

Consumption and Income Inequality in the U.S. Since the 1960s*

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Abstract

Official income inequality statistics indicate a sharp rise in inequality over the past four decades. These statistics, however, may not accurately reflect inequality in well-being for a number of reasons. Income is likely to be poorly measured, particularly in the tails of the distribution. Also, current income may differ from permanent income, failing to capture the enjoyment of past and future income through borrowing and saving and the consumption of durables such as houses and cars. This paper examines inequality in economic well-being in the U.S. since the 1960s using consumption and income based measures of inequality. We advance the literature on inequality by constructing improved measures of consumption over a long time period. We examine income inequality between 1963 and 2011 using data from the Current Population Survey and consumption inequality between 1960 and 2011 using data from the Consumer Expenditure 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. In general, accounting for taxes considerably reduces the rise in income inequality since 1963, while accounting for noncash benefits has only a small effect on changes in income inequality. Consumption inequality is less pronounced than income inequality, particularly for the bottom half of the distribution. Income inequality fell in the 1960s while consumption inequality rose. In the 1980s, inequality for both measures rose, but the increase was much greater for income than for consumption. After 2005 these measures moved in opposite directions as income inequality rose sharply while consumption inequality fell. Over the period from 1980 to 2011, both income and consumption inequality rose, but the rise was much more noticeable for income (45 percent) than for consumption (19 percent). Furthermore, until 2005 differences between the two are only apparent in the bottom half of the distribution.

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1. Introduction

There is a national debate in the U.S. on trends in inequality and the appropriate responses to them. Political rhetoric emphasizes a growing divide between the rich and the poor, highlighting the rise in executive pay and the increasing ranks of the very rich. While the extremely affluent are an important group to study, they are a small share of the population. Measures of inequality that look beyond the very top of the distribution and that more accurately reflect economic well-being are essential for evaluating existing policies and for determining the need for policy changes. 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.

The debate over inequality relies almost exclusively on income data. Official income statistics indicate that inequality has increased sharply. But these official statistics have a number of shortcomings. These measures ignore taxes and transfers and often rely on income that is badly reported in surveys. Even improved income measures are subject to transitory variation 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. For these reasons, the consumption patterns of families provide a better indicator of economic well-being.

This paper focuses on inequality in well-being and how it has changed over time. We report measures of inequality for income since 1963 and consumption since 1960. We examine income inequality using data from the Current Population Survey and consumption inequality using 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. In general, accounting for taxes considerably reduces the rise in income inequality since 1963, while accounting for noncash benefits has only a small effect on changes in income inequality. Consumption inequality is less pronounced than income inequality, particularly for the bottom half of the distribution. Income inequality fell in the 1960s while consumption inequality rose. In the 1980s, inequality for both measures rose, but the increase was much greater for income (28 percent)

than for consumption (13 percent). Consumption inequality continued to rise during the 1990s while income inequality was flat, and after 2005 these measures moved in opposite directions as income inequality rose sharply while consumption inequality fell. Over the period from the 1980 to 2011, both income and consumption inequality rose, but the rise was much more noticeable for income (45 percent) than for consumption (19 percent). Furthermore, this much smaller percentage increase in consumption inequality started from a considerably lower base. The differences between income and consumption through 2005 are almost exclusively in the bottom half of the distribution, indicating that the under-reporting of consumption by the rich is not an explanation for the differences.

There is a growing literature that examines broader measures of inequality in the U.S. We contribute to this literature by providing updated results for more recent years that span the Great Recession; by examining measures of consumption that address concerns about under-reporting; and by considering possible explanations for changes in inequality over time and why the patterns for income and consumption inequality differ.

In the following section, we summarize the previous work on income and consumption inequality. In Section 3 we discuss the advantages of measuring economic well-being using consumption rather than income. We describe the data in Section 4 and discuss data quality issues in Section 5. The results are presented in Section 6 and we consider explanations for changes in inequality in Section 7. We conclude in Section 8.

2. Previous Research on Income and Consumption Inequality

Much of the previous work on inequality in the U.S. has focused on earnings and wages (Juhn, Murphy, and Pierce, 1993; Autor, Katz and Kearney, 2005a,b; 2006, for example). The dispersion in the distribution of wages and earnings is important for understanding the impact of changes in technology, human capital, globalization, labor market institutions or other factors that affect the labor market. However, these measures do not fully capture dispersion in family well-being. While wages are an important component of overall economic well-being, other factors also contribute to well-being such as unemployment,

disability, retirement, family formation, child bearing, health, transfers from family, friends and government, or saving and borrowing.

Official measures of income inequality are based on pre-tax money income (U.S. Census, 2009). These official measures indicate that inequality has risen steadily in the U.S. since the early 1970s. An important limitation of the official statistics is that they do not account for the effects of taxes on the distribution of resources. In addition, they do not account for changes in family size and are household weighted rather than person weighted, i.e. they weight a family with one person and one with six equally. Much of the research using conceptually better measures of income inequality has focused on total family income. Burkhauser, Feng and Jenkins (2009) find that individual weighted household income inequality measured by the 90/10 ratio rose until the early 1990s and then declined slightly through 2004, while the Gini coefficient rose over the entire period.

Several studies have examined after-tax income inequality (for example see Heathcote, Perri and Violante, 2010). This research shows that taxes reduce the level of inequality considerably, and although after-tax income inequality still rises over time, the rise since the mid-1980s is less noticeable than that for pre-tax income. Other research examines tax filing units and finds a sharp increase in inequality in the very top percentiles (Piketty and Saez, 2003), though some research has argued that definitional changes, income shifting, and other tax responses have exaggerated these changes (Reynolds, 2007).

Other studies have looked at consumption as a more comprehensive measure of well-being. Earlier work looking at consumption based measures of inequality suggests that consumption inequality has risen less than income inequality. Cutler and Katz (1991) find that consumption inequality rose less sharply than income inequality between 1960-61 and 1988. Slesnick (2001) finds that consumption inequality was roughly constant between 1970 and 1995. Krueger and Perri (2006) find that consumption inequality increased only moderately between 1980 and 2003, and Heathcote et al. (2010) show that disposable income inequality rises more than nondurable consumption inequality between 1980 and 2005.

Some more recent work has argued that changes in consumption and income inequality are similar. Attanasio, Battistin and Ichimura (2004) combine Consumer Expenditure Diary and Interview Surveys using a number of assumptions. They conclude that

consumption inequality has risen over time along with income inequality. Two recent working papers (Aguiar and Bils 2012; Attanasio et al. 2013) argue that increases in consumption and income inequality have been similar in recent decades, while a third study disagrees with this conclusion (Fisher et al. 2013).

3. The Conceptual Advantages of Consumption Measures of Well-Being

Throughout this paper we emphasize the differences between income and consumption based measures of inequality. Previous work has presented evidence that consumption provides a better measure of well-being than income for families with few resources (Meyer and Sullivan 2003, 2011). Conceptual arguments as to whether income or consumption is a better measure of the material well-being almost always favor consumption. For example, consumption better reflects long-run resources (for further discussion, see Cutler and Katz 1991; Poterba 1991; Slesnick 1993). Income measures fail to capture disparities in consumption that result from differences across families in the accumulation of assets or access to credit. Consumption measures will reflect the loss of housing services flows if homeownership 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. Consumption will also better reflect the insurance value of government programs, and is more likely to capture private and government transfers. In addition to these reasons, available consumption data are better suited than available income data for imputing some non-money resources, particularly those related to housing and vehicle ownership.¹

Meyer and Sullivan (2003, 2011a) provide evidence that consumption is a better predictor of well-being than income. They show that other measures of material hardship or adverse family outcomes are more severe for those with low consumption than for those with

¹ In addition to these reasons, available consumption data are better suited than available income data for imputing some non-money resources, particularly those related to housing and vehicle ownership. For example, a better value of housing subsidies can be computed using Consumer Expenditure (CE) Survey data than the Current Population Survey (CPS) because the survey provides information on out of pocket rent and the characteristics of the living unit including the total number of rooms, the number of bathrooms and bedrooms, and appliances such as a washer, dryer, etc. These characteristics can be used to impute a total rental value as explained in the Data Appendix. In addition, for homeowners the CE provides self-reported values of the rental equivalent of the home.

low income, indicating that consumption does a better job of capturing well-being for these families. In an even more direct evaluation of poverty measures, Meyer and Sullivan (2012) compare the characteristics of those added to poverty and subtracted from poverty when going from an income based measure to a consumption based measure, holding the poverty rate constant. They find that those added to poverty by the consumption based measure are less likely to have health insurance, have less education, smaller and cheaper cars, fewer household appliances and amenities.

Some researchers have argued that income may have some conceptual advantages over consumption.² One reason is that individuals can choose to have low consumption, while income reflects access to resources that can be used for consumption, and as such is not driven by consumption decisions (Atkinson, 1991). However, individual choices affect the level of income as well through education, occupation and labor supply choices. Furthermore, consumption is more likely than income to be affected by the ability to borrow and 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. Another potential advantage to income is that current consumption fails to capture the welfare benefits of leaving bequests.

That consumption can be divided into meaningful categories, such as food and housing, provides several advantages over income. First, expenditures on categories such as food and housing are of interest in their own right. In fact, subcategories of consumption such as nondurable consumption have been used extensively in past work. Second, with consumption one can better account for relative price changes by using component specific price indices. Furthermore, we can examine the effects of excluding categories of consumption that may not directly increase well-being, such as work expenses and out-of-pocket medical expenses.

While the conceptual advantages of consumption are clear, previous studies have raised concerns about the quality of income and consumption data. We discuss these important measurement issues in Section 5.

² Blundell and Preston (1998) is sometimes characterized as finding that income has advantages over consumption. A more accurate summary is that some comparisons of consumption across cohorts or age will not give the correct sign to the difference in utility, but income suffers from the same types of problems in the situations they consider.

4. Data

4.A Current Population Survey Income Measures

The official inequality measures in the U.S. are based on data from the Current Population Survey Annual Social and Economic Supplement (CPS). This survey interviews approximately 100,000 households annually (60,000 households prior to 2002).³ For the previous calendar year, respondents report the income amounts for a number of different sources that are included in the money income measure used to determine official income distribution statistics. In addition, the survey collects information on the dollar value of food stamps received by the household, as well as whether household members received other noncash benefits including housing subsidies and subsidies for reduced or free school lunch. Starting with the 1980 survey, the also provides imputed values for these and other noncash benefits including Medicaid and Medicare, the value of housing equity converted into an annuity, and the value of employer health benefits. See the Data Appendix for more details.

