to capture consumption out of financial wealth and durables such as housing and cars and, therefore, provide a narrow, short-term view of how well-being has changed.

Consumption may provide a better indicator of economic well-being for several reasons. Consumption better reflects long-run resources and is more likely to capture disparities that result from differences across families in the accumulation of assets or access to credit. Consumption will reflect the loss of housing service flows if home ownership falls, the loss in wealth if asset values fall, and the belt-tightening that a growing debt burden might require, all of which an income measure would miss. Furthermore, consumption is more likely than income to be affected by access to public insurance programs. Thus, consumption will do a better job of capturing the effects of changes in access to credit or the government safety net. In addition to these conceptual advantages, consumption may better reflect economic well-being because of measurement issues—income has been shown to be substantially underreported in surveys, especially for those with few resources, and the extent of underreporting has increased over time (Meyer and Sullivan 2003, 2011; Meyer, Mok, and Sullivan 2015). Empirical evidence supports the notion that consumption is a better measure of well-being than is income. For example, consumption has been shown to be more strongly correlated with other indicators of economic well-being than income (Meyer and Sullivan 2003, 2011, 2012a).

Several researchers have documented the patterns in consumption inequality. While some previous work has shown little change in consumption inequality over the past few decades, some more recent studies have concluded that the rise in consumption inequality mirrors, or even exceeds, the rise in income inequality. These differences arise from the use of different data sources or definitions of consumption (i.e., nondurable vs. total consumption), and different methods of addressing measurement error.

Our study advances this literature by presenting new evidence on consumption inequality that relies on improved measures of consumption. To account for measurement error in consumption, we take a simple

University Indianapolis, Institute for Research on Poverty at the University of Wisconsin, Iowa State University, Massachusetts Institute of Technology, National Tax Association Spring Symposium, Peking University, Stanford University, the University of Chicago, the University of Paris, and Wheaton College. This paper was edited by James Heckman.

approach that relies on clear, testable, and transparent assumptions. In addition, we show that the conclusion from previous work that consumption inequality trends mirror those for income inequality is overturned when well-measured components of consumption are relied upon. We also extend the literature by providing results for both income and consumption inequality for more recent years that span the Great Recession and by considering possible explanations for changes in inequality over time and why the patterns for income and consumption inequality differ.

To address concerns about measurement error in consumption, we build upon recent evidence showing that some components of consumption reported in survey data compare quite favorably to national accounts, both in levels and in changes over time. Other components are sharply underreported, with this bias increasing over time (Bee, Meyer, and Sullivan 2015). We construct a measure of consumption that relies on the well-measured components. These components represent an important share of overall consumption—they include key components such as food at home, housing, and vehicles. Even though several other papers rely on subsets of total consumption, they rarely test the conditions under which distributional statistics for these subsets can be extrapolated to total consumption. We show that the validity of well-measured consumption as a proxy for total consumption is robust to income and price changes—it is close to a constant share of total consumption and has aggregate price changes similar to the total consumption bundle.

We report measures of inequality for income and consumption over the past 5 decades, using income data from the Current Population Survey and consumption data from the Consumer Expenditure Interview Survey. We investigate inequality patterns in different parts of the distribution by reporting ratios of percentiles, focusing on the 90:10, 90:50, and 50:10 ratios that are less affected by errors in the extreme tails. Thus, our analyses capture changes in the bulk of the distribution but not in the extreme tails.

Using our improved measures of consumption, we show sharp differences in the patterns for consumption and income inequality. Since the early 1960s, the rise in income inequality as measured by the 90:10 ratio (25%) has significantly exceeded the rise in consumption inequality (9.5%). Furthermore, this much smaller percentage increase in consumption inequality started from a considerably lower base. In some decades, such as the 1960s and 1990s, income and consumption inequality moved in parallel, but in other decades the differences were sharp. In the 1980s, inequality for both measures rose, but the increase was much greater for income (26%) than for consumption (5%). After 2005, these measures moved in opposite directions as income inequality rose sharply while consumption inequality fell. The differences between income and consumption through 2005 are almost exclusively in the bottom half of

the distribution, indicating that the underreporting of consumption by the rich is not an explanation for the differences.

Our main results are robust to using different measures of consumption, including total consumption, and we find similar results when we use the demand system approach proposed by Aguiar and Bils (2015) that is designed to correct for systematic measurement error. We also show that the sharp differences between our main results and those of Aguiar and Bils can be explained by the sensitivity of their results to small changes in how consumption is defined—if one uses their approach to address measurement error but focuses on large or well-measured consumption components, excluding tiny, poorly measured components that do not fit their assumed functional form, the resulting patterns for consumption inequality are very similar to the patterns we find and are therefore sharply different from those for income.

We also consider several possible explanations for the differences in these patterns. Decompositions show that changing demographics can account for some of the changes in consumption inequality, but they account for little of the changes in income inequality. We also find that the divergence between income and consumption inequality measures is almost exclusively concentrated in single-parent-headed families and single individuals, who have the largest increases in income inequality but the largest declines in consumption inequality. The declining quality of income data is likely an important reason for the differences between income and consumption at the very bottom. Given the evidence on limited assets and debts for those near the bottom, borrowing and saving do not appear to be a significant explanation for the differences. However, changes in asset prices likely account for some of the differences between the measures in recent years for the top half of the distribution.

II. Previous Research on Income and Consumption Inequality

Official measures of income inequality, which are based on the pretax money income of the household, indicate that inequality has risen steadily in the United States since the mid-1970s; between 1975 and 2017, the 90:10 ratio rose by 49% (Semega et al. 2020). Many studies have considered alternative approaches to measuring income inequality by, for example, adjusting for changes in family size and accounting for taxes and in-kind transfers, and accrued capital gains (Burkhauser, Feng, and Jenkins 2009; Heathcote, Perri, and Violante 2010; Armour, Burkhauser, and Larrimore 2014; Fisher, Johnson, and Smeeding 2015; Piketty, Saez, and Zucman 2018; Larrimore et al. 2021). A common finding in this literature is that measures of income that more closely reflect resources available for consumption display a less noticeable increase in inequality in recent

decades than other measures of income. Research using data on tax filing units finds a sharp increase in inequality in the very top percentiles (Piketty and Saez 2003, 2007; Piketty, Saez, and Zucman 2018), though other research has argued that definitional changes, tax base changes, income shifting, and other tax responses and measurement issues have exaggerated these changes (Reynolds 2007; Guvenen and Kaplan 2017; Auten and Splinter 2019; Splinter 2020; Larrimore et al. 2021).

The evidence from the consumption inequality literature on whether consumption inequality trends are different from income is mixed. Cutler and Katz (1991) find that changes in consumption inequality were comparable to changes in income inequality for the period between 1960-61 and 1988, but Slesnick (1994) finds consumption inequality rose less than income inequality for the 1960–91 period. Several studies indicate that consumption inequality has risen less than income inequality since the early 1980s (Johnson and Shipp 1997; Slesnick 2001; Krueger and Perri 2006; Heathcote, Perri, and Violante 2010). Fisher, Johnson, and Smeeding (2015) indicate that income and consumption inequality follow similar patterns from 1984–2006, but the patterns diverge between 2006 and 2011.

All of these studies that conclude that the rise in consumption inequality is more muted than the rise in income inequality rely on expenditure data from the Consumer Expenditure (CE) Interview Survey (the CE has both an interview and diary component), which provides the most comprehensive data on household spending for a nationally representative sample. However, there are many consumption categories in the interview data, including alcohol, tobacco, and jewelry, that are greatly underreported and for which underreporting has risen over time (Bee, Meyer, and Sullivan 2015).

Recent studies have questioned the validity of these data and have argued that once one corrects for the measurement error, the evidence indicates that changes in consumption inequality mirror or exceed changes in income inequality (Attanasio, Battistin, and Ichimura 2007; Aguiar and Bils 2015; Attanasio, Hurst, and Pistaferri 2015). These studies use the less well-measured CE Diary Survey as well as some of the poorly measured CE Interview Survey components. These papers tend to use clever approaches to try to overcome the measurement error issues, but the assumptions are largely untestable. Expenditures in the CE Diary Survey tend to be less well reported than in the CE Interview Survey. For nearly all categories, the interview survey data compare more favorably to national aggregates than the diary data (Bee, Meyer, and Sullivan 2015). In addition, diary data generate biased trends in inequality due to the short time interval over which consumption is reported, combined with changes in shopping frequency and the size of purchases—Coibion, Gorodnichenko, and Koustas (2017) conclude that most of the rise in

expenditure inequality since 1980 calculated using the diary survey can be accounted for by changing shopping patterns.

Employing a demand system approach, estimates from Aguiar and Bils (2015) indicate that consumption inequality rose more than income inequality over the period from 1980 to 2010. Attanasio and Pistaferri (2014) use data from the Panel Study of Income Dynamics (PSID) to measure consumption inequality. Historically, the PSID included only a few components of consumption, but additional components have been added in recent years. Some of the components of consumption measured in the PSID are ones that, at least for the CE data, have not compared well to national aggregates and have been deteriorating over time, such as food away from home and childcare (Bee, Meyer, and Sullivan 2015). Blundell, Pistaferri, and Saporta-Eksten (2016) report comparisons to National Income and Product Accounts (NIPA) for two broad categories in the PSID: nondurables and services (including food away from home and childcare). These comparisons indicate that for nondurables and services, the PSID to NIPA ratio ranges from 0.64 to 0.73 for the years from 1998 to 2008, which is significantly lower and varies more noticeably over time than the ratio for the key consumption components in the CE that we rely on for our analyses. Attanasio and Pistaferri (2014) use the relationship between a total spending measure in the PSID and spending on food in the PSID in recent years to impute a measure of total spending for the years prior to 1999. This procedure relies on having a base year without underreporting of any goods, which is not available given the long-standing differential underreporting for some expenditure components.

III. Econometric Model

To address concerns about measurement error, we estimate changes in inequality using a measure of consumption that relies on its well-measured components. Under a few simple assumptions, changes in inequality in well-measured consumption is an appropriate proxy for changes in inequality of total consumption. In particular, our model of consumption with measurement error is

$$\ln x_{hjt} = \ln x^{*}_{hjt} + \psi^{j}_{t} + \nu_{hjt}, \tag{1}$$

where x is observed consumption; x^{*} is true consumption; and h indexes households, j goods, and t years. Here, ψ^{j}_{t} is systematic error in good j in year t, while v_{hjt} is idiosyncratic error that is assumed to be uncorrelated with x^{*}_{hjt}.