We use data from the 1964-2012 CPS surveys which provide data on income for the previous calendar year. Our analysis focuses on three different measures of income: pre-tax money income, after-tax money income, and after-tax money income plus noncash benefits. Pre-tax money income follows the Census' definition of money income that is used to measure poverty and inequality.⁴ To calculate after-tax money income we add the value of tax credits such as the EITC, and subtract state and federal income taxes and payroll taxes. Federal income tax liabilities and credits and FICA taxes are calculated for all years using TAXSIM (Feenberg and Coutts 1993). State taxes and credits are also calculated using TAXSIM for the years 1977-2011. Prior to 1977 we calculate state taxes using IncTaxCalc (Bakija, 2008). We confirm that in 1977 net state tax liabilities generated using IncTaxCalc

³ The Annual Social and Economic Supplement (formerly known as the March Current Population Survey or the Annual Demographic File) is currently administered to the March sample of the Current Population Survey as well as a subsample of the respondents in the February and April surveys. Prior to reference year 2002 (survey year 2003), the supplement was only included in the March survey.

⁴ These sources, as reported in the ASEC codebook, include: earnings; net income from self-employment; Social Security, pension, and retirement income; public transfer income including Supplemental Security Income, welfare payments, veterans' payment or unemployment and workmen's compensation; interest and investment income; rental income; and alimony or child support, regular contributions from persons outside the household, and other periodic income.

match very closely those generated using TAXSIM.⁵ Our measure of after-tax money income plus noncash benefits adds to after-tax money income the cash value of food stamps, and the Census' imputed value of housing subsidies, school lunch programs, Medicaid and Medicare, employer health benefits, and the net return on housing equity.

We measure income at the family level, counting the resources for all individuals within a housing unit who are related by blood or marriage. Measuring resources at the family level follows the approach used for official poverty statistics. This approach excludes from family income the resources of unrelated individuals, such as a cohabiting partner. Analytically, the unit should be based on those who share resources. However, in the CPS we do not observe whether the cohabitor is sharing resources with other family members. In the CE Survey we have more information about who shares resources as explained in the following subsection. To adjust for differences in family size and composition we scale all income measures using an NAS recommended equivalence scale (Citro and Michael, 1995) that allows for differences in costs between adults and children and exhibits diminishing marginal cost with each additional adult equivalent. In particular, we scale our measures by $(A + 0.7K)^{0.7}$, where A is the number of adults in the family and K is the number of children.

4.B Consumption Measures from the Consumer Expenditure Survey

Our consumption data come from the Consumer Expenditure (CE) Survey, which is the most comprehensive source of consumption data in the U.S. We use the Interview component of the CE Survey for the years 1960-1961, 1972-1973, 1980-1981 and 1984-2011 (see Data Appendix for details). The CE Survey provides annual or annualized data for 13,728 families in 1960-1961 and 19,975 families in 1972-1973. From 1980-2011 the survey is a rotating panel that includes about 5,000 families each quarter until 1998 and about 7,500 families thereafter. Each family, or what the CE refers to as the consumer unit, reports spending on a large number of expenditure categories for up to four consecutive quarters. The

⁵ The CPS also includes an imputed value for taxes and credits, but this information is only available starting with the 1980 survey, and the methodology for imputing taxes has changed over time.

consumer unit is defined as either a group of individuals who are related by blood or marriage, a single or financially independent individual, or two or more persons who share resources.⁶

To convert reported expenditures into a measure of consumption, we make a number of adjustments. While previous studies have made similar adjustments, our approach involves several important methodological improvements. First, we convert vehicle spending to a service flow equivalent. Instead of including the full purchase price of a vehicle, we calculate a flow that reflects the value that a consumer receives from owning a car during the period that is a function of a depreciation rate and the current market value of the vehicle. To determine the current market value of each car owned, we use detailed information on vehicles (including make, model, year, age, and other characteristics). This approach accounts for features and quality improvements through what purchasers are willing to pay. See the Data Appendix of Meyer and Sullivan (2012) for more details on how we calculate vehicle service flows.

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. Third, for respondents living in government or subsidized housing, we impute a rental value using detailed housing characteristics available in the survey including the number of rooms, bedrooms and bathrooms, and the presence of appliances such as a microwave, disposal, refrigerator, washer, and dryer.

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.⁷ We exclude out of pocket medical expenses because high out of pocket expenses are arguably more likely to reflect substantial need or lack of good insurance rather

⁶ Individuals are considered to be sharing resources if expenses are not independent for at least two of the three major expense categories: housing, food, and other living expenses.

⁷ We also exclude spending on charitable contributions and spending on cash gifts to non-family members. This category is very small relative to total consumption. We considered subtracting estimated monetary work expenses from consumption. However, work related expenses that are reported in the CE, such as child care and domestic services, on average tend to be very small relative to total spending. We have also examined the difference in transportation and clothing expenditures for those who work and those who do not as an estimate of additional work expenses, but again this estimate is small relative to total consumption. To account for how work affects consumption more generally, one may want to examine the consumption of leisure (Aguar and Hurst 2007, Meyer and Sullivan 2008).

than greater well-being. However, given the importance of health coverage and changes over time in public and private insurance, we report alternative consumption measures that include a value for public and private health insurance (more details on our measure of consumption are in the Data Appendix).

5. Data Quality and Under-reporting in the CPS and CE Survey

Evidence on the tendency of surveys to capture more accurate information on income or on consumption is split. For most families, income is easier to report, given administrative reporting by employers and other sources, and the typically small number of sources. However, for analyses of families with few resources this argument is less valid, as these families tend to have many income sources. Additionally, while income may be easier to report, it is likely to be a more sensitive topic for survey respondents than consumption. The CPS has slightly lower survey non-response than the CE Survey, but much higher item non-response on income questions than the CE Survey has on expenditure questions. Taken together, the CPS has appreciably higher nonresponse than the CE Survey (Meyer and Sullivan 2011).

5.A. Income Under-Reporting

Income in the CPS is substantially under-reported, especially for categories of income important for those with few resources. Furthermore, the extent of under-reporting has increased over time. Meyer and Sullivan (2003, 2011a) and Meyer, Mok and Sullivan (2009) report comparisons of weighted micro-data from the CPS to administrative aggregates for government transfers and tax credits. These ratios are substantially below one and have declined over time, falling to below 0.6 for Food Stamps and 0.5 for Temporary Assistance for Needy Families (TANF) in recent years. Comparisons of CPS micro-data to administrative micro-data for the same individuals corroborate the severe under-reporting of government transfers (Meyer and Goerge 2011). Concerns about income under-reporting are not limited to transfer income. Davies and Fisher (2009) summarize evidence finding under-reporting in surveys of earnings at the bottom of the distribution based on comparisons of

survey and administrative data. Consistent with these results, income is often far below consumption for those with few resources, even for those with little or no assets or debts (Meyer and Sullivan 2003, 2011a).

5.B. Consumption Under-Reporting

There is also substantial evidence that aggregate consumption is under-reported in the CE and that this under-reporting has increased over time. Given that we generally find that consumption exceeds income at the bottom, and that in recent years consumption inequality has not risen with income inequality, the main findings of the paper are likely somewhat understated by consumption under-reporting. To assess the degree of under-reporting, CE data have been compared to data from many sources, but the most extensive and heavily cited comparisons are to the Personal Consumption Expenditure (PCE) data from the National Income and Product Accounts (NIPA). Focusing on comparable expenditure categories is important because past studies have indicated that half or more of the discrepancy between the two sources is due to definitional differences (Slesnick 1992, General Accounting Office 1996).

Bee, Meyer and Sullivan (2012) survey and update these analyses, focusing on the CE Interview Survey data rather than the published integrated data examined in the literature. Among the eight largest comparable categories of expenditures six are reported at a high rate in the CE Interview Survey 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 PCE is 0.95 or higher for imputed rent, rent and utilities, and new motor vehicles. It is 0.86 for food at home, 0.80 for communication, and 0.78 for gasoline and other energy goods. 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.

However, these aggregate numbers likely overstate the weakness of the data for the typical person and even more so for those with few resources. Sabelhaus et al. (2012) examine the representativeness of the CE Interview Survey by income. They match CE

respondent and non-respondent households to income at the zip code level. They find that there is a small under-representation of those from the top four or five percentiles of zip code level income and no under-representation (maybe a slight over-representation) at the bottom of the zip code level income percentiles. Much more important quantitatively, they find that the income reported in the survey, either because high income people are missing or because income is under-reported at the top, does not match well to other sources such as the Survey of Consumer Finances and tax records. Furthermore, reported spending relative to income is very low at the top. The finding that much of the under-reporting of expenditures occurs at the very top of the income distribution means that the aggregate under-reporting statistics likely overstate the weakness of the CE for a typical person.

Our measures of consumption also include the value of the flow from the ownership of durables such as houses and cars. Reporting ownership of houses and vehicles is very different from reporting the mostly small, discretionary purchases that are badly reported in the CE. Validation of these data suggests that ownership of these durables is reported reasonably well (Bee, Meyer and Sullivan 2012).

5.C. Addressing Under-Reporting of Consumption

Incorporating the lessons of the previous section, we construct two alternative measures of consumption. The first is a measure that includes spending components that have reporting ratios that are high and constant or that decline slowly over time—what we call core consumption. This core consumption measure consists of food at home, rent plus utilities, transportation, gasoline, the value of owner-occupied housing, rental assistance, and the value of owned vehicles. Overall, our core consumption measure is 73 percent of total reported consumption in the early 1980s.⁸

The second alternative measure of consumption we examine is predicted consumption, which we calculate (for either consumption or consumption excluding health insurance) by regressing the consumption measure (in constant dollars) on a cubic in core consumption, a cubic in the age of the head, education of the head dummies, family type dummies, and race dummies for consumer units in the CE Survey from the first quarter of 1980 through the third

⁸ Non-medical core consumption is on average 80 percent of total non-medical consumption in the early 1980s, and a higher share in recent years due to the decline in reporting of other components of consumption.

quarter of 1981 (the fourth quarter of 1981 includes only urban consumer units). We choose these years because total expenditures in the CE Survey compare more favorably to NIPA in the early 1980s than in recent years and this period is prior to the change in the question regarding food at home (which was different for the 1982-1987 period). Coefficients from this regression are then used to predict a value of the respective consumption measure for each consumer unit in all years.

6. Results

The results that follow report measures of income and consumption inequality between 1961 and 2011. We focus on measures of the distribution of income and consumption such as the ratio of the 90th percentile to the 10th percentile (the 90/10 ratio), the 50/10 ratio, and the 90/50 ratio. These ratios are not as sensitive to the poorly measured extreme tails of the distribution as are other measures such as the variance of the logarithm of income or consumption or the Gini coefficient.

6.A. Income Inequality

In Figure 1 we report the 90/10 ratio for the official measure of income (household pre-tax money income without an adjustment for household size or composition) from Census Bureau reports (U.S. Census 2012). We also report 90/10 ratios for other income measures that conceptually better capture disposable resources. The 90/10 ratio for the official measure shows a pattern with no discernible trend from 1967 through the mid-1970s. Since the late 1970s, this measure of inequality rises steadily, aside from a few transitory dips around 1989 and 1995.

Our pre-tax money income measure of inequality differs from the official measure in three ways. First, we measure resources at the family level, while the official measure pools resources at the household level. Second, our observations are person weighted while the official measure is household weighted. Finally, we adjust for differences in family size and composition, while the official measure is not equivalence-scale adjusted. Our pre-tax income measure shows a fairly similar pattern, but with a significantly lower level of inequality. In

2011, for example, the 90/10 ratio for our measure is 15 percent lower than that of the official measure. That we adjust income by an equivalence scale accounts for this reduced dispersion at a point in time. In 2008, for example, adjusting income by an equivalence scale, but measuring resources and weighting at the household level, as is done in the official measure, reduces the 90/10 ratio by 24 percent.

Our different methodology also affects changes over time in pre-tax income inequality. The most important difference for changes over time is that our measure is person weighted. The 90/10 ratio rises faster for person weighted income than for household weighted income, mainly because the 10th percentile of person weighted income rises more slowly over time than does the 10th percentile of household weighted income in the late 1970s and 1980s. Consequently, a person weighted measure of pre-tax money income inequality rises more in the late 1970s and early 1980s than does the official measure, while the two series change nearly one-for-one between the early 1980s and 2011.

We also present pre-tax income inequality measures for several years in the 1960s that are not available in official reports. These data indicate that pre-tax income inequality falls between 1963 and 1970.

After-tax money income inequality has a very different pattern. As with the pre-tax measure, after-tax money income inequality falls in the 1960s. Starting in the late 1970s, however, after-tax money income inequality rises more slowly than does pre-tax money income inequality. There is very little increase in after-tax money income inequality for the period from the late-1980s through the early-2000s, although there is a small temporary increase centered around 1993. After-tax income inequality rose noticeably from 2007 to 2011, but the rise was not nearly as large as that for the pre-tax series. For the years since 1980, we also have information on noncash benefits. Adding non-cash benefits to after-tax money income leads to slightly lower inequality, but the changes over time are similar to those for after-tax money income.

Changes in inequality at the bottom half of the income distribution differ considerably from those of the overall distribution, as shown in Figure 2. The official pre-tax measure declined in the 1960s and early 1970s and then was nearly constant for the next 35 years. The pre-tax measure at the family level that is equivalence scale adjusted and person weighted

declined in the 1960s, rose in the late 1970s and early 1980s and then changed little until after 2008 when it rose substantially. The after-tax measures show a similar pattern, except that there was a decline in inequality in the bottom half of the distribution in the early 1990s that persisted at least until the early 2000s. The decline in inequality for the after-tax measure in the early 1990s occurs during a period when the EITC expanded considerably, increasing disposable incomes near the bottom of the distribution. Including non-cash benefits results in a slightly lower level of inequality in 1980, because these benefits affect the 10th percentile more than the median. By 1998, however, the addition of non-cash benefits has little effect on the level of inequality in the bottom half of the distribution, and the changes over time in inequality mirror those for the after-tax measure thereafter.

One potential reason that noncash benefits may have only a small effect on the 90/10 or 50/10 ratios is that many of these benefits go to individuals below the 10th percentile. As shown in Appendix Figure 1, adding noncash benefits to after-tax income noticeably reduces the 50/5 ratio. 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 between 1980 and 2007, although after 2007 the 50/5 ratio for after-tax income rose noticeably more than that for after-tax income plus noncash benefits.

It is important to note that our measure of noncash benefits does not adjust for under-reporting of these benefits in surveys. Given research which shows that these benefits are significantly under-reported in the CPS and that this under-reporting has increased over time (Meyer, Mok, and Sullivan, 2009), it is likely that our results understate the true impact of noncash benefits on the level and changes in income inequality.

The results in Figure 3 show that income inequality has a very different pattern in the top half of the distribution than in the bottom half. The official measure shows a steady increase beginning in the late 1960s and continuing through 2011. Adjusting for family size and person weighting flattens out or even eliminates the increase through around 1980, but the steady increase in inequality in the years after the early 1980s remains. Not surprisingly, the inclusion of noncash benefits has no discernible effect on the level or trend in inequality for the top half of the distribution.

6.B. Consumption Inequality

We report the 90/10 ratio for consumption in Figure 4 along with that for after-tax money income for comparison. We also report the 90/10 ratio for core consumption, the subset of consumption that includes components of consumption that tend to be well-measured throughout the sample period. As expected, the consumption distribution is less dispersed than the after-tax income distribution. Over the entire period, both income inequality and consumption inequality rose, but the former rose more. Between 1980 and 2011 income inequality rose by 45 percent while consumption inequality rose by 19 percent. Differences are even more noticeable for shorter time periods. Income inequality fell in the 1960s (the 90/10 ratio declines 10 percent) while consumption inequality rose (by 9 percent). In the 1980s, inequality for both measures rose, but the increase was much greater for income (28 percent) than for consumption (13 percent). Consumption inequality continued to rise during the 1990s while income inequality was flat, and after 2005 these measures moved in opposite directions as income inequality rose sharply while consumption inequality fell. The pattern for inequality in core consumption is similar to that of consumption, although inequality in core consumption rose much less noticeably—between 1980 and 2011 core consumption inequality rose by 9 percent.

Consumption inequality in the bottom half of the distribution (Figure 5) shows a similar pattern to overall consumption inequality for most periods. The most noticeable difference is in the latter part of the 1980s, when the 90/10 ratio for consumption rose slightly (Figure 4) but the 50/10 ratio fell (Figure 5). As with the 90/10 ratio, the 50/10 ratio for consumption rose during the 1990s and fell after the mid-2000s. The patterns for consumption inequality in the bottom half of the distribution are noticeably different from those for income. For example, between 1980 and 2011 the 50/10 ratio for after-tax income rose by 15 percent while the ratio for consumption rose by just over 1 percent. 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 2011, the 50/10 ratio for after-tax income was more than 45 percent greater than the 50/10 ratio for consumption. In previous research we have argued that spending exceeds income at the bottom of the distribution in large part due to under-reporting of income (Meyer and Sullivan 2011).

In the top half of the distribution, income inequality and consumption inequality follow a very similar pattern for much of the sample period—between 1980 and 2005 the 90/50 ratio for after-tax income rose by 22 percent while that for consumption rose 24 percent (Figure 6). After 2005, however, these measures moved in opposite directions with the 90/50 ratio for after-tax income continuing 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 rose.

In Appendix Figure 2 we report the 90/10 ratio for expenditures and other measures of consumption. 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. Changes in the 90/10 ratio for expenditures are comparable to those for consumption although the 90/10 ratio for expenditures rose much more between 1972 and 1986 and then was roughly flat from the early 1980s to the early 2000s, a period when the 90/10 ratio for consumption rose. Appendix Figure 2 also shows that adjusting consumption for under-reporting has a noticeable effect on the patterns of consumption inequality—between 1987 and 2005 the 90/10 ratio for unadjusted consumption was flat or falling, while the 90/10 ratio for consumption rose. Finally, Appendix Figure 2 shows that including the value of health insurance does not significantly affect the patterns for consumption inequality.⁹

In summary, our main results show that while both income and consumption inequality have risen over the past five decades, income inequality rose more. Moreover, the patterns for income and consumption inequality differ sharply within each decade, and most notably, these measures have moved in opposite directions since 2005. The differences between changes in income and consumption inequality are much more noticeable at the bottom of the distribution (for 50/10 ratios) than at the top (90/50 ratios) indicating that under-reporting of consumption by the rich is not behind the differences.

⁹ The 50/10 ratio and the 90/50 ratio for expenditures and other measures of consumption are reported in Appendix Figures 3 and 4.

7. Potential Explanations for Inequality Patterns

In this section we consider potential explanations for changes in income and consumption inequality over time and for differences in the patterns for these measures. In particular, we consider the extent to which changes in demographic characteristics over the past five decades can explain changes in either income or consumption inequality. We also discuss two other possible explanations for changes in income and consumption inequality: borrowing and saving behavior and changes in under-reporting.

To determine the impact of changing demographics, we decompose changes in inequality into three separate components: changes in observable characteristics, changes in the return to these observable characteristics, and changes in unobservables. This decomposition can be done for each quantile, following the approach from Melly (2005) and Autor, Katz and Kearney (2005). This procedure is similar to, but less restrictive than, the decompositions from Juhn, Murphy, Pierce (1992), because the quantile decomposition approach allows observable characteristics to affect the whole distribution of income or consumption.

The first step in the quantile decomposition is to estimate a model of the conditional quantiles. Then, we generate the unconditional distribution by integrating the conditional distribution over the whole range of the distribution of observable characteristics. Using this unconditional distribution, we can construct counterfactual distributions. For example, we can construct a hypothetical distribution of income for 1980 in the case where observable characteristics are the same as those in 1990. We denote the q^{th} quantile from this counterfactual distribution as $q(\hat{\beta}^{80}, x^{90})$, where $\hat{\beta}^{80}$ represents the return to observable characteristics in 1980 and x^{90} represents the observable characteristics in 1990. Consider the following decomposition, which is similar to equation 2 from Melly (2005),

$$\begin{aligned}
q(\hat{\beta}^{90}, x^{90}) - q(\hat{\beta}^{80}, x^{80}) = & \\
& \{q(\hat{\beta}^{90}, x^{90}) - q(\hat{\beta}^{m90,r80}, x^{90})\} \\
& + \{q(\hat{\beta}^{m90,r80}, x^{90}) - q(\hat{\beta}^{80}, x^{90})\} \\
& + \{q(\hat{\beta}^{80}, x^{90}) - q(\hat{\beta}^{80}, x^{80})\}
\end{aligned} \tag{1}$$

where $q(\hat{\beta}^{m90,r80}, x^{90})$ is the q^{th} quantile from the counterfactual distribution generated using the median return to characteristics from 1990 and the residual distribution from 1980.

This equation shows that the actual change in a given quantile, q , of income or consumption—the left hand side of equation 1—can be decomposed into changes in residuals (the first bracketed term on the right hand side), changes in the return on the observable characteristics (the second bracketed term on the right hand side), and changes in observable characteristics (the last bracketed term on the right hand side).

We decompose the log of consumption and income so that changes in ratios of quantiles, such as the 90/10 ratio, can be written as differences between expressions like that in equation 1 for two different quantiles. We rely on the result that the logarithm is a monotonic function so that the logarithm of a quantile is just the quantile of the logarithm. Then, because the ratio of two quantiles, $\log(q/q')$ is just $\log(q) - \log(q')$, we have that the change in the log of the q/q' ratio between 1980 and 1990 is of the form

$[q(\hat{\beta}^{90}, x^{90}) - q(\hat{\beta}^{80}, x^{80})] - [q'(\hat{\beta}^{90}, x^{90}) - q'(\hat{\beta}^{80}, x^{80})]$ which is just the difference in the left hand side of equation 1 for quantiles q and q' . Thus, to decompose changes in ratios, we simply group the like terms from the right hand side of equation 1 for the two quantiles. For example, when decomposing changes in q/q' , the effect of changes in residuals can be expressed as $[q(\hat{\beta}^{90}, x^{90}) - q(\hat{\beta}^{m90,r80}, x^{90})] - [q'(\hat{\beta}^{90}, x^{90}) - q'(\hat{\beta}^{m90,r80}, x^{90})]$.