We split goods into two composite categories: w for well measured and n for not well measured. Because one of the features of the components

of well-measured consumption is that the reporting of these goods has changed little over time, as discussed below, we assume that v_{hwt} has the same distribution over time. For the goods where there is substantial evidence of declining quality of reporting, v_{hnt} is not required to have the same distribution over time. Thus, ψ_t^j allows for changes in the reporting of goods and services consumed that differs across goods and over time.

This simple model allows us to calculate changes in distributional statistics, in particular, ratios of percentiles, directly from the well-measured components under two additional assumptions. First, we assume that the well-measured components are a constant share of the total (plus an error) as total consumption rises. In other words,

$$\ln x_{hwt}^* = \alpha + \ln x_{ht}^* + \varepsilon_{hwt}, \tag{2}$$

so that the total consumption elasticity of the well-measured components is one. Second, we require that the price of the well-measured consumption components has not changed relative to the price of the entire market basket. Equation (2) would include the relative price of well-measured components, but if relative prices do not change, they can be safely ignored. Importantly, these two assumptions can be directly examined. While they do not hold exactly, they are fairly close to true, as we show in section VI.

Given these assumptions, estimates of changes in various indicators of inequality in well-measured consumption approximate changes in inequality in total consumption. By inserting equation (2) into the version of equation (1) where $j = w$ and exponentiating, we get

$$x_{hwt} = x_{ht}^* e^{\alpha + \psi_t^w} e^{\varepsilon_{hwt} + v_{hwt}}. \tag{3}$$

This equation expresses observed well-measured consumption as true total consumption times two functions of errors; the first is constant across households and differences out, while the second error differs across households and requires further discussion. In section D of the appendix, we show that, under the assumption that these errors are independent of true consumption and their distributions do not change over time, changes in the variance of well-measured consumption are equal to changes in the variance of true total consumption; and we note that, with an additional distributional assumption, changes over time in the ratios of percentiles for both income and consumption would be reduced by measurement error. This approach ignores the part of the dispersion in well-measured consumption that comes from the idiosyncratic error in equation (3). Although typically not explicitly stated, ignoring this error is standard in the inequality literature (Krueger and Perri 2006;

Blundell, Pistaferri, and Preston 2008) but worth noting. Much of the income inequality literature similarly ignores idiosyncratic error.

As a robustness check, we also employ the demand system approach of Aguiar and Bils. Combining their equations (1) and (2), we have

$$\ln x_{hjt} = \ln x^{*}_{hjt} + \psi^{j}_{t} + \phi^{i}_{t} + \nu_{hjt}. \tag{4}$$

This equation adds ϕ^{i}_{t} to our equation (1), allowing systematic measurement error to vary by income quintile and time. This additional flexibility comes at substantial expense, and we argue that it is not needed in the case of well-measured consumption components. First, one needs to globally linearize the model. Given the wide range of the data, it is not clear what biases this generates. More fundamentally, one cannot estimate any standard measures of inequality, such as unconditional quantiles or Gini coefficients. Rather, through inverting the demand system and globally linearizing it, one can estimate the ratio of the mean of consumption within one measured income quintile (which is prone to substantial error that has changed over time) to the mean of consumption within another measured income quintile.

Assumptions on the errors are required to consistently estimate any measure of inequality using the AB demand system approach. The assumption emphasized by AB is that the systematic measurement error (mean understatement or overstatement) in logs is the same for all incomes for a given good and time period, except for a common degree of systematic error (mean understatement or overstatement) that is the same for all goods but differs by income. This assumption relies on the lack of interaction effects; in other words, underreporting does not vary over time with income differentially for different goods. Although this assumption is untestable, it is likely to be a good approximation when there is no or little systematic error in the goods examined. For goods that have substantial error, however, this assumption is less plausible. If the primary source of measurement error is underreporting, as is strongly suggested by recent research (Bee, Meyer, and Sullivan 2015; Meyer, Mok, and Sullivan 2015), then if there is little overall bias (underreporting) that leaves little room for there to be differential underreporting by income. On the other hand, when a good is greatly underreported on average, it mechanically leaves much more room for there to be misreporting that varies by income.

For this model to say anything about the distribution of consumption as opposed to the mean of consumption within income quintiles, one would need to make some fairly strong assumptions on the joint distribution of income and consumption and how it has changed or not changed over time. As with our base model, one must additionally assume that the errors are uncorrelated with the true values. This model is overidentified

and can be estimated with only a few categories of goods. We rely on this below when considering the robustness of the results to small changes in the set of goods employed.

IV. Data and Measures of Income and Consumption

The official inequality measures in the United States are based on data from the Current Population Survey Annual Social and Economic Supplement (CPS). We use data from the 1964–2018 CPS surveys, which provide information on income for the previous calendar year. Our analysis focuses on after-tax money income, although we also consider a pretax measure of income as well as one that includes the cash value of some transfers. See section C of the appendix for more details.

Our consumption data come from the CE Interview Survey, which is the most comprehensive source of consumption data in the United States. We use data from the 1960–61, 1972–73, 1980–81, and 1984–2017 survey years. For our main analyses, we report measures of total consumption and well-measured consumption (described in sec. VI), focusing on the latter. To convert reported expenditures into a measure of consumption, we make a number of adjustments. First, we convert vehicle spending to a service flow equivalent, which we calculate using information on the market value of the car and a fixed depreciation rate. Second, to convert housing expenditures to housing consumption for homeowners, we substitute the reported rental equivalent of the home for the sum of mortgage interest payments, property tax payments, spending on insurance, and maintenance and repairs. Finally, we exclude spending that is better interpreted as an investment such as spending on education and health care and outlays for retirement including pensions and social security. To adjust for differences in family size and composition, we scale all income and consumption measures in the paper using an equivalence scale recommended by the National Academy of Sciences (NAS; Citro and Michael 1995). For more details on the CE, its sample frame, and our measures of consumption, see sections A and B of the appendix.

V. Income and Consumption Underreporting

Income in the CPS is substantially underreported, especially for categories of income important for those with few resources and the extent of underreporting has increased over time. Many studies that either compare weighted microdata to administrative aggregates (Meyer and Sullivan 2003, 2011; Meyer, Mok, and Sullivan 2015) or link survey data to administrative microdata (Meyer and Mittag 2019; Meyer, Mittag, and Goerge 2022) have shown that government transfers are significantly underreported. Other studies have shown that other components of

income are significantly underreported, including earnings (Davies and Fisher 2009) and retirement income (Bee and Mitchell 2017). For more discussion, see Meyer and Sullivan (2021). The direct substitution of administrative program data for survey data shows that measures of poverty and inequality are sharply overstated when calculated using reported income (Bee and Mitchell 2017; Meyer and Mittag 2019).

There is also substantial evidence that aggregate consumption is underreported in the CE and that this underreporting has increased over time. However, Bee, Meyer, and Sullivan (2015) show that among the eight largest categories of expenditures in the CE Interview Survey for which comparable CE and National Account data are available, six are reported at a high rate and that rate has been roughly constant over time. These well-measured categories are the imputed rent on owner-occupied nonfarm housing, rent and utilities, food at home, gasoline and other energy goods, communication, and new motor vehicles. In 2010, the ratio of CE to personal consumption expenditures is 0.95 or higher for imputed rent, rent and utilities, and new motor vehicles. The largest poorly measured expenditure categories are food away from home, with a ratio of 0.51, furniture and furnishings at 0.44, clothing at 0.32, and alcohol at 0.22, and for all of these poorly measured categories, the ratio has fallen noticeably since 1980. Bee, Meyer, and Sullivan (2015) also show that ownership of durables such as houses and vehicles is reported reasonably well, which is important because information on ownership of these durables is used to calculate service flows that are included in consumption.

VI. Addressing Underreporting of Consumption

To address concerns about measurement error in consumption, we build upon this evidence that some components of consumption reported in the CE compare quite favorably to national accounts, both in levels and in trends, while other components do not compare well and are deteriorating in quality.[1] In particular, we construct a measure of economic well-being that is based on "well-measured consumption," which is composed of the components that have been shown to be measured well: food at home, rent plus utilities, gasoline and motor oil, the rental value of owner-occupied housing, and the rental value of owned vehicles.[2]

[1] The conclusion that spending categories that compare favorably to national accounts or other aggregates are better measured implicitly assumes that most of the misreporting is underreporting. This assumption seems reasonable given that underreporting appears to be the dominant pattern that one finds for income and consumption in surveys (Meyer, Mok, and Sullivan 2015).

[2] Even though it is well measured, we exclude communication because this category of expenditures changes greatly over time with the introduction of cell phones and other changes.

As discussed in section III, there are two key requirements for well-measured consumption to serve as an accurate proxy for total consumption: the well-measured components should have a total consumption elasticity of one, and their prices should not change over time relative to those of all items consumed. We first examine whether well-measured consumption is roughly a constant share of total consumption, as total consumption rises.[3] In table A.1, we report average consumption for three different measures: total consumption, well-measured consumption, and well-measured consumption less food consumed at home. We also calculate the means for these measures by quintile of total consumption, excluding the bottom and top 5% of overall consumption because those observations are disproportionately likely to be in error. Overall, we see in table A.1 that the well-measured components account for 59% of total reported consumption in 1980 and 64% in 2017. When food at home is excluded, the well-measured components account for 43% of the total in 1980 and 52% in 2017. The higher share in the more recent year is partly or wholly attributable to the increased underreporting of the poorly measured components of consumption over time.

The ratio of means by quintile provide evidence on whether well-measured consumption is roughly a constant share of total consumption. In 1980, the well-measured share falls from 0.68 in the bottom quintile to 0.55 in the top quintile. In 2017, the fall is less pronounced, from 0.72 to 0.60. That the well-measured share falls a bit as total consumption rises occurs partly by construction. Because we are dividing observations into groups on the basis of the denominator; when we examine a higher quintile, it will naturally have a lower ratio because the classification will partly be due to cases where the denominator has a large positive reported (but not necessarily true) value. In table A.2, we classify consumer units into consumption quintiles based on well-measured consumption and find that the share is nearly the same in the top and bottom quintiles in 1980 and falls only from 0.62 to 0.60 in 2017. Thus, it appears that much of the decline is due to this bias. We find similar evidence when we examine the ratio of well-measured consumption less food to the total.

While table A.1 clearly shows the reported shares do not change much as total consumption rises, there is still a concern, but little evidence, that underreporting rises with income. Most of this concern seems to be focused on the very top percentiles of income and expenditures that we exclude. Furthermore, there is a remarkable similarity over time in the relationship between reported income and reported expenditures. Sabelhaus

[3] While well-measured consumption being a constant share is not required if the expenditure elasticity is only locally one, we are implicitly testing whether it is globally equal to one.

et al. (2015) show that the ratio of expenditures to income at very high incomes is virtually the same in 2010 as in the early 1970s.