The results from these decompositions are presented in Table 1 for consumption inequality and Table 2 for income inequality. We decompose the changes in the 90/10, 50/10, and 90/50 ratios for each decade separately. In Table 1 we see that the effect of changing demographic characteristics explains much of the rise in the overall consumption inequality between 1961 and 1972 and between 1972 and 1980. In more recent years, changing demographics play a small or negligible role, while changes in residuals account for much of

the change in consumption inequality. For income inequality (Table 2), changes in demographic characteristics suggest a rise in inequality throughout the period from 1963 to 2011. Given that actual income inequality falls in the 1960s and 1970s, changing demographics cannot account for actual changes in income inequality during these periods. For most periods, changes in residuals and the return on observable characteristics account for the actual change in overall income inequality.

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 that greater availability of credit could explain why consumption inequality rose less than income inequality in recent decades. Individuals at the bottom of the distribution, however, have only limited access to debt, so consumption smoothing cannot explain why, for example, the 25/5 ratio for after-tax income rose sharply over the past three decades while the 25/5 ratio for consumption fell.

For families with substantial asset holdings, changes in asset values could affect consumption even if income is unchanged. Thus, the sharp decline in asset prices after 2006, first housing and then financial assets, could explain why consumption inequality fell in recent years even though income inequality did not. In separate analyses we find that homeowners tended to reduce their consumption more than non-homeowners after 2006. We also examine changes in consumption separately for high and low asset groups. We find that between 2006 and 2011 consumption rose slightly for the lowest asset quintile, while it fell for the top three. Petev, Pistaferri and Eksten (2012) provide similar evidence for an earlier period. Given the distribution in asset holdings, it is easy to see why declining asset values would disproportionately impact the top of the consumption distribution. For the 2000-2011 period, families in the bottom quintile of consumption had very few assets—the median was zero throughout this period. Families in the top quintile of consumption, in contrast, had substantial asset holdings, and the value of their assets rose noticeably between 2000 and 2007 and then declined after 2007.

Declining survey data quality is another potential explanation for the income and consumption differences. As discussed in Section 5, there is considerable evidence that

consumption is better measured than income for those with few resources. Comparisons to administrative aggregates show that transfer income, which is particularly important for those at the bottom of the distribution, is significantly under-reported in surveys and the extent of under-reporting has grown over time. A story 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 few decades.

One might also be concerned with the declining quality of consumption data. However, as discussed in Section 5, many of the important components of consumption compare favorably to administrative aggregates. Moreover, there is evidence that much of the under-reporting of expenditures occurs at the top of the distribution. Such under-reporting would bias measures of inequality for the top of the distribution but not the bottom. However, for most of our sample period we find that differences between income and consumption inequality changes are almost exclusively in the bottom half of the distribution—the 90/50 ratio for consumption mirrored that for income for the period from 1980-2005, but the 50/10 ratio for income rose much more than the 50/10 ratio for consumption. Also, it is unlikely that increased under-reporting 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. Studies comparing CE consumption to administrative aggregates show that while the quality of some components of consumption (such as clothing, food away from home, tobacco, and alcohol) have declined over time, the decline in quality starts well before the 2000s.

7. Conclusions

This paper examines inequality in the United States from 1960 through 2011. We show that conceptually preferable measures of income or consumption tend to show a lower level and slower increase in inequality, but the differences vary over time. After-tax income inequality falls during the 1960s, remains fairly flat in the 1970s, rises sharply in the 1980s, falls slightly during the 1990s, and then rises steadily starting in the early 2000s. In general, accounting for taxes considerably reduces the rise in income inequality over the past 45 years,

while accounting for noncash benefits has only a small effect on changes in income inequality.

Consumption inequality is less pronounced than income inequality and changes in consumption inequality differ considerably from changes in income inequality. While income inequality falls in the 1960s, consumption inequality rises slightly. Both consumption and income indicate rising inequality during the 1980s, but the rise is more noticeably for income. Since the mid-2000s, income inequality has risen while consumption inequality has fallen. Over the past three decades, both income and consumption inequality have risen, but the rise is much more noticeable for income (45 percent) than for consumption (19 percent). Differences between income and consumption are also evident for different parts of the distribution. Income inequality in the top half of the distribution rose steadily between 1980 and 2011, while consumption inequality for the top half of the distribution rose between 1980 and 2005, but then fell noticeably. Although changing demographics can account for some of the changes in consumption inequality, they do not account for changes in income inequality.

Comparisons of survey data to administrative records and national income accounts data indicate under-reporting of both income and consumption. There is evidence of considerable under-reporting of government transfers in income surveys, and the extent of under-reporting has grown overtime. Such under-reporting could lead to significant bias in the level and pattern of income inequality. There is also evidence of under-reporting of consumption data, although major components of consumption such as food at home and housing are reported at a high and stable rate relative to aggregate data. The differences between income and consumption inequality changes through 2005 are almost exclusively in the bottom half of the distribution, indicating that the under-reporting of consumption by the rich is not an explanation for the differences.

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Data Appendix

A. CE and CPS Samples

Income data primarily come from the Current Population Survey Annual Social and Economic Supplement (CPS), which is the source for official measures of poverty and inequality in the U.S. We use data from the 1964-2012 surveys which provide data on income for the previous calendar year. Our samples exclude individuals under the age of 15 who are not related to any other member in the household.

All expenditure and consumption data come from the Interview component of the Consumer Expenditure (CE) Survey. We use data from the 1960-1961 and 1972-1973 surveys and all quarterly waves from the first quarter of 1980 through the third quarter of 1981 and from 1984 through 2005 (some of the fourth quarter of 2005 data comes from surveys conducted in the first quarter of 2006). The 1960-1961 surveys provide data on annual expenditures collected in a single interview, while the 1972-1973 surveys provide data on annualized expenditures collected from quarterly interviews. Since 1980, quarterly expenditures have been provided. To obtain annual measures we multiply these quarterly measures by four. We do not use the data from the fourth quarter of 1981 through the fourth quarter of 1983 because the surveys for these quarters only include respondents from urban areas. We report inequality for years 1960 and 1961 together because the data are only representative of the full population when the samples from these two years are combined.

B. Measures of Consumption in the CE

Expenditures: This summary measure includes all expenditures reported in the CE Interview Survey except miscellaneous expenditures and cash contributions because some of these expenditures are not collected in all interviews. Since 1980 a subset of miscellaneous expenditures has been collected only in the fifth interview, and cash contributions are only collected in the fifth interview for surveys conducted from the first quarter of 1980 through the first quarter of 2001.

Consumption: Consumption includes all spending in our measure of total expenditures less spending on out of pocket health care expenses, education, and payments to retirement accounts, pension plans, and social security. In addition, housing and vehicle expenditures are converted to service flows. For homeowners we subtract spending on mortgage interest, property taxes, maintenance, repairs, insurance, and other expenses, and add the reported rental equivalent of the home. For years when the rental equivalent is not reported, we impute a value as explained below. For those in public or subsidized housing, we impute a rental value using the procedure outlined in the text. For vehicle owners we subtract spending on recent purchases of new and used vehicles as well vehicle finance charges. We then added the service flow value of all vehicles owned by the family, as described in the data appendix of Meyer and Sullivan (2012). The data appendix of Meyer and Sullivan (2012) also summarizes the comparability of this consumption measure over time.

C. Measures of Income in the CPS

CPS respondents report annual measures of money income for the previous calendar year. Respondents also report the dollar value of food stamps received by the household, as well as whether household members received other noncash benefits including housing subsidies and subsidies for reduced or free school lunch. Starting with the 1980 survey, the Census also provides imputed values for these and other noncash benefits. For more details see U.S. Census (various years-a,b), Appendices B and C.

Money Income: The Census definition of money income that is used to measure poverty and inequality.

After-Tax Money Income: adds to money income the value of tax credits such as the EITC, and subtracts state and federal income taxes and payroll taxes, and includes capital gains and losses. Federal income tax liabilities and credits and FICA taxes are calculated for all years using TAXSIM (Feenberg and Coutts 1993). State taxes and credits are also calculated using TAXSIM for the years 1977-2005. Prior to 1977 we calculate state taxes using IncTaxCalc (Bakija, 2008). We confirm that in 1977 net state tax liabilities generated using IncTaxCalc match very closely those generated using TAXSIM.

After-tax Money Income Plus Noncash Benefits: this adds to After-Tax Money Income the cash value of food stamps, and imputed values for housing subsidies, school lunch programs, Medicaid and Medicare, employer health benefits, and the net return on housing equity.

Face Value of Food Stamps: The value of food stamps for each family is determined by the Census using reported information on the number of persons receiving food stamps in the household and the reported total value of food stamps received.

Income Value of School Lunch Program: The Census imputes a value for lunch subsidies for families that report having children who receive free or reduced price school lunch. The value is determined using information on the dollar amount of subsidy per meal as reported by the USDA. If a child participates in school lunch, it is assumed that the child receives that subsidy type (reduced price or free) for the entire year.

Fungible Values of Medicaid and Medicare: The Census imputes a “fungible” value of Medicaid or Medicare for families that include an individual who is reported to be covered by Medicaid or Medicare. Fungible means that “Medicare and Medicaid benefits are counted as income to the extent that they free up resources that could have been spent on medical care” (U.S. Census various years-b). Thus, these programs have no income value if the family does not have resources (the sum of money income, food stamps, and housing subsidies) that exceed basic needs. If these resources do exceed basic needs, then the fungible value of medical benefits is equal to the smaller of: a) the market value of these benefits and b) the value of resources less basic needs. The market value of Medicaid is equal to mean

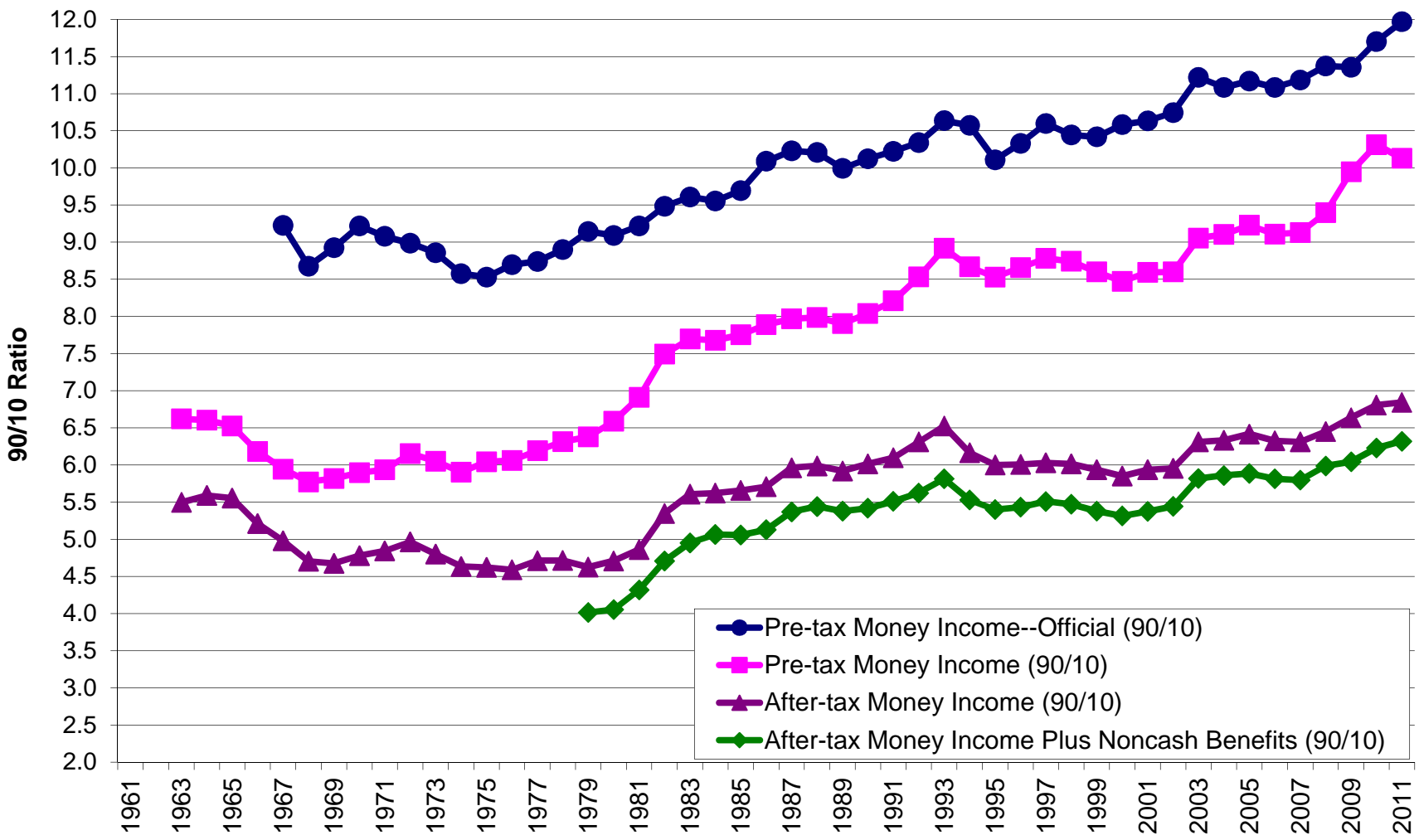
government outlays for families in a given state and risk class. The four risk classes are: 65 and over, blind and disabled, 21-64 nondisabled, and less than 21 nondisabled. The market value of Medicare is equal to mean government outlays for families in a given state and risk class. The two risk classes are: 65 and over and blind and disabled.

Housing Subsidies: The Census imputes a value of housing subsidies for households that report living in public housing or receiving a public rent subsidy. The value of the subsidy is calculated as follows. Using data from the 1985 American Housing Survey (AHS), reported rent for unsubsidized two-bedroom housing units is regressed on housing characteristics. Separate regressions are estimated for each of four regions, and the coefficients from these models are used to predict rent for those living in subsidized units in the AHS. The subsidy for those in subsidized housing in the AHS sample is then calculated as the difference between out of pocket rent and imputed total rent. Region-specific adjustment factors for smaller and larger units are estimated using data on rent for units with different numbers of bedrooms in the 1985 AHS. Thirty-six different subsidy values are calculated which vary by four regions, three income brackets, and three different unit sizes. Because unit size is not observed in the CPS, this is imputed from family composition. Subsidy values for each year are based on estimates using the 1985 data, but are updated to reflect changes in shelter costs using the CPI residential rent index. Before 1985 housing subsidies in the CPS were imputed using the 1979 or 1981 Annual Housing Survey.

Employer Contributions to Health Insurance: The Census imputes a value of health insurance for persons who were covered by an employer health insurance plan. Using data from the 1977 National Medical Care Expenditures Survey, the value of the employer contribution was imputed as a function of observable characteristics including earnings, full-time/part-time, industry, occupation, sector, public/private, residence, and personal characteristics of the worker such as age, race, marital status, and education, and information on whether the employer paid all, part, or none of the cost of health insurance as reported in the supplement.

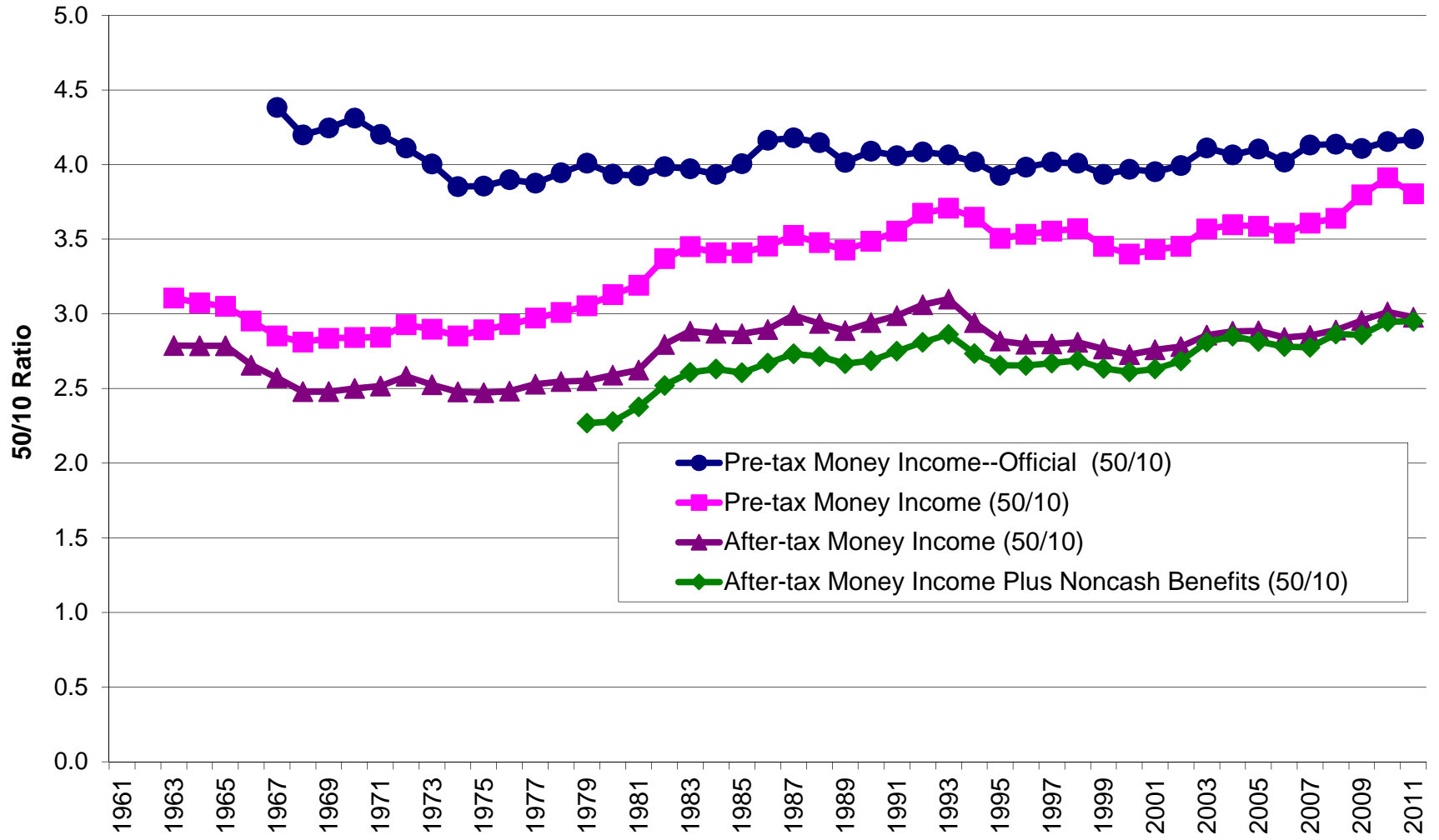
Net Return on Home Equity (annuitized value): Using data from the 1985 or 1989 AHS, a value of home equity is imputed for each CPS household by statistically matching the two surveys on observable characteristics including geographic location, income, household size, number of living quarters, and the age, race, sex, and education of the household head. The equity value of the home and property taxes for homeowners in the CPS are determined by using these values from a household with similar characteristics in the AHS. This equity is converted to an annuity using a rate of return based on high grade municipal bonds from the Standard & Poor's series. The value of home equity is net of imputed property taxes.

Figure 1: Income Inequality 1963-2011



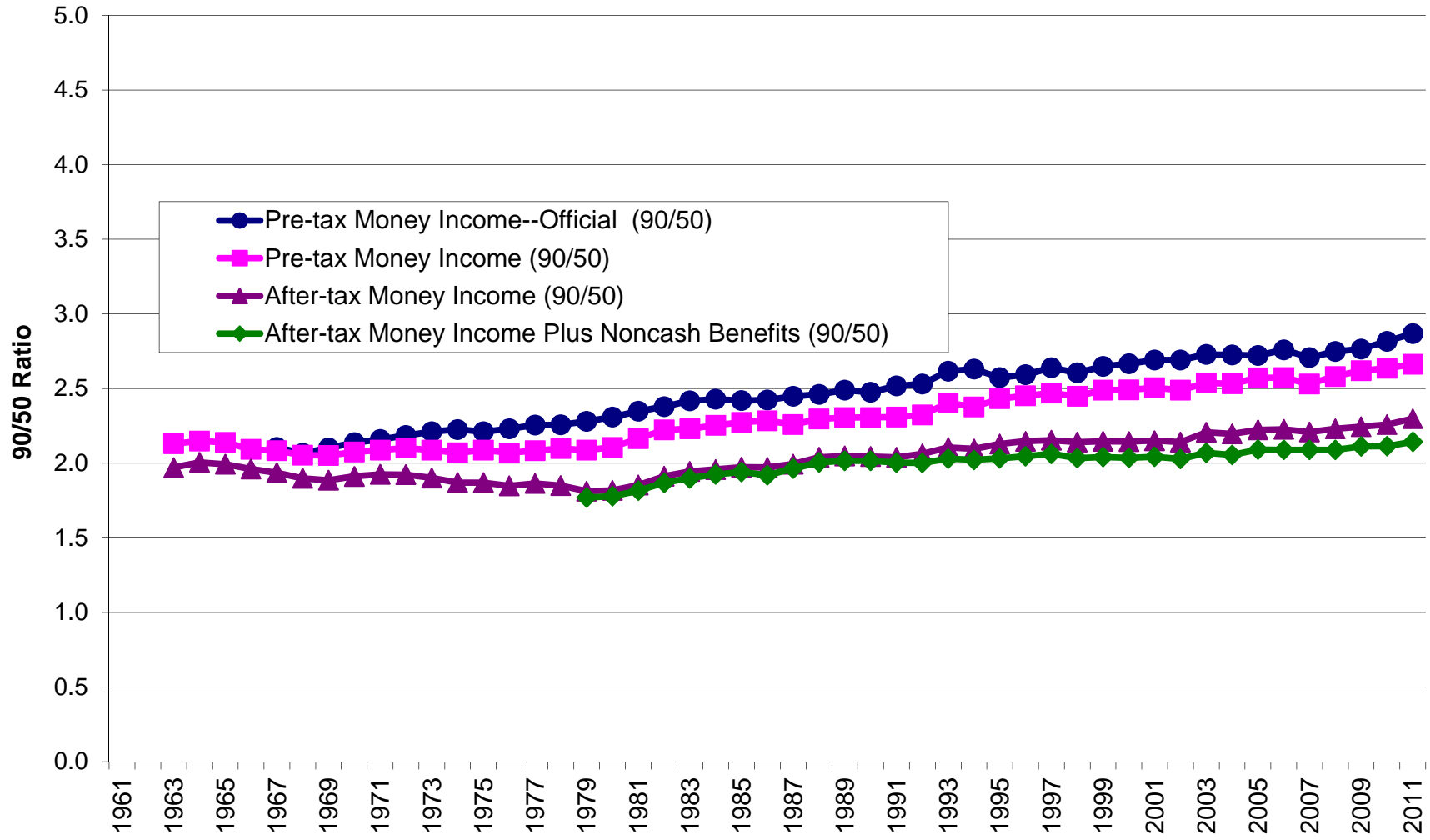
Notes: All measures other than the official measure, are adjusted for differences in family size using the NAS recommended equivalence scale. The unit of observation for the official measure is the household, while it is the family for the other income measures.