We also directly estimate the total consumption elasticity of well-measured consumption. The concern is that if well-measured consumption has an elasticity much below one, then it would understate the growth in inequality as total consumption rose. Conversely, if well-measured consumption is elastic, inequality based on this measure would overstate the rise in inequality as total consumption rose. In the top panel of table 1, we report the coefficient on total consumption from an ordinary least squares (OLS) regression of the logarithm of well-measured consumption on the logarithm of total consumption. We have separate rows for 1980 and 1988 but focus on 1980 because of the declining reporting over time of some of the components of total consumption. The elasticity estimate in the first column of the first row is 0.93, close to one but statistically significantly below one given the precision of the estimate. In the second column, we consider estimates for well-measured consumption less food at home, our alternative version of well-measured consumption. Given

TABLE 1
Total Consumption Elasticities of Well-Measured Consumption

Model, Sample Restriction, Year and Sample Size	Independent Variable	Dependent Variable: Log Well-Measured Consumption	Dependent Variable: Log Well-Measured Consumption Less Food at Home
Ordinary least squares:			
None:			
1980, $N = 19{,}073$	Log total consumption	.928	1.169
		(.001)	(.001)
1988, $N = 20{,}294$	Log total consumption	.810	.967
		(.005)	(.008)
Instrumental variables, instrument = log income:			
Complete income reporters between 5th and 95th percentile of income:			
1980, $N = 14{,}531$	Log total consumption	.944	1.167
		(.001)	(.002)
1988, $N = 15{,}596$	Log total consumption	.829	.997
		(.009)	(.013)

Note.—All data are from the Consumer Expenditure Interview Survey. Well-measured consumption includes spending on food at home, rent (for renters), rental equivalent (for homeowners or those in government or subsidized housing), utilities, service flows from owned vehicles, and spending on gasoline and motor oil. Income and consumption are adjusted for differences in family size using the NAS-recommended equivalence scale.

that food at home is often taken to be the prototypical necessity, it is not surprising that the resulting elasticity estimate is above one, in this case 1.17, even further above one than the earlier estimate was below one. For 1988, the estimates in both cases are slightly lower, 0.81 for well-measured consumption and 0.97 for well-measured consumption excluding food at home.

There are potential issues with these OLS regressions because total consumption contains the dependent variable and because it is subject to substantial error since it includes the poorly measured components of consumption. We thus instrument total consumption with income, recognizing that income is measured with error as well, particularly in the tails. We include only consumer units designated complete income reporters and those who are not in the tails of the income distribution (dropping the top and bottom 5%). The resulting instrumental variables (IV) estimates indicate similar but usually slightly higher elasticities than those reported in the top panel. Again, the estimates for well-measured consumption including food at home are under one, while those for well-measured consumption excluding food at home are either above or equal to one. Thus, it appears that one of our well-measured consumption series is slightly inelastic, while the other is slightly elastic, so that they bracket the behavior of total consumption as income and total consumption rise.

Given constant shares, the remaining assumption sufficient for well-measured consumption to be an accurate indicator of trends in total consumption is that the prices for the well-measured components do not change over time relative to the prices of overall consumption. To examine changes in relative prices, we examine several different price indexes (fig. A.1) including the Consumer Price Index (CPI)–All Items index, which should reflect price changes for total spending, and a CPI for well-measured consumption, which we construct by taking the weighted average of the CPI indexes for each component, where the weights are defined as the share of well-measured consumption represented by each component in 1980. We construct a similar index for well-measured consumption less food.

As shown in figure A.1, there are only trivial differences from 1960 through the mid-2000s across these three indexes, implying that relative price changes are of negligible importance for the vast majority of our time period. Starting in the mid-2000s, there are larger differences between the price of well-measured consumption, either including or excluding food at home, and the price of total consumption. These differences are modest and nearly disappear for well-measured consumption by 2017. In any case, the price differences would require a very large price elasticity of well-measured consumption to sharply alter the relationship between well-measured and total consumption.

VII. Results for Income and Consumption Inequality

In table 2, we report income and consumption inequality between 1961 and 2017, as measured by ratios of percentiles including the 90:10 ratio, the 50:10 ratio, and the 90:50 ratio (also see figs. 1, A.2–A.6). These ratios are less sensitive to the poorly measured extreme tails of the distributions of income and consumption than measures such as the variance of the logarithm or the Gini coefficient. Our results indicate that after-tax income inequality grew by 25% between 1963 and 2017. The 90:10 ratio fell in the 1960s, changed very little in the 1970s, rose sharply in the 1980s, and then mostly held steady through the early 2000s but rose noticeably from 2007 to 2011.[4] For the years since 1980, we also have information on noncash benefits. Adding noncash benefits to after-tax money income (fig. A.2) leads to slightly lower inequality, but the changes over time are similar to those for after-tax money income.

The rise in inequality in the bottom half of the income distribution is much less pronounced than for the overall distribution. Between 1963 and 2017, the 50:10 ratio rose by only 5%. The 50:10 ratio rose less than the 90:10 ratio in the 1980s and 2000s. Including noncash benefits (fig. A.3) results in a slightly lower level of inequality in the 1980–2017 period, because these benefits affect the 10th percentile more than the median, but this has little effect on changes over time. That these noncash benefits have only a small effect on the 90:10 or 50:10 ratios may partly be because many of these benefits go to individuals below the 10th percentile. Adding noncash benefits to after-tax income noticeably reduces the 50:5 ratio (fig. A.7). However, even for these results that focus on the very bottom of the distribution, the inclusion of noncash benefits does little to alter the pattern of inequality, except for a few short periods. Importantly, our measure of noncash benefits does not adjust for the significant and increasing underreporting of these benefits in surveys. For more details, see Meyer and Sullivan (2021). For the top half of the distribution, income inequality rose by nearly 19% between 1963 and 2017, with nearly all of this rise occurring since 1980.

As shown in table 2 and figure 1, the patterns for consumption inequality are quite different from those for income inequality. The consumption distribution is less dispersed. In 2017, the 90:10 ratio for after-tax income was nearly double that of well-measured consumption. Moreover, the trends differ considerably across these measures. While overall income inequality (as measured by the 90:10 ratio) rose over the past 5 decades by 25%, the rise in well-measured consumption inequality was much smaller at 9.5%. Differences are even more noticeable for some

[4] This evidence is consistent with previous studies of income inequality (Burkhauser, Feng, and Jenkins 2009; Heathcote, Perri, and Violante 2010; Armour, Burkhauser, and Larrimore 2014; Fisher, Johnson, and Smeeding 2015; Piketty, Saez, and Zucman 2018).

TABLE 2
CHANGES IN CONSUMPTION AND INCOME INEQUALITY, 1961–2017

	Initial Level in 1961[a]	Percentage Changes						
		1961[a]–72	1972–80	1980–90	1990–2000	2000–2017	1984–2017	1961[a]–2017
90:10 ratio:								
After-tax income	5.54	−9.86	−4.08	25.63	−2.11	17.59	20.49	25.05
Total consumption	3.70	−2.52	8.24	8.43	−2.21	−2.51	−5.10	9.07
Well-measured consumption	3.33	−5.67	5.12	5.47	1.87	2.81	7.84	9.54
Well-measured consumption less food at home	4.84	−10.92	2.07	3.28	−3.21	.02	−.15	−9.09
50:10 ratio:								
After-tax income	2.79	−7.44	1.40	12.38	−6.76	7.10	1.12	5.33
Total consumption	2.09	−3.63	4.69	−.75	−3.11	−2.21	−7.60	−5.11
Well-measured consumption	2.02	−6.05	3.94	−.41	−.21	.02	−1.84	−2.94
Well-measured consumption less food at home	2.54	−8.35	3.74	−2.68	−5.19	−1.26	−7.31	−13.38
90:50 ratio:								
After-tax income	1.99	−2.61	−5.40	11.80	4.99	9.80	19.15	18.72
Total consumption	1.76	1.15	3.39	9.24	.92	−.31	2.71	14.94
Well-measured consumption	1.65	.41	1.13	5.91	2.09	2.79	9.86	12.85
Well-measured consumption less food at home	1.91	−2.80	−1.60	6.12	2.09	1.29	7.72	4.96

NOTE.—Consumption data are from the CE, and income data are from the CPS. Well-measured consumption includes spending on food at home, rent (for renters), rental equivalent (for homeowners or those in government or subsidized housing), utilities, service flows from owned vehicles, and spending on gasoline and motor oil. See text for more details.

[a] 1960–61 for consumption but 1963 for income.

shorter periods. Income inequality fell in the 1970s (the 90:10 ratio declined 4%), while consumption inequality rose (by 5%). In the 1980s, inequality for both measures rose, but the increase was much greater for income (26%) than for consumption (5%). Both consumption and income inequality changed little over the course of the 1990s, but after 2005, these measures moved in opposite directions as income inequality rose sharply while consumption inequality fell.

For reasons discussed in section VI, we focus on the consumption measures that rely on the well-measured components, but the patterns for inequality based on the different measures of consumption are similar.[5] Over the entire period, total consumption inequality rose only slightly less than

[5] While there is substantial evidence that certain components of consumption are poorly reported and this reporting has degraded over time, whether these reporting errors biases changes in ratios of percentiles of consumption is an empirical question without knowing more about the nature of the errors.

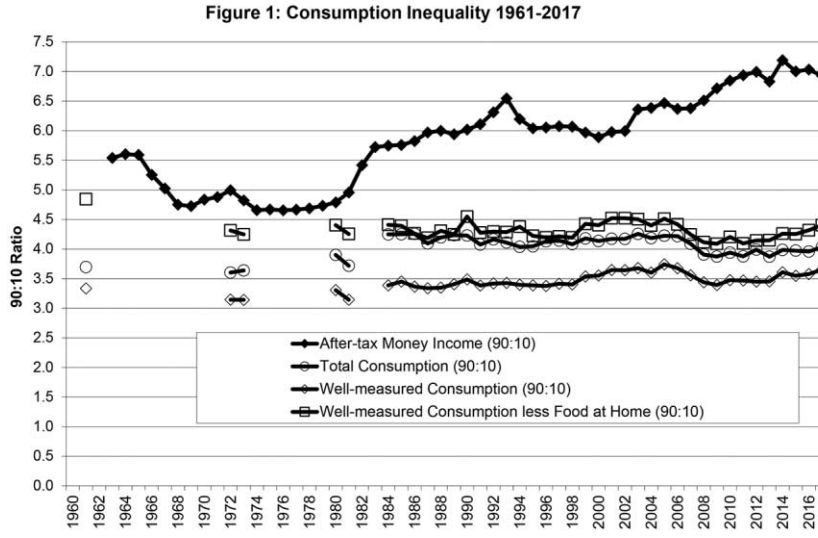

FIG. 1.—Consumption inequality 1961–2017: after-tax money income (90:10), total consumption (90:10), well-measured consumption (90:10), and well-measured consumption less food at home (90:10). Consumption data are from the Consumer Expenditure Interview Survey, and income data are from the Current Population Survey. Well-measured consumption includes spending on food at home, rent (for renters), rental equivalent (for homeowners or those in government or subsidized housing), utilities, service flows from owned vehicles, and spending on gasoline and motor oil. See text for more details.

well-measured consumption inequality (9.1% vs. 9.5%), and the patterns for these two measures of inequality were quite similar over the past 5 decades.