Figure 2: Income Inequality 1963-2011



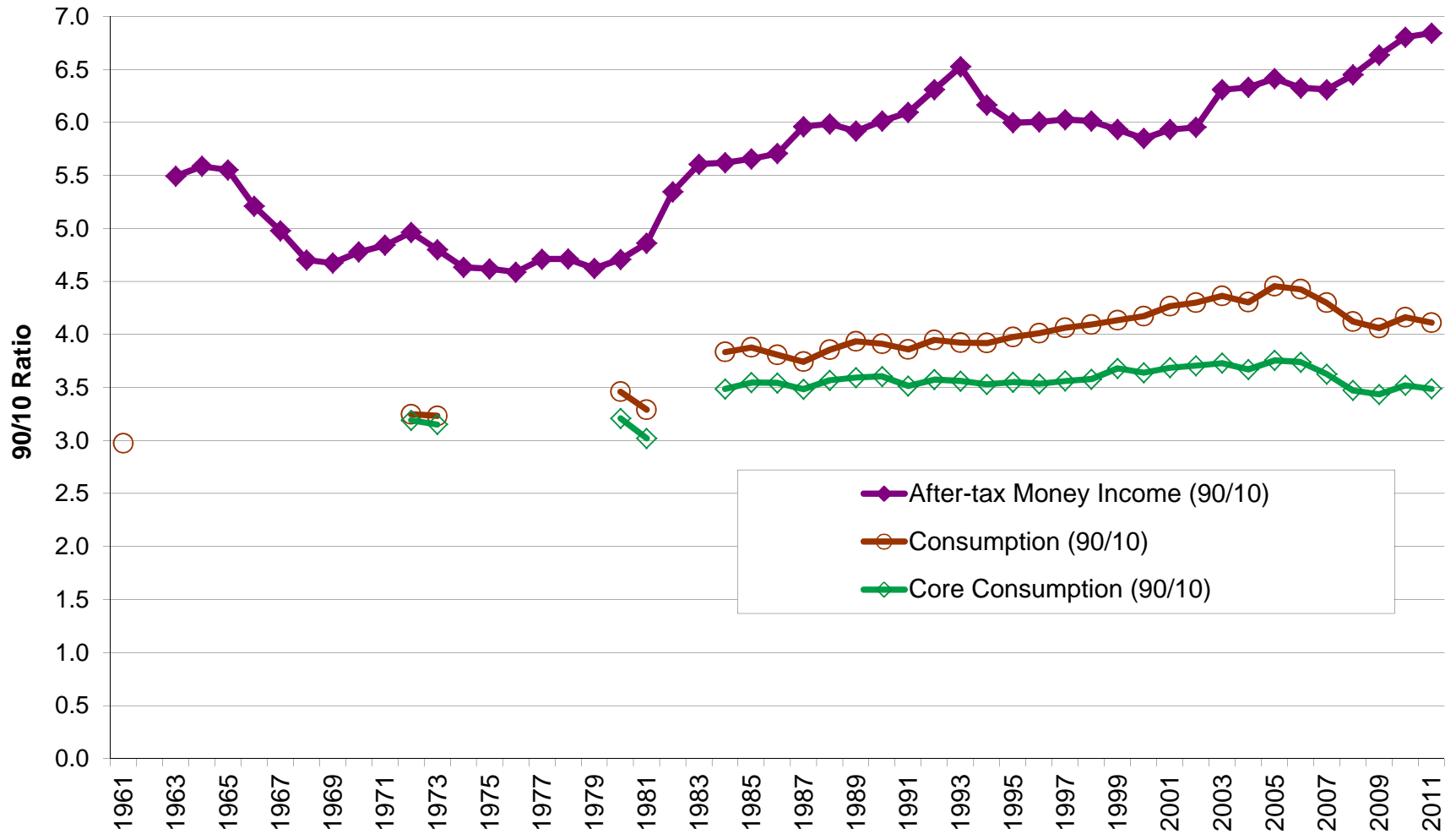
Notes: See notes to Figure 1.

Figure 3: Income Inequality 1963-2011



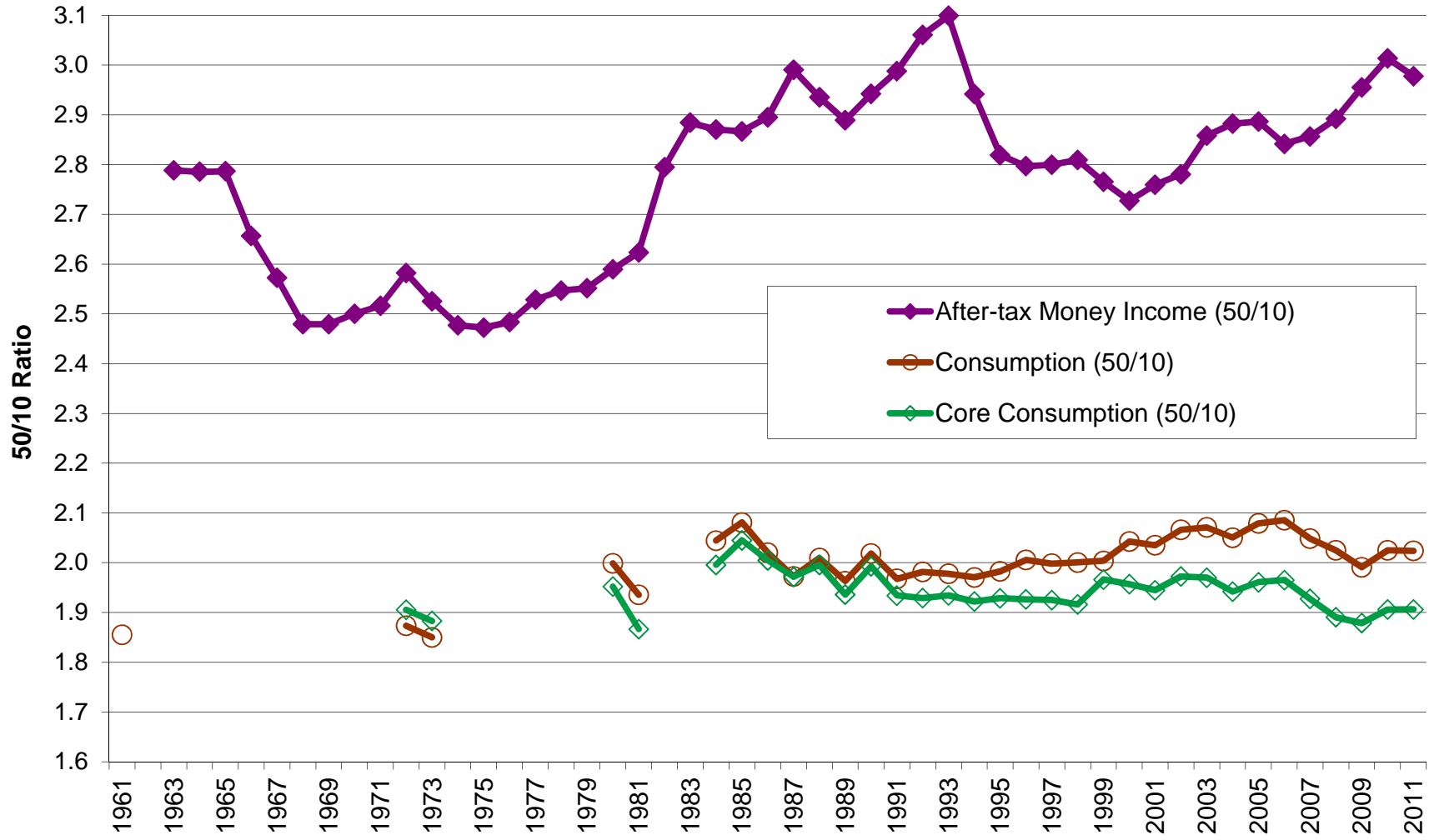
Notes: See notes to Figure 1.