The similarity of the results for the well-measured and total consumption measures is not surprising. Since well-measured consumption has a total consumption elasticity of approximately one, poorly measured consumption, its complement, should as well. In other words, since the well-measured components of consumption are roughly a constant share of consumption as total consumption rises, poorly measured components must also be roughly a constant share of the total. A decline over time in the reporting of these components (if constant across income for each component) would not bias inequality measures. We should emphasize that although some previous work has suggested that expenditure underreporting varies with income, this same work shows that this underreporting has remained remarkably constant over time (see fig. 8.4 of Sabelhaus et al. 2015).[6]

[6] The evidence of underreporting from Sabelhaus et al. (2015) is for expenditures rather than service flows for housing and vehicles, which amount to about 40% of consumption. It is hard to know to what extent the pattern of differential underreporting at a point in time reflects measurement error in income and deviations of annual income from permanent income as opposed to differential underreporting by income. These results do not provide conclusive evidence of differential underreporting. Sabelhaus et al. (2015) also find that there is

Consumption inequality in the bottom half of the distribution rose less over the sample period than did overall inequality—between 1961 and 2017, the 50:10 ratio declined by nearly 3%, while the 90:10 ratio rose by 9.5%. Much of this difference occurred during the 1980s, when the 90:10 ratio for consumption rose by more than 5%, while the 50:10 ratio was flat. The patterns for consumption inequality in the bottom half of the distribution are noticeably different from those for income. For example, between the early 1960s and 2017, the 50:10 ratio for after-tax income rose by 5%, while the ratio for consumption fell by 3%. These results also show that the difference in the levels of consumption and income inequality are particularly large for the bottom half of the distribution. In 2017, the 50:10 ratio for after-tax income was 50% greater than the 50:10 ratio for consumption, which is likely due, in part, to income being understated at the bottom. Previous research has argued that spending exceeds income at the bottom of the distribution in large part due to underreporting of income (Meyer and Sullivan 2011; Meyer and Mittag 2019).

In the top half of the distribution, income and consumption inequality both rose over the past 5 decades—the 90:50 ratio for after-tax income rose by 19% and that for consumption rose 13%. After 2005, however, these measures moved in opposite directions when the 90:50 ratio for after-tax income continued to rise, while the 90:50 ratio for consumption fell. These measures also moved in opposite directions in the 1960s and 1970s, when income inequality fell but consumption inequality was flat or rose.

In summary, our main results show that while overall income inequality (90:10 ratios) rose over the past 5 decades, the rise in overall consumption inequality was small. The patterns for income and consumption inequality differ sharply within each decade, and most notably, these measures have moved in opposite directions since 2005. Income inequality rose for the top (90:50 ratio) and bottom (50:10 ratio) of the distribution, but an increase in consumption inequality is evident only for the top. That the patterns for consumption and income inequality at the top are fairly similar from the early 1960s through 2005 suggests that underreporting of consumption by the rich cannot account for the differences.

In table 3, we report the 90:10, 50:10, and 90:50 ratios for other measures of consumption and for expenditures. When we exclude food at home, an inelastic component of consumption, we see that inequality rises less (or falls more) than the measure that includes food at home.

---

an underrepresentation of people from the zip codes in the top five percentiles of average income. The degree of underrepresentation is small, and furthermore Brummet et al. (2018) find differences in response rates by income from linked CE Survey and tax data that imply only small biases in the consumption distribution that are likely to be unimportant at the 10th and 90th percentiles.

TABLE 3
CHANGES IN CONSUMPTION INEQUALITY FOR OTHER MEASURES OF CONSUMPTION, 1961–2017

	Initial Level in 1961[a]	Percentage Changes						
		1961[a]–72	1972–80	1980–90	1990–2000	2000–2017	1984–2017	1961[a]–2017
90:10 ratio:								
Well-measured consumption	3.33	−5.67	5.12	5.47	1.87	2.81	7.84	9.54
Well-measured consumption less food at home	4.84	−10.92	2.07	3.28	−3.21	.02	−.15	−9.09
Well-measured consumption less food at home and utilities	5.62	−5.52	.04	5.54	−7.66	1.04	−1.37	−6.92
Well-measured consumption less housing	3.15	11.29	−4.25	−6.48	−.89	1.90	−.12	.65
Expenditures	3.86	.36	19.94	17.22	1.60	−3.98	−.70	37.66
Total consumption	3.70	−2.52	8.24	8.43	−2.21	−2.51	−5.10	9.07
Total consumption including health insurance				9.25	.62	3.04		
50:10 ratio:								
Well-measured consumption	2.02	−6.05	3.94	−.41	−.21	.02	−1.84	−2.94
Well-measured consumption less food at home	2.54	−8.35	3.74	−2.68	−5.19	−1.26	−7.31	−13.38
Well-measured consumption less food at home and utilities	2.81	−3.91	1.84	−2.57	−7.92	−.74	−8.60	−12.87
Well-measured consumption less housing	2.02	7.71	−8.93	−4.83	−2.00	.22	−3.41	−8.31
Expenditures	1.80	2.64	12.77	12.87	3.46	−2.11	4.33	32.31
Total consumption	2.09	−3.63	4.69	−.75	−3.11	−2.21	−7.60	−5.11
Total consumption including health insurance				1.75	.18	−2.83		
90:50 ratio:								
Well-measured consumption	1.65	.41	1.13	5.91	2.09	2.79	9.86	12.85
Well-measured consumption less food at home	1.91	−2.80	−1.60	6.12	2.09	1.29	7.72	4.96
Well-measured consumption less food at home and utilities	2.00	−1.67	−1.76	8.33	.28	1.80	7.91	6.83
Well-measured consumption less housing	1.56	3.32	5.14	−1.74	1.13	1.68	3.41	9.76
Expenditures	2.15	−2.22	6.36	3.86	−1.80	−1.91	−4.81	4.04
Total consumption	1.76	1.15	3.39	9.24	.92	−.31	2.71	14.94
Total consumption including health insurance				7.37	.44	6.05		

NOTE.—See table 2 note and section D of the online appendix for details on the measures of consumption and expenditures reported here.

[a] 1960–61 for consumption but 1963 for income.

Over the past 5 decades, the 90:10 ratio for well-measured consumption less food fell by 9%. When we also exclude utilities—another relatively inelastic component of consumption—the patterns for inequality look very similar to those for well-measured consumption less food. We also considered a measure of consumption excluding housing to see the extent to which our inequality patterns might be driven by housing consumption. Prior to 1990, the patterns for this measure that excludes housing tended to move in the opposite direction from those for well-measured consumption. However, between 1990 and 2017, a period during which housing prices fluctuated considerably, the inequality patterns for these two measures are quite similar. Dispersion in expenditures is greater than that of consumption because expenditures include lumpy spending on owner-occupied housing and vehicles, while consumption includes the service flow from ownership of these durables. The 90:10 ratio for expenditures rose much more than that for well-measured consumption between 1972 and 1986, but from the mid-1980s to the mid-2000s, this ratio was flat for both measures. After 2006, inequality in both of these measures fell.

In results not reported here, we also examine how inequality changes for specific demographic groups. Examining such changes is important for explaining trends and for thinking about designing or understanding the impact of targeted policies. Changes in inequality may be uneven across demographic groups because one group is the target of a redistributive policy or because of differences in employment patterns across groups. For example, tax and transfer policies often target specific family types; welfare and EITC (earned income tax credit) dollars predominantly go to single-parent families.

The consumption inequality patterns are very different across demographic groups. See tables A.3–A.5 and figs. A.8, A.9. For single mothers and single individuals, consumption inequality (since 1980) generally fell, while consumption inequality for married families (both with and without children) rose noticeably, and consumption inequality for elderly households rose slightly. The patterns are very different for income, where the 90:10 ratio rose sharply for all groups over the past 25 years. In fact, income inequality rose the most for the groups that saw consumption inequality fall, and nearly all of this difference is due to the difference between income and consumption in the bottom half of the distribution. The sharp difference in the patterns for income and consumption inequality for single parents and single individuals is consistent with the evidence that income, in particular, is significantly underreported at the bottom and that underreporting of government transfers can explain a substantial part of the differences between income and consumption for households with few resources (Meyer and Sullivan 2012a, 2012b; Meyer and Mittag 2019).

VIII. Demand System Estimates

In our main results for consumption inequality reported above, we address concerns about measurement error in consumption by focusing on its well-measured components. In this section, we consider whether our results are robust to addressing systematic measurement error using the demand system approach of Aguiar and Bils (2015) described in section III.

In table 4, we report estimates of changes in after-tax income inequality as well as our demand system estimates of changes in consumption inequality for various measures of consumption. We report results for the same statistics and time periods as Aguiar and Bils in order to help reconcile differences between our results and theirs. In particular, for panel A, we report the ratio of consumption or income among high-income households to consumption or income among low-income households, where high income is between the 80th and 95th percentiles and low income is between the 5th and 20th percentiles. In addition, we report estimates of the changes in inequality separately for the top (between the 80th and 95th percentiles and the 40th and 60th percentiles; panel B) and the bottom (between the 60th and 40th percentiles and the 20th and 5th percentiles; panel C) of the distribution. We present the level of inequality in the base period (1980–82) and changes in inequality for the full period from 1980–82 through 2008–10 as well as for several subperiods. See tables 1 and 3 of Aguiar and Bils (2015) for comparison.

Column 1 of panel A reports the change in log after-tax income inequality as calculated by Aguiar and Bils—the ratio of average income for high-income households to the average for low-income households. We are able to reproduce their results exactly from their archived files. These results indicate that over the period from 1980–82 to 2008–10, after-tax income inequality rose 34%. This result is very similar to our estimates for the change in the 90:10 ratio using income data from the CPS instead of the CE; for this same period, we find that the 90:10 ratio for after-tax income rose by 32%.

In columns 2–8 of table 4, we report demand system estimates for the levels and changes in consumption inequality. Given the concern about Aguiar and Bils's assumptions for goods that have substantial underreporting or frequently are at the lower limit of zero, we apply their approach using those categories of spending that have been shown to be well reported and are large categories with relatively few zeros, progressively adding less suitable data. Our approach is to solely decide on the suitable categories based on the reporting rate and the frequency of zero expenditures. We begin with the seven categories that have a reporting rate of at least 0.75 when comparing CE expenditures to NIPA expenditures (Bee, Meyer, and Sullivan 2015). These categories are all among the

TABLE 4
DEMAND SYSTEM ESTIMATES OF CONSUMPTION AND INCOME INEQUALITY, 1980–2010

	After-Tax Income Aguiar and Bils (2015) (1)	Categories with High Reporting Rates (2)	Categories with <5% Zero for Year (3)	Categories with <10% Zero for Year (4)	13 Largest Consumption Categories (5)	Col. 4 Plus Domestic Services and Childcare (6)	Col. 5 Plus Education (7)	Total Consumption Aguiar and Bils (2015) (8)
	A. High-Low Income							
Log inequality, 1980–82	1.041	1.004	.964	1.004	.958	.879	.871	.855
	(.023)	(.096)	(.073)	(.072)	(.079)	(.077)	(.076)	(.066)
Log change, 1980–82/ 1991–93	.167	−.030	.046	.021	.168	.278	.257	.275
	(.030)	(.113)	(.084)	(.076)	(.088)	(.099)	(.100)	(.080)
Log change, 1991–93/ 1998–2000	.102	−.074	−.076	−.075	−.111	−.108	−.091	−.030
	(.024)	(.077)	(.060)	(.065)	(.083)	(.088)	(.082)	(.066)
Log change, 1998–2000/ 2005–7	.062	.017	.002	.041	.127	.121	.232	.240
	(.020)	(.073)	(.057)	(.060)	(.065)	(.070)	(.091)	(.071)
Log change, 2005–7/ 2008–10	.004	.029	.031	.012	−.054	−.022	−.045	−.059
	(.018)	(.072)	(.055)	(.052)	(.071)	(.074)	(.090)	(.077)
Total log change, 1980–82/ 2005–7	.331	−.087	−.029	−.014	.185	.290	.398	.485
	(.027)	(.105)	(.105)	(.074)	(.077)	(.090)	(.101)	(.084)
Total log change, 1980–82/ 2008–10	.335	−.058	.003	−.002	.131	.268	.353	.425
	(.025)	(.109)	(.081)	(.078)	(.081)	(.090)	(.094)	(.080)

TABLE 4 (*Continued*)

	After-Tax Income Aguiar and Bils (2015) (1)	Categories with High Reporting Rates (2)	Categories with <5% Zero for Year (3)	Categories with <10% Zero for Year (4)	13 Largest Consumption Categories (5)	Col. 4 Plus Domestic Services and Childcare (6)	Col. 5 Plus Education (7)	Total Consumption Aguiar and Bils (2015) (8)
	B. High-Middle Income							
Log inequality, 1980–82	.528	.601	.638	.705	.652	.575	.579	.571
	(.019)	(.103)	(.080)	(.069)	(.077)	(.070)	(.080)	(.070)
Log change, 1980–82/1991–93	.116	−.023	.006	−.006	.166	.279	.302	.298
	(.022)	(.128)	(.103)	(.082)	(.093)	(.106)	(.106)	(.086)
Log change, 1991–93/1998–2000	.020	−.114	−.095	−.079	−.108	−.113	−.129	−.123
	(.017)	(.079)	(.067)	(.064)	(.084)	(.091)	(.086)	(.068)
Log change, 1998–2000/2005–7	.077	.096	.065	.292	.171	.187	.313	.292
	(.015)	(.080)	(.059)	(.061)	(.069)	(.074)	(.096)	(.074)
Log change, 2005–7/2008–10	.012	−.044	−.008	−.011	−.066	−.054	−.065	−.071
	(.014)	(.086)	(.059)	(.053)	(.071)	(.070)	(.089)	(.072)
Total log change, 1980–82/2005–7	.213	−.041	−.025	−.011	.229	.353	.485	.467
	(.020)	(.121)	(.092)	(.075)	(.081)	(.100)	(.111)	(.088)
Total log change, 1980–82/2008–10	.225	−.085	−.033	−.022	.163	.299	.420	.396
	(.021)	(.130)	(.097)	(.079)	(.084)	(.096)	(.106)	(.084)

	C. Middle-Low Income							
Log inequality, 1980–82	.514	.404	.326	.299	.306	.305	.293	.284
	(.022)	(.061)	(.049)	(.040)	(.046)	(.056)	(.052)	(.045)
Log change, 1980–82/ 1991–93	.051	−.006	.040	.027	.002	−.002	−.045	−.023
	(.029)	(.066)	(.060)	(.049)	(.054)	(.063)	(.057)	(.052)
Log change, 1991–93/ 1998–2000	.082	.039	.020	.004	−.003	.005	.038	.093
	(.026)	(.049)	(.046)	(.039)	(.040)	(.040)	(.045)	(.039)
Log change, 1998–2000/ 2005–7	−.015	−.079	−.064	−.034	−.044	−.066	−.081	−.052
	(.023)	(.055)	(.040)	(.036)	(.035)	(.033)	(.034)	(.042)
Log change, 2005–7/ 2008–10	−.008	.073	.039	.023	.013	.032	.021	.012
	(.019)	(.050)	(.039)	(.037)	(.034)	(.034)	(.032)	(.043)
Total log change, 1980–82/ 2005–7	.118	−.046	−.004	−.003	−.044	−.063	−.087	.018
	(.026)	(.071)	(.057)	(.046)	(.052)	(.059)	(.054)	(.051)
Total log change, 1980–82/ 2008–10	.110	.027	.035	.020	−.032	−.031	−.067	.030
	(.025)	(.068)	(.056)	(.049)	(.048)	(.058)	(.051)	(.050)
Share of total consumption	NA	73.8	78.4	83.4	91.9	93.4	94.7	100.0

NOTE.—Reported estimates are for the change in income or consumption inequality for the top vs. bottom income quintiles (panel A), top vs. middle income quintiles (panel B), or middle vs. bottom income quintiles (panel C), where the top, middle, and bottom income quintiles are defined as the 80th–95th percentiles, the 40th–60th percentiles, and the 5th–20th percentiles, respectively. Column 1 reports the change in after-tax income inequality as reported in table 1 of Aguiar and Bils (2015). Column 2 includes categories with a reporting rate greater than 0.75 in 2010, as reported in table A.6. These categories include housing; food at home; vehicle purchasing, leasing and insurance, and all other transportation; utilities; appliances, phones, and computers with associated services; and entertainment equipment and subscription TV. Column 3 includes all the categories in col. 2 plus food away from home. Column 4 includes all the categories in col. 3 plus health expenditures and men's and women's clothing. Column 5 includes all the categories in col. 4 plus entertainment fees, admissions, and reading; cash contributions; and furniture and fixtures. Column 6 includes all categories in col. 5 plus domestic services and childcare. Column 7 includes all categories in col. 6 plus education. Column 8, which is a replication of estimates of the change in consumption inequality from table 3 of Aguiar and Bils (2015), includes all spending categories reported in table A.6.

nine largest and together constitute nearly three-quarters of all spending, with fewer than 5% of households reporting zero spending for each of them. The change in consumption inequality estimated using these seven categories (col. 2) indicates that consumption inequality has fallen by 5.8% over the 3 decades from 1980–82 to 2008–10.

We then consider broader groups of expenditure categories. Because their model examines log consumption, Aguiar and Bils globally linearize the log function when expenditures are zero. This approach might not be a good fit for categories where a large fraction of respondents reports zero spending. The biases due to this adjustment are unclear, but the model is clearly less appropriate when one cannot take logarithms of half of the observations. We thus include only those categories with a small percentage of zero expenditures in a year. We report results for all categories with fewer than 5% zeros in column 3; the fraction reporting zero spending for each category of consumption is reported in table A.6. These categories include all of the well-measured ones from column 2 and account for 78.4% of total consumption. We now find that the overall rise in consumption inequality over 3 decades is positive, but just barely at 0.3%. Adding those categories with up to 10% of households without any expenditures in a year (col. 4), which account for 83.4% of consumption, barely changes the estimate.

In column 8, we present our replication of Aguiar and Bils's main results for changes in consumption inequality indicating that over the period from 1980–82 to 2008–10, consumption inequality rose 42.5%, which is 27% greater than the rise in income inequality over this period. These results are in sharp contrast to our main results as well as our demand system estimates in columns 2–4. Their estimates indicate that all of the rise in consumption inequality for the full period occurred in the 1980–82 to 1991–93 and 1998–2000 to 2005–7 periods. In the latter period, Aguiar and Bils's estimates suggest that consumption inequality rose four times more than income inequality. The greater rise in inequality for consumption is surprising because households should be able to insure some income shocks (e.g., Blundell, Pistaferri, and Preston 2008), leading consumption inequality to rise less than any rise for income inequality over time.

The key difference between our demand system estimates and those of Aguiar and Bils is that their estimates are based on total consumption rather than its well-measured components. To understand which categories, in particular, are driving these very sharp differences, we consider even broader definitions of consumption. For example, when we include in consumption the 13 largest categories, which account for more than 90% of total spending (col. 5), consumption inequality between 1980–82 and 2008–10 rose by 13.1%, now higher, but still one-third the size of the rise in consumption inequality reported in Aguiar and Bils (col. 8)

and less than 40% of the rise in income inequality (col. 1). The results in columns 6 and 7 show that what leads to a larger estimate of the rise in consumption inequality is including a few small and very poorly measured categories. Adding domestic services and childcare (at 1.5% of expenditures) and then education (at 1.3% of expenditures) increases the estimated rise in consumption inequality to 35.3%, greater than the rise in income but still 7% below the Aguiar and Bils estimate using all categories.

Domestic services and childcare and education are the categories with the very highest rate of reported zeros. Over 40% of households report no spending on domestic service or childcare, and 60% of households report no spending on education (table A.6), so these categories are not a good fit for Aguiar and Bils's log model. In general, the smaller categories with less than 2% of consumption each are reported very poorly in the Consumer Expenditure Interview Survey. The share of national account consumption that is recorded in the survey for these categories in 2010 never exceeds 0.46 and in most cases is below 0.32 when a comparison is available (table A.6). Many of the categories are sufficiently idiosyncratic that they cannot be easily compared to the national accounts.