Figure 4: Consumption Inequality 1961-2011



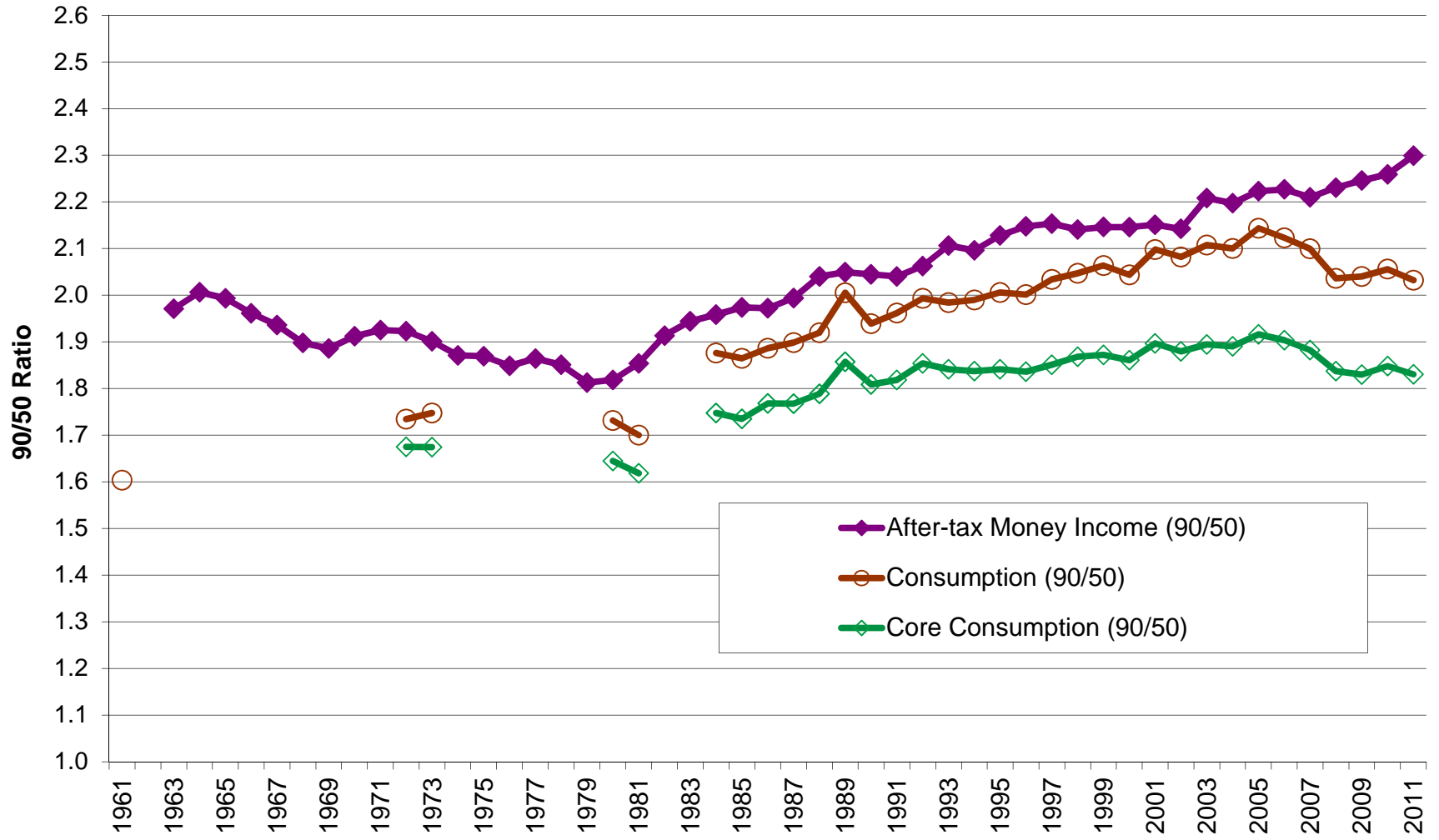
Notes: Consumption data are from the CE and income data are from the CPS. Consumption is measured as the predicted value of consumption from a regression of total consumption on core consumption and demographic characteristics using data from 1980 and 1981. Core Consumption includes consumption of housing, food at home, vehicles, and other transportation. See text for more details.

Figure 5: Consumption Inequality 1961-2011



Notes: See notes to Figure 5.

Figure 6: Consumption Inequality 1961-2011



Notes: See notes to Figure 5.

Table 1: Decomposition of Changes in Consumption Inequality

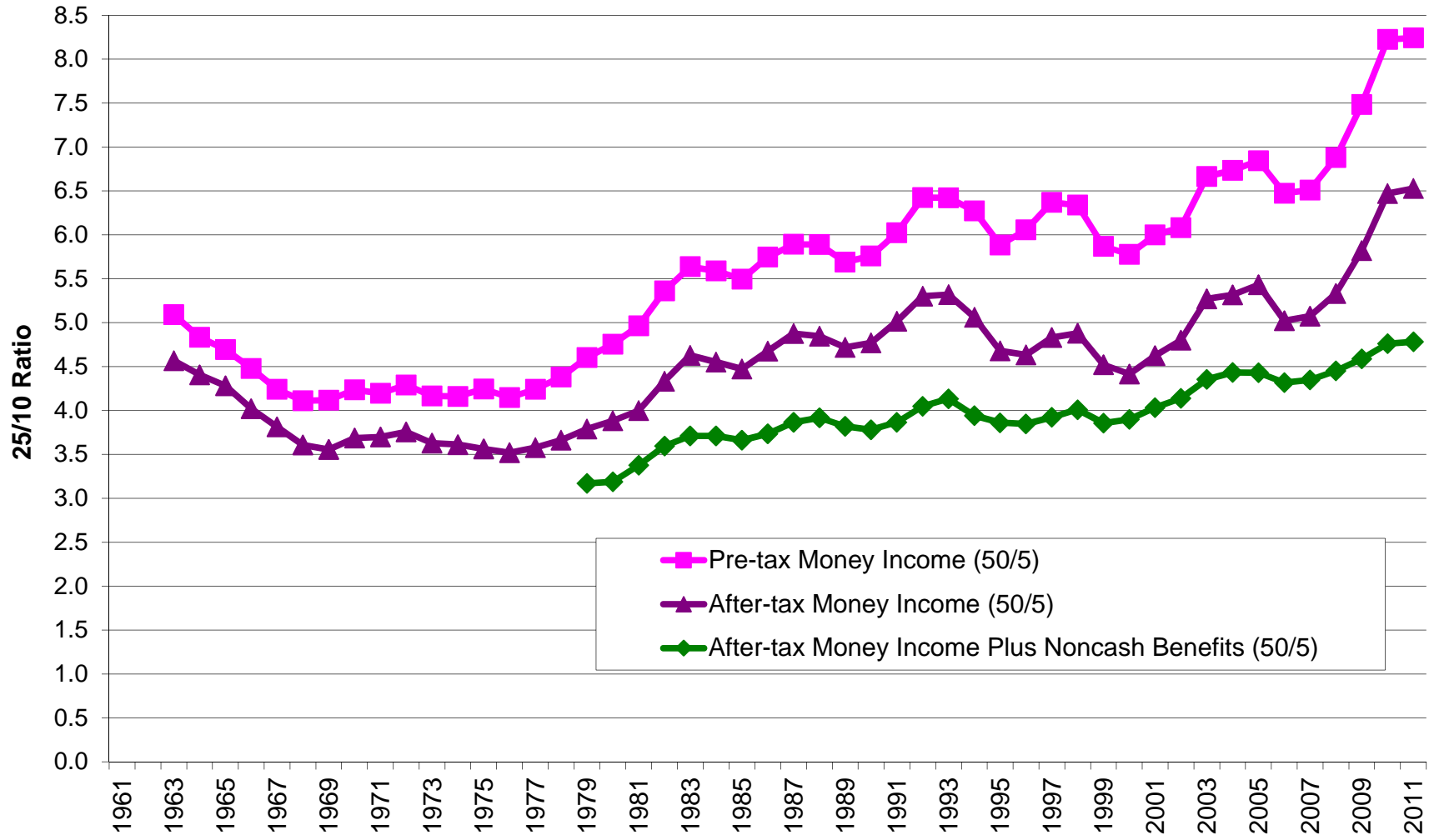
	Total Change	Residuals	Coefficients	Characteristics
1961-1972				
90-10	0.084	0.116	-0.097	0.065
		137.8%	-115.3%	77.5%
50-10	0.016	0.054	-0.090	0.051
		346.6%	-572.5%	325.9%
90-50	0.069	0.062	-0.008	0.014
		90.2%	-11.1%	20.9%
1972-1980				
90-10	0.044	0.033	-0.057	0.069
		74.5%	-129.4%	154.9%
50-10	0.043	0.019	-0.029	0.052
		45.0%	-66.8%	121.8%
90-50	0.002	0.014	-0.029	0.017
		905.2%	-1894.9%	1089.7%
1980-1990				
90-10	0.149	0.055	0.068	0.026
		37.3%	45.6%	17.2%
50-10	0.036	0.000	0.019	0.017
		-1.3%	54.0%	47.2%
90-50	0.113	0.056	0.049	0.009
		49.4%	42.9%	7.7%
1990-2000				
90-10	0.051	0.048	0.009	-0.006
		94.2%	17.1%	-11.4%
50-10	0.001	-0.003	0.009	-0.004
		-378.4%	986.0%	-507.6%
90-50	0.050	0.051	0.000	-0.001
		102.4%	0.3%	-2.8%
2000-2011				
90-10	-0.023	-0.016	-0.029	0.022
		70.7%	123.6%	-94.3%
50-10	-0.004	0.002	-0.023	0.017
		-55.3%	561.8%	-406.5%
90-50	-0.019	-0.019	-0.006	0.005
		97.5%	30.6%	-28.1%

Notes: Data are from the CE survey. These estimates are for log consumption where consumption is measured as the predicted value of consumption from a regression of total consumption on core consumption and demographic characteristics using data from 1980 and 1981. See text for more details.