Thus, the difference between our consumption inequality results and those of Aguiar and Bils is that their measure of consumption includes a few very small consumption categories that have been shown to be poorly measured. And it turns out that the demand system approach is highly sensitive to the inclusion of these small categories. The choice of categories should depend on the bias and precision of the resulting estimates, with bias introduced by including the poorly measured categories that are unlikely to fit their model, weighted against the possible reduction in precision from excluding certain categories. There is not a trade-off in practice in this case, however. Using a subset of consumption components that are well measured and fit the log model does not lead to appreciably lower precision. The standard errors are lower for our estimates in column 4 than in Aguiar and Bils's estimates reported in column 8 and not appreciably different in our columns 3 and 5.

In panels B and C of table 4, we consider demand system estimates of inequality for the top and bottom of the distribution. Our main results (sec. VII) indicate that increases in consumption inequality are evident only in the top half of the distribution, with little evidence of a rise in inequality for the bottom half. The results using a demand system approach are similar. For the bottom half (panel C), there is little evidence of a rise in consumption inequality over the full period, while income inequality rises noticeably (11%). In the top half (panel B), we find little evidence of a rise in consumption inequality for measures that include only the most well-measured components, but if you consider the 13 largest consumption categories (panel B, col. 5), the estimated rise in consumption inequality using the demand system approach is 16.3%. It is in the top half

of the income distribution where Aguiar and Bils's consumption inequality results differ sharply from ours. The demand system estimates using total consumption suggest that inequality in the top half of the consumption distribution rose by 40% during the full period (panel B, col. 8), an increase that is significantly larger than that for income. In the bottom half of the distribution, there is little difference between the demand system estimates using the well-measured components and those using total consumption. In the top half, the estimates are very sensitive to the inclusion of the small poorly measured categories. Furthermore, the inclusion of the poorly measured data leads to the counterintuitive result that consumption inequality rose almost twice as much as income inequality.

IX. Potential Explanations for Inequality Patterns

To understand some of the reasons for changes in income and consumption inequality, we consider the role of changes in demographic characteristics, measurement error in income, as well as the potential for households to consumption smooth through saving and borrowing. It is worth noting that the past work arguing that consumption inequality has mirrored income inequality is contradicted by a broad theoretical and empirical literature on smoothing of consumption. This literature (see Blundell, Pistaferri, and Preston 2008 for a structurally informed example or Arellano, Blundell, and Bonhomme 2017 for a fully structural example) allows for shocks to income to be smoothed through consumption. The former finds that temporary shocks are largely smoothed, while permanent ones are not. Thus, if shocks to income explain part of the rise in income inequality, smoothing behavior would imply that consumption inequality would rise less than income inequality.

A. Changes in Demographic Characteristics

Changing demographics may contribute to changes in inequality as well as explain why patterns differ for income and consumption. For example, rising college completion rates or rising wages for college relative to high school graduates may lead to greater inequality. If education is related to borrowing and saving behavior or to reporting of income and consumption, then greater educational attainment or a rising college premium would affect income and consumption inequality differently. To determine the impact of changing demographics, we decompose changes in inequality into two components: explained changes (due to either changes in observable characteristics or in the return to these characteristics) and unexplained changes (due to changes in unobservables). This decomposition can be done for each quintile, following the approach of Melly (2005) and Autor, Katz, and Kearney (2005).

For this decomposition, we first estimate a model of the conditional quantiles of income or consumption and then generate a close approximation to the unconditional distribution by numerically integrating the conditional distribution over the range of the distribution of observable characteristics and over all quantiles. Using this estimated unconditional distribution, we can construct counterfactual distributions. For example, we can construct a hypothetical distribution of income for 1980 if observable characteristics are the same as those in 1990. We describe this approach in detail in section E of the appendix.

The results from these decompositions for the changes in the 90:10, 50:10, and 90:50 ratios for each decade are presented in table 5. Overall, these decompositions show that changing characteristics and the return on these characteristics can account for a noticeable part of the changes in consumption inequality, but they account for much less of the changes in income inequality. For the 1960s, changes in the return on observable characteristics account for much of the change in overall consumption inequality. For the 1970s, consumption inequality rose only modestly, with changing demographic characteristics implying a rise in consumption inequality, and changes in the return on observable characteristics mostly offsetting this rise. For the 1980s, the rise in consumption inequality can be accounted for by changes in both demographic characteristics and the return on these characteristics. For example, between 1980 and 1990, the 90:10 ratio rose by 0.062, and changes in demographic characteristics during this period account for a rise in the 90:10 ratio of 0.025. Since 1990, changing demographics can explain very little of the overall pattern in consumption inequality, although this was a period when consumption inequality was fairly flat.

For income inequality, changes in demographic characteristics suggest a rise in inequality throughout the period from 1963 to 2017. Given that income inequality fell in the 1960s and 1970s, changing demographics cannot account for actual changes in income inequality during these periods. For each of the periods, changes in the return on observable characteristics account for a sizable fraction of the actual change in overall income inequality, but much of the change remains unexplained—changes in residuals account for more than a third of the overall change in every decade except the 1990s.

B. Intertemporal Substitution of Resources

Borrowing and saving could potentially explain some of the differences between the patterns for income and consumption inequality, particularly if, due to greater access to credit, some families can now more easily smooth consumption. Krueger and Perri (2006) suggest this as an explanation for why consumption inequality rose less than income inequality

TABLE 5
DECOMPOSITION OF CHANGES IN CONSUMPTION AND INCOME INEQUALITY

			Unexplained		Explained			
	Total Change		Residuals		Coefficients		Characteristics	
	Consumption	Income	Consumption	Income	Consumption	Income	Consumption	Income
1961–72:								
90:10	−.062	−.073	−.015	−.100	−.065	−.070	.018	.096
			24.5%	136.2%	104.9%	95.5%	−29.4%	−131.7%
50:10	−.060	−.047	−.018	−.064	−.054	−.048	.011	.065
			29.2%	136.3%	89.8%	102.8%	−19.0%	−139.1%
90:50	−.001	−.026	.002	−.036	−.011	−.022	.007	.031
			−177.4%	136.0%	755.4%	82.4%	−477.9%	−118.4%
1972–80:								
90:10	.037	−.048	.039	−.072	−.042	−.039	.040	.063
			104.4%	149.4%	−112.4%	81.1%	108.1%	−130.5%
50:10	.025	.010	.024	−.005	−.024	−.025	.025	.040
			96.2%	−43.2%	−95.9%	−237.9%	99.7%	381.1%
90:50	.013	−.059	.015	−.067	−.018	−.014	.016	.023
			120.2%	115.0%	−144.7%	24.1%	124.5%	−39.1%
1980–90:								
90:10	.062	.249	−.004	.114	.041	.112	.025	.023
			−6.1%	45.9%	66.3%	44.8%	39.8%	9.3%
50:10	.007	.128	−.020	.056	.010	.054	.017	.018
			−286.8%	43.9%	148.4%	42.3%	238.5%	13.8%
90:50	.055	.121	.016	.058	.031	.057	.008	.005
			29.8%	47.9%	55.8%	47.6%	14.4%	4.5%

1990–2000:								
90:10	.015	−.030	.015	.024	−.002	−.072	.002	.019
			100.7%	−79.0%	−11.3%	241.4%	10.5%	−62.4%
50:10	−.010	−.062	−.009	−.033	−.002	−.050	.002	.020
			97.5%	52.9%	22.0%	79.4%	−19.5%	−32.2%
90:50	.024	.033	.024	.057	.000	−.022	.000	−.002
			99.4%	173.1%	2.0%	−68.3%	−1.5%	−4.8%
2000–2017:								
90:10	.024	.125	.002	.073	.009	.037	.013	.015
			8.8%	57.9%	35.7%	29.8%	55.5%	12.3%
50:10	.011	.050	.004	.035	−.001	.008	.008	.007
			36.9%	70.2%	−5.5%	15.3%	68.6%	14.5%
90:50	.013	.075	−.002	.037	.009	.030	.006	.008
			−15.2%	49.8%	70.9%	39.4%	44.2%	10.8%

NOTE.—Data are from the CE (consumption) and CPS (income) surveys. These estimates are for log well-measured consumption and log income. See text for more details.

in recent decades. The divergent trends between income and consumption inequality that we find, however, are concentrated in the bottom of the distribution, and these differences are due, in large part, to differences in the trends at the 10th percentile—the 10th percentile of consumption rose more than the 10th percentile of income. If increased borrowing were the primary explanation for this differential patterns, then we should see increases in debt for families with few resources. In table A.7, we report information on various forms of debt for families in the bottom income quintile in the Survey of Consumer Finances (SCF) as well as mortgage and home equity debt in the Consumer Expenditure Survey. We first consider credit card debt, as previous research has found that some households use it to smooth consumption (Sullivan 2008). Average credit card balances for low-income households were very low—only $624 in 2016—and most of these households (71%) had no balances. The 75th percentile of credit card debt for these households was only $150. Furthermore, these balances did not rise noticeably after the early 1990s—in 1992, average credit card balances for households in the bottom quintile averaged $499 (in 2016 dollars).[7]

These low-income households also had only a limited amount of debt used to purchase goods and services. The average amount of such debt was only $1,284, and the 75th percentile was only $300 in 2016. These levels of debt for low-income households were small relative to the average reported income for this group of about $15,100 in 2016, with actual income certainly much higher. This evidence is consistent with findings of low assets from other studies using other data sources (Meyer and Sullivan 2003, 2011, 2021; Sullivan 2008). Use of payday loans, another way low-income households may have gained expanded access to credit, was also fairly limited. In 2016, only 4% of households in the bottom income quintile had taken a payday loan in the past year, which is only slightly higher than the 3% rate for 2007, the first year payday loan data are available in the SCF.

Previous research has shown that some households use mortgage debt to smooth consumption. For example, Hurst and Stafford (2004) show that households with limited liquid assets that experience an unemployment shock are 25% more likely to refinance. Our results in table A.7 show that mortgage debt increases noticeably for households in the bottom income quintile. In particular, there is a sharp rise in mortgage debt

[7] There is some evidence that some measures of liabilities reported in the SCF fall short of aggregate measures reported in the Financial Accounts of the United States. For consumer credit, the ratio of SCF to the Financial Accounts increased over time from 0.59 in 1989 to 0.68 in 2016 (Batty et al. 2020). Even if one were to scale up the average credit card debt we report in table A.7 by these ratios, the rise in this debt would still be too small to explain the differences we observe between the changes in income and consumption at the 10th percentile.

between 2001 and 2007 (a real increase of $4,174), which coincides with a period during which the income and consumption inequality diverge. However, there are other periods where the timing does not match well with the timing of the divergence between income and consumption inequality. Mortgage debt for the bottom income quintile rises sharply during the 1990s, increasing by $4,977 between 1989 and 2001, but we see little divergence in income and consumption inequality during this period, as shown in table 2. After 2007, mortgage debt rises sharply then falls while there is little change in the difference between income and consumption inequality.

Another potential explanation for the divergence between income and consumption inequality is that the cost of home ownership declined, freeing up resources for those at the bottom of the consumption distribution to consume other goods and services. The average interest rate on a 30-year, fixed-rate mortgage fell from 8.05% in 2000 to 3.99% in 2017.[8] Based on data from the CE, average mortgage debt (mortgages and home equity loans) for households around the 10th percentile of the consumption distribution was about $8,200 in 2017. At this level of debt, the decline in the cost of mortgage debt results in savings of $335, which is 8.2% of the $4,100 real rise in consumption at the 10th percentile between 2000 and 2017. By comparison, the 10th percentile of after-tax income rose by $2,400 over this period, so the decline in the cost of mortgage debt is 20.3% of the difference between the rises in the 10th percentiles of consumption and income between 2000 and 2017. Thus, the decline in the cost of mortgage debt could account only for a moderate fraction of the rise in the 10th percentile of consumption in recent years.[9]

Instead of debt, low-income families could pay for consumption by spending down assets. Here, again, data from the SCF suggests this was unlikely. The 75th percentile of liquid assets for the bottom-quintile households was only $1,540. Furthermore, in results not reported but available upon request, we see divergent trends between income and

[8] https://fred.stlouisfed.org/series/MORTGAGE30US.

[9] The average home ownership rate for CUs between the 5th and 15th percentiles of the well-measured consumption distribution in 2017 was 29%, and the average mortgage principal plus home equity loan debt among these home owners was about $28,000. We calculate the potential cost savings for this group as the product of the average mortgage plus home equity in 2017 and the change in interest rates ($8,243 × 0.0406 = $335). This savings would be larger if true mortgage debt was greater than what is reported in the CE. Evidence from Batty et al. (2020) indicates that reported mortgage debt in the SCF aligns closely with the Financial Accounts of the United States. Comparisons of mortgage debt of the bottom income quintile indicate that such debt is lower in the CE than the SCF in 2016 (table A.7). If we scale up average reported mortgage plus home equity debt in the CE by the ratio of average mortgage plus home equity debt in the SCF to that in the CE for the bottom income quintile (1.19), the average mortgage debt for our low-consumption sample in the CE would be $9,808, resulting in a cost savings of $398, which is 9.8% of the increase in consumption.

consumption inequality further down the distribution, such as for the 25:5 ratio, where the divergence is even more pronounced. These households with very low income or consumption were very unlikely to have significant assets or debts.

Standard dynamic models, where households can fully insure themselves against consumption risk, imply that consumption does not respond to transitory changes in asset values. In the absence of full risk sharing, however, consumption may be sensitive to changes in wealth. Empirical studies typically reject full risk sharing (i.e., Cochrane 1991; Attanasio and Davis 1996; Mian, Sufi, and Rao 2013). Campbell and Cocco (2007) show with microdata that changing asset prices have a noticeable effect on consumption for groups with considerable wealth, such as older homeowners, but little effect on consumption for groups with few assets, such as young renters. Thus, the sharp decline in asset prices after 2006—first housing and then financial assets—could explain why consumption inequality fell in some recent years even though income inequality did not.

If declining asset prices had a significant impact on consumption inequality, then we would expect to see a more noticeable decline in consumption for households with more significant asset holdings. To see whether this pattern is evident in the data, we sort households by the value of their total asset holdings, including both financial and housing assets. In table 6, we report the mean of well-measured consumption by quintile of total household assets from 1991 to 2017. This analysis shows that consumption growth for the lowest-asset households was different

TABLE 6
Real Well-Measured Consumption Growth, 1991–2017, by Asset Quintile

						Percent Change				
Total Asset Quintile	1991 (1)	2000 (2)	2006 (3)	2010 (4)	2017 (5)	1991–2000 (6)	2000–2006 (7)	2006–17 (8)	2006–10 (9)	2010–17 (10)
First	16,002	17,995	20,930	23,343	25,597	12.5	16.3	22.3	11.5	9.7
Second	19,425	21,090	25,125	22,806	25,662	8.6	19.1	2.1	−9.2	12.5
Third	21,504	24,315	29,166	28,169	31,156	13.1	20.0	6.8	−3.4	10.6
Fourth	24,511	29,621	36,702	32,097	37,644	20.8	23.9	2.6	−12.5	17.3
Fifth	32,413	40,388	49,823	47,388	52,996	24.6	23.4	6.4	−4.9	11.8

Note.—Data are from the CE Survey. Well-measured consumption includes spending on food at home, rent (for renters), rental equivalent (for homeowners or those in government or subsidized housing), utilities, service flows from owned vehicles, and spending on gasoline and motor oil. See text for more details. The amounts are in 2017 dollars using the adjusted CPI-U-RS (Consumer Price Index for All Urban Consumers Research Series) equivalence scale adjusted and scaled to a two-adult, two-child family. Total assets are measured as total financial assets (stocks, bonds, checking, and savings) plus housing equity (current house value less housing debt including mortgages, home equity loans, and home equity lines of credit). Information on housing equity loans and lines of credit are not available in the CE prior to 1991.

from that for higher-asset households. Between 1991 and 2006—a period when housing prices and financial asset values rose considerably—consumption grew for all quintiles of the asset distribution, but the growth was a bit more pronounced for the higher quintiles. Between 2006 and 2010, asset prices fell sharply. The Case-Shiller index of house prices fell by 21%, and the S&P 500 index fell by 12%. These declines coincided with a drop in real consumption of between 3% and 13% for the second through fifth quintiles of the asset distribution. But for the bottom quintile, consumption actually rose by 12%; for similar evidence, see Petev, Pistaferri, and Eksten (2012). In separate analyses, we find that homeowners tended to reduce their consumption more than nonhomeowners between 2006 and 2010. Between 2010 and 2017, the S&P 500 rose by more than 200%, and the Case-Shiller index rose by about 30%. During this period of sharply rising asset values, consumption rose by 10%–17% for all quintiles, with growth for the bottom quintile only slightly smaller than that for other quintiles.

C. Measurement Error

Declining survey data quality is another potential explanation for the income and consumption differences. The evidence described earlier of declining relative quality of income data at low percentiles is consistent with our results that show a much more noticeable rise in the 50:10 ratio for income than the 50:10 ratio for consumption over the past 3 decades. It is also consistent with the fact that we find pronounced differences between income and consumption inequality changes for single mothers—a group that receives a disproportionate share of these income transfers. Relatedly, Corinth, Meyer, and Wu (2022) document that the decline in poverty is sharply understated by measurement error in income data between 1995 and 2016 for single parents.

One might also be concerned with the declining quality of consumption data. However, as discussed in section V, many of the important components of consumption, and those that comprise our measure of well-measured consumption, compare favorably to administrative aggregates, both at a point in time and over time. Moreover, if underreporting of expenditures was increasingly concentrated in the top of the distribution, such underreporting might bias measures of inequality for the top half of the distribution but not the bottom half. However, for most of our sample period, we find that differences between income and consumption inequality changes are most noticeable in the bottom half of the distribution, but at the bottom, income and consumption inequality moved in opposite directions. Also, it is unlikely that increased underreporting of consumption is the primary explanation for why the 90:50 ratio for consumption fell, while the 90:50 ratio for income rose after 2005, because

our measure of consumption is composed of well-measured components that did not experience an increase in underreporting after 2005.

X. Conclusions

The perception of a growing divide in economic well-being in the United States has fueled debates over whether the benefits of economic growth are shared by all and has played prominently in efforts to reform tax, immigration, and trade policy. These concerns are supported by well-documented evidence of rising income inequality over the past 40 years, particularly, but not exclusively, at the top of the distribution. Evidence on the patterns for consumption inequality has been mixed.

Our study revisits this question of the trends in income and consumption inequality. To address concerns about measurement error, we construct a measure of consumption that relies on components that are consistently reported well in surveys. These components represent an important share of overall consumption, and the validity of our use of them as a proxy for total consumption is robust to income and price changes. Our results show that consumption inequality rose considerably less than income inequality over the past 5 decades. Between the early 1960s and 2017, income inequality measured as the 90:10 ratio grew by 25%, while inequality in consumption rose just 9.5%. The patterns differ sharply for certain subperiods, with the most noticeable differences occurring during the 1980s, when income inequality rose much more than consumption inequality, and since 2005, when these measures moved in opposite directions. Income inequality rose at the top (90:50 ratio) and bottom of the distribution (50:10 ratio), but increases in consumption inequality are evident only in the top. The differences between income and consumption inequality changes through 2005 are almost exclusively in the bottom half of the distribution.

Our main findings are robust to using different measures of consumption and to using a demand system approach to correct for systematic measurement error. We also show that the sharp differences between our results and those in Aguiar and Bils (2015) can be explained by demand system estimates of consumption inequality being very sensitive to the inclusion of small, poorly measured components of consumption. We consider various explanations for differences in the patterns of income and consumption inequality. Our findings are consistent with a broad theoretical and empirical literature that suggests that consumption inequality should not fully reflect increases in income inequality due to transitory income shocks. Although changing demographic characteristics can account for some of the changes in consumption inequality, they do not account for changes in income inequality. Sharp changes in asset prices may explain some of the differences in the patterns for

income and consumption inequality in the top half of the distributions. Evidence on changes in consumption by asset quintile suggests that falling asset prices in recent years contributed to the decline in consumption inequality in a period when income inequality was rising.

Measurement error likely explains many of the differences in the bottom part of the distribution. Government transfers are considerably underreported in income surveys, and the extent of this underreporting has grown over time. Such underreporting could lead to significant bias in the level and pattern of income inequality, particularly at the bottom, which is where we find the most significant differences between income and consumption inequality changes. That most of the differences between income and consumption inequality changes prior to 2005 are in the bottom half of the distribution indicates that the underreporting of consumption by the rich is not an explanation for the differences.

Our evidence of only a modest rise in consumption inequality over the past 5 decades contrasts sharply with evidence from tax data that an increasing share of the nation's income is going to families with the very highest incomes (Piketty and Saez 2003). It is important to qualify, however, that our analyses do not capture dispersion in the extreme tails of the distribution. Rather, we focus on the bulk of the distribution, between the 90th and 10th percentiles, because these percentiles will be less sensitive to the poorly measured extreme tails in survey data than other measures of inequality that consider the full distribution.

Data Availability

Data and code for replicating the tables and figures in this article can be found in Meyer and Sullivan (2022) in the Harvard Dataverse, https://doi.org/10.7910/DVN/587F9Z.