Table 2: Decomposition of Changes in Income Inequality

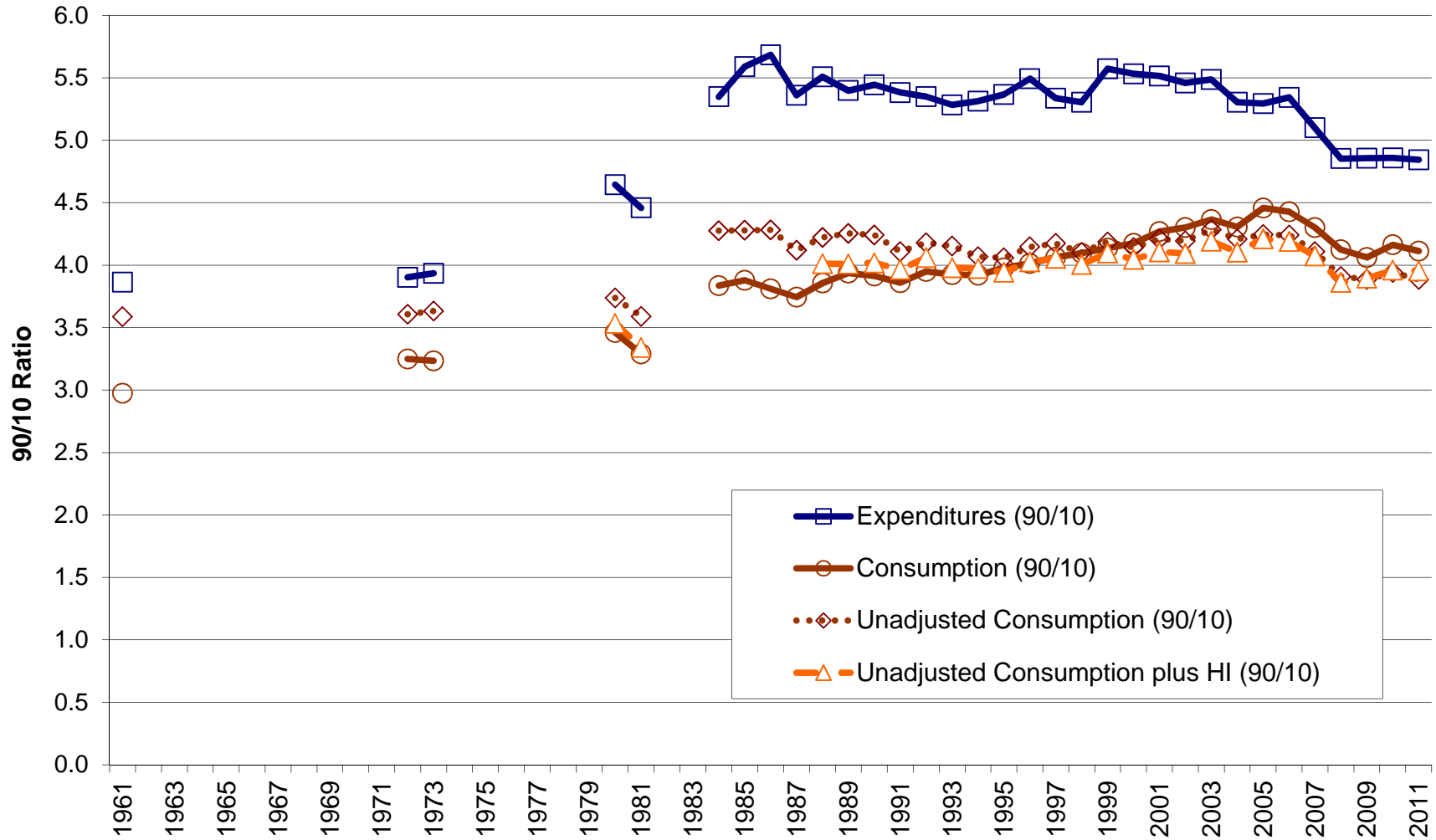
	Total Change	Residuals	Coefficients	Characteristics
1961-1972				
90-10	-0.072	-0.104	-0.072	0.104
		143.8%	99.9%	-143.7%
50-10	-0.061	-0.076	-0.056	0.071
		125.6%	91.5%	-117.1%
90-50	-0.011	-0.028	-0.017	0.033
		240.9%	144.5%	-285.4%
1972-1980				
90-10	-0.045	-0.065	-0.046	0.067
		145.8%	103.8%	-149.5%
50-10	0.013	-0.004	-0.027	0.044
		-28.4%	-210.9%	339.2%
90-50	-0.057	-0.061	-0.019	0.023
		106.7%	33.2%	-40.0%
1980-1990				
90-10	0.257	0.110	0.125	0.022
		42.7%	48.8%	8.5%
50-10	0.127	0.050	0.059	0.018
		39.5%	46.5%	14.1%
90-50	0.130	0.059	0.066	0.004
		45.8%	51.1%	3.1%
1990-2000				
90-10	-0.040	0.022	-0.081	0.019
		-53.2%	200.1%	-46.8%
50-10	-0.069	-0.036	-0.056	0.022
		51.6%	80.4%	-32.0%
90-50	0.029	0.057	-0.025	-0.003
		199.8%	-88.8%	-11.0%
2000-2011				
90-10	0.110	0.043	0.043	0.024
		39.4%	39.0%	21.6%
50-10	0.067	0.032	0.018	0.017
		47.4%	27.6%	25.1%
90-50	0.043	0.012	0.024	0.007
		27.1%	56.6%	16.3%

Appendix Figure 1: Income Inequality 1963-2011



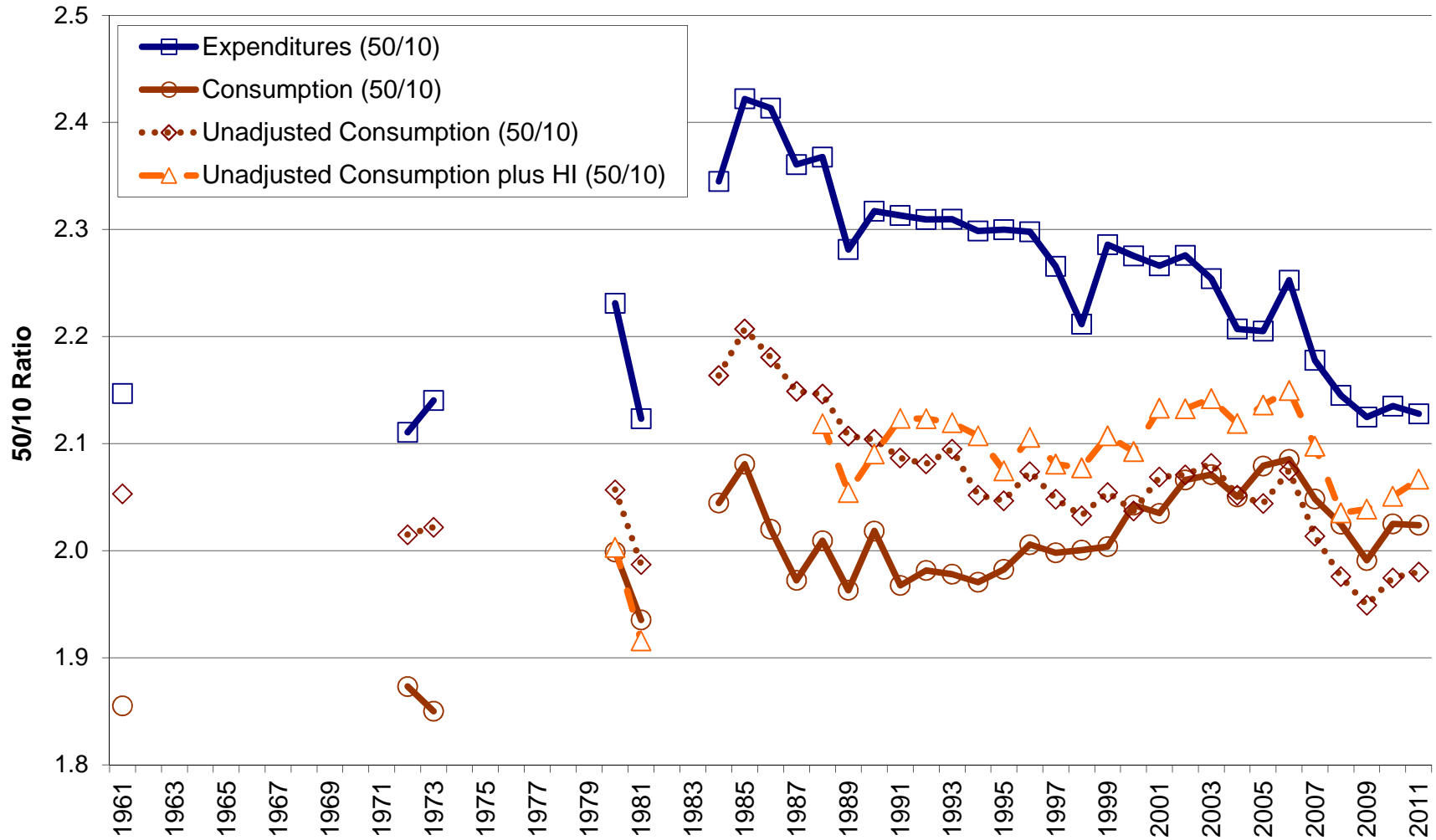
Notes: See notes to Figure 1.

Appendix Figure 2: Consumption Inequality 1961-2011



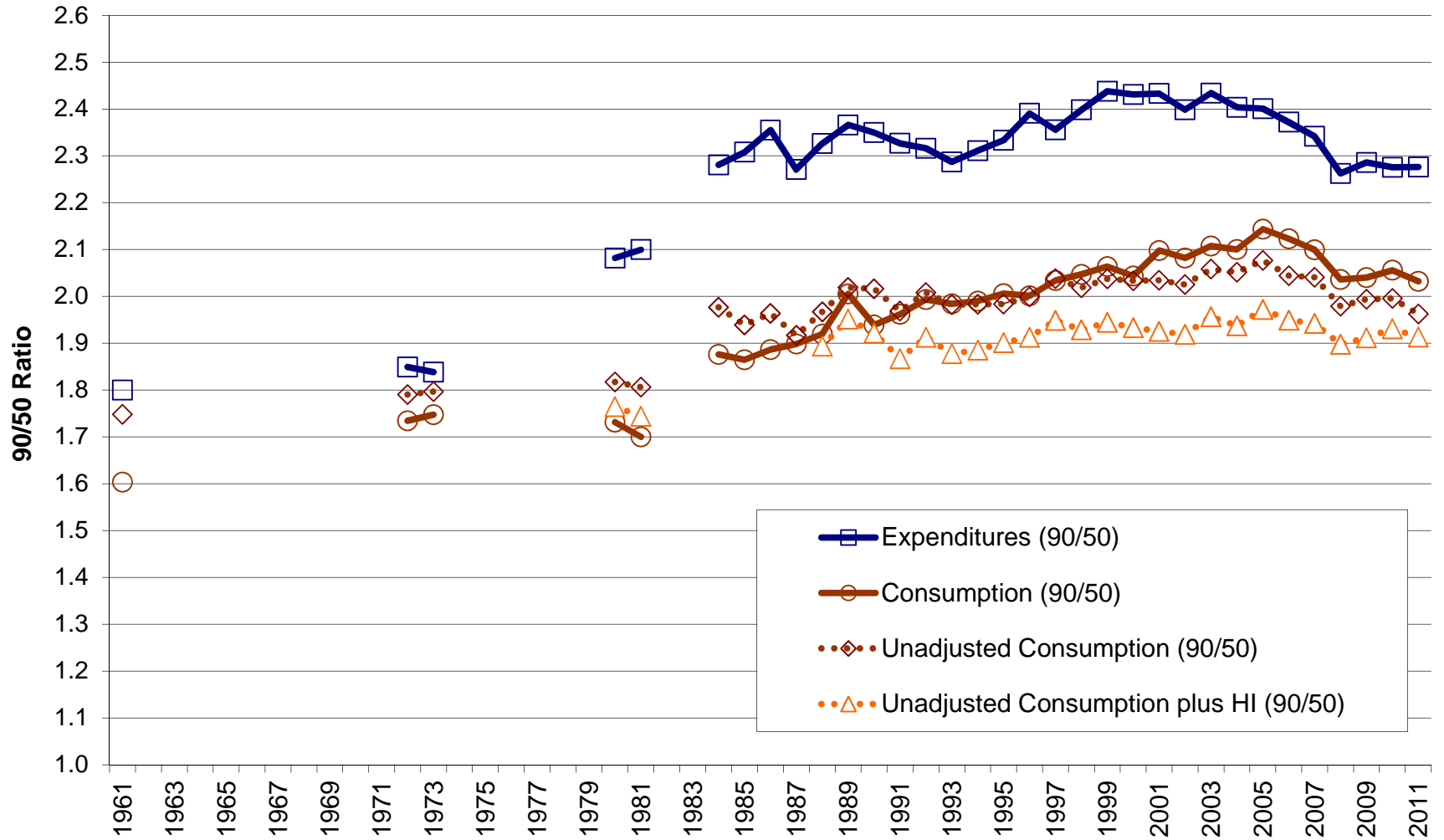
Notes: See notes to Figure 5.

Appendix Figure 3: Consumption Inequality 1961-2011



Notes: See notes to Figure 5.

Appendix Figure 4: Consumption Inequality 1961-2011



Notes: See notes to Figure 5.