References

Aguiar, Mark, and Mark Bils. 2015. "Has Consumption Inequality Mirrored Income Inequality?" *A.E.R.* 105 (9): 2725–56.

Arellano, Manuel, Richard Blundell, and Stéphane Bonhomme. 2017. "Earnings and Consumption Dynamics: A Nonlinear Panel Data Framework." *Econometrica* 85 (3): 693–734.

Armour, Philip, Richard Burkhauser, and Jeff Larrimore. 2014. "Levels and Trends in US Income and its Distribution: A Crosswalk from Market Income towards a Comprehensive Haig-Simons Income Approach." *Southern Econ. J.* 81 (2): 271–93.

Attanasio, Orazio P., Erich Battistin, and Hidehiko Ichimura. 2007. "What Really Happened to Consumption Inequality in the United States?" In *Hard-to-Measure Goods and Services: Essays in Honor of Zvi Griliches*, edited by Ernst E. Berndt and Charles R. Hulten. Cambridge, MA: NBER.

Attanasio, Orazio, and Steven J. Davis. 1996. "Relative Wage Movements and the Distribution of Consumption." *J.P.E.* 104 (6): 1227–62.

Attanasio, Orazio, Erik Hurst, and Luigi Pistaferri. 2015. "The Evolution of Income, Consumption and Leisure Inequality in the US, 1980–2010." In *Improving the Measurement of Consumer Expenditures*, edited by Christopher Carroll, Thomas Crossley, and John Sabelhaus. Chicago: Univ. Chicago Press.

Attanasio, Orazio and Luigi Pistaferri. 2014. "Consumption Inequality over the Last Half Century: Some Evidence Using the New PSID Consumption Measure." *A.E.R.* 104 (5): 122–26.

Auten, Gerald, and David Splinter. 2019. "Income Inequality in the United States: Using Tax Data to Measure Long-Term Trends." Working paper, Joint Committee on Taxation.

Autor, David H., Lawrence F. Katz, and Melissa S. Kearney. 2005. "Rising Wage Inequality: The Role of Composition and Prices." Working Paper no. 11628, NBER, Cambridge, MA.

Batty, Michael, Jesse Bricker, Joseph Briggs, et al. 2020. "The Distributional Financial Accounts of the United States." In *Measuring Distribution and Mobility of Income and Wealth*, edited by Raj Chetty, John N. Friedman, Janet C. Gornick, Barry Johnson, and Arthur Kennickell. Chicago: Univ. Chicago Press.

Bee, C. Adam, Bruce Meyer, and James Sullivan. 2015. "The Validity of Consumption Data: Are the Consumer Expenditure Interview and Diary Surveys Informative?" In *Improving the Measurement of Consumer Expenditures*, edited by Christopher Carroll, Thomas Crossley, and John Sabelhaus. Chicago: Univ. Chicago Press.

Bee, Adam, and Joshua Mitchell. 2017. "Do Older Americans Have More Income than We Think?" SESHD Working Paper no. 2017-39, US Census Bureau, Washington, DC.

Blundell, Richard, Luigi Pistaferri, and Ian Preston. 2008. "Consumption Inequality and Partial Insurance." *A.E.R.* 98 (5): 1887–921.

Blundell, Richard, Luigi Pistaferri, and Itay Saporta-Eksten. 2016. "Consumption Inequality and Family Labor Supply." *A.E.R.* 106 (2): 387–435.

Brummet, Quentin, Denise Flanagan-Doyle, Joshua Mitchell, John Voorheis, Laura Erhard, and Brett McBride. 2018. "Investigating the Use of Administrative Records in the Consumer Expenditure Survey." CARRA Working Paper no. 2018-01, US Census Bureau, Washington, DC.

Burkhauser, Richard V., Shuaizhang Feng, and Stephen P. Jenkins. 2009. "Using the P90/P10 Index to Measure US Inequality Trends with Current Population Survey Data: A View from Inside the Census Bureau Vaults." *Rev. Income and Wealth* 55:166–85.

Campbell, J., and J. Cocco. 2007. "How Do House Prices Affect Consumption? Evidence from Micro Data," *J. Monetary Econ.* 54:591–621.

Citro, Constance F., and Robert T. Michael, eds. 1995. *Measuring Poverty: A New Approach.* Washington, DC: National Acad. Press.

Cochrane, John. 1991. "A Simple Test of Consumption Insurance." *J.P.E.* 99 (5): 957–76.

Coibion, Olivier, Yuriy Gorodnichenko, and Dmitri Koustas. 2017. "Consumption Inequality and the Frequency of Purchases." Working Paper no. 23357, NBER, Cambridge, MA.

Corinth, Kevin, Bruce D. Meyer, and Derek Wu. 2022. "The Change in Poverty from 1995 to 2016 among Single Parent Families." *AEA Papers and Proc.* 112 (May): 345–50.

Cutler, David M., and Lawrence F. Katz. 1991. "Macroeconomic Performance and the Disadvantaged." *Brookings Papers Econ. Activity* 2:1–74.

Davies, Paul S., and T. Lynn Fisher. 2009. "Measurement Issues Associated with Using Survey Data Matched with Administrative Data from the Social Security Administration." *Soc. Sec. Bull.* 69 (2): 1–12.

Fisher, J., D. S. Johnson, and T. M. Smeeding. 2015. "Inequality of Income and Consumption in the US: Measuring the Trends in Inequality from 1984 to 2011 for the Same Individuals." *Rev. Income and Wealth* 61 (4): 630–50.

Guvenen, Fatih, and Greg Kaplan. 2017. "Top Income Inequality in the 21st Century: Some Cautionary Notes." Working paper, Univ. Chicago.

Heathcote, Jonathan, Fabrizio Perri, and Giovanni L. Violante. 2010. "Unequal We Stand: An Empirical Analysis of Economic Inequality in the United States, 1967–2006." *Rev. Econ. Dynamics* 13 (1): 15–51.

Hurst, Erik, and Frank Stafford. 2004. "Home Is Where the Equity Is: Liquidity Constraints, Refinancing and Consumption." *J. Money, Credit and Banking* 36 (6): 985–1014.

Johnson, David, and Stephanie Shipp. 1997. "Trends in Inequality Using Consumption Expenditures." *Rev. Income and Wealth* 43 (2): 133–52.

Krueger, Dirk, and Fabrizio Perri. 2006. "Does Income Inequality Lead to Consumption Inequality? Evidence and Theory." *Rev. Econ. Studies* 73 (1): 163–93.

Larrimore, Jeff, Richard V. Burkhauser, Gerald Auten, and Philip Armour. 2021. "Recent Trends in US Income Distributions in Tax Record Data Using More Comprehensive Measures of Income Including Real Accrued Capital Gains." *J.P.E.* 129 (5): 1319–60.

Melly, Blaise. 2005. "Decomposition of Differences in Distribution Using Quantile Regression." *Labour Econ.* 12 (2005): 577–90.

Meyer, Bruce D., and Nikolas Mittag. 2019. "Using Linked Survey and Administrative Data to Better Measure Income: Implications for Poverty, Program Effectiveness and Holes in the Safety Net." *American Econ. J. Applied Econ.* 11 (2; April): 176–204.

Meyer, Bruce D., Nikolas Mittag, and Robert M. Goerge. 2022. "Errors in Survey Reporting and Imputation and Their Effects on Estimates of Food Stamp Program Participation." *J. Human Res.* 57 (5): 1605–44.

Meyer, Bruce D., Wallace K. C. Mok, and James X. Sullivan. 2015. "Household Surveys in Crisis." *J. Econ. Perspectives* 29 (4): 199–226.

Meyer, Bruce D., and James X. Sullivan. 2003. "Measuring the Well-Being of the Poor Using Income and Consumption." *J. Human Res.* 38 (suppl.): 1180–220.

———. 2011. "Further Results on Measuring the Well-Being of the Poor Using Income and Consumption." *Canadian J. Econ.* 44 (1): 52–87.

———. 2012a. "Identifying the Disadvantaged: Official Poverty, Consumption Poverty, and the New Supplemental Poverty Measure." *J. Econ. Perspectives* 26 (3): 111–36.

———. 2012b. "Winning the War: Poverty from the Great Society to the Great Recession." *Brookings Papers Econ. Activity* (Fall): 133–83.

———. 2021. "Consumption and Income Inequality in the US Since the 1960s." Working Paper no. 23655, NBER, Cambridge, MA.

———. 2022. "Replication Data for: Consumption and Income Inequality in the US since the 1960s." Harvard Dataverse, https://doi.org/10.7910/DVN/587F9Z.

Mian, Atif, Amir Sufi, and Kamalesh Rao. 2013. "Household Balance Sheets, Consumption, and the Economic Slump." *Q.J.E.* 128 (4): 1687–726

Petev, Ivaylo, Luigi Pistaferri, and Itay Saporta Eksten. 2012. "An Analysis of Trends, Perceptions, and Distributional Effects in Consumption." In *The Great*

Recession, edited by D. Grusky, B. Western, and C. Wimer. New York: Russell Sage Found.

Piketty, T., and E. Saez. 2003. "Income Inequality in the United States: 1913–1998." *Q.J.E.* 118 (1): 1–39.

———. 2007. "Thomas Piketty and Emmanuel Saez Respond to Alan Reynolds." *Economist's View*, http://economistsview.typepad.com/economistsview/2007/01/thomas_piketty_.html.

Piketty, T., E. Saez, and G. Zucman. 2018. "Distributional National Accounts: Methods and Estimates for the United States." *Q.J.E.* 131 (2): 519–78.

Reynolds, Alan. 2007. "Has US Income Inequality Really Increased?" Policy Analysis 586 (January), Cato Inst., Washington, DC.

Sabelhaus, John, David Johnson, Stephen Ash, et al. 2015. "Is the Consumer Expenditure Survey Representative by Income?" In *Improving the Measurement of Consumer Expenditures*. Chicago: Univ. Chicago Press.

Semega, Jessica, Melissa Kollar, Emily A. Shrider, and John F. Creamer. 2020. "Income and Poverty in the United States: 2019." *Current Population Reports* (September), P60–270. Washington, DC: US Census Bureau.

Slesnick, Daniel T. 1994. "Consumption, Needs and Inequality." *Internat. Econ. Rev.* 35 (3): 677–703.

———. 2001. *Consumption and Social Welfare*. Cambridge: Cambridge Univ. Press.

Splinter, David. 2020. "Reply: Trends in US Income and Wealth Inequality: Revising After the Revisionists." Working paper, http://www.davidsplinter.com/Splinter2020-SaezZucmanReply.pdf.

Sullivan, James. 2008. "Borrowing during Unemployment: Unsecured Debt as a Safety Net." *J. Human Res.* 43 (2): 383–412.