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. The ratio of the 90th to the 10th percentile of income, for example, grew by 23 percent between 1970 and 2008. Official inequality 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, income fails to capture other important dimensions of well-being including in-kind benefits, lifetime resources, housing quality, and access to medical care. 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 investigating the importance of measurement error and constructing improved measures of consumption over a longer time period. We examine income inequality between 1963 and 2008 using data from the Current Population Survey (CPS-ADF/ASEC) and consumption inequality between 1960 and 2008 using data from the Consumer Expenditure (CE) 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. We show that both the level and pattern of inequality are sensitive to how inequality is measured. 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. Both income and consumption inequality rise in the early 1980s and remain somewhat flat in the 1990s, but in the 2000s overall consumption inequality shows little change while overall income inequality rises somewhat.

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1. Introduction

There is a growing national debate in the U.S. on trends in inequality. 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. Much of the focus of recent discussions of rising inequality is on the very top of the income distribution. 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 fail to capture important components of economic well-being such as wealth or the insurance value of government programs, and therefore provide a narrow, short-term view of how well-being has changed. In addition, income is likely to be more volatile than a more comprehensive measure of economic well-being. For these reasons, changes in income inequality are not likely to capture accurately changes in the inequality of economic well-being. 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 (CPS-ADF/ASEC) and consumption inequality using data from the Consumer Expenditure (CE) 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. We show that both the level and pattern of inequality are sensitive to how inequality is measured. 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. Both income and consumption inequality rise in the early 1980s and remain somewhat flat in the 1990s, but in the 2000s overall consumption inequality shows little change while overall income inequality rises somewhat.

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 conclude in Section 7.

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). While 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, 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.

Much of the research on more broad measures of 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. 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. 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 changes in these measures differ from income based measures. 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. 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.

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

Throughout this paper we emphasize the differences between income and consumption based measures of well-being. In previous work, we 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.[1] 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. Similarly, consumption will better reflect the insurance value of government

[1] 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.

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. For example, a better value of housing subsidies can be computed using Consumer Expenditure (CE) Survey data 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 we will explain in Section 5. In addition, homeowners in the CE Survey report the rental equivalent value of their home.

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. Second, one can use components of consumption to predict total consumption. 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.

Meyer and Sullivan (2003, 2011) also provide evidence that consumption is a better predictor of well-being than income. For example, we examine other measures of material hardship or adverse family outcomes for those with very low consumption or income. These problems are more severe for those with low consumption than for those with low income, indicating that consumption does a better job of capturing well-being for these families.

4. Data

4.A Current Population Survey (CPS) Income Measures

The official inequality measures in the U.S. are based on data from the Current Population Survey (CPS) Annual Social and Economic Supplement (ASEC, formerly the March CPS or ADF). This survey interviews approximately 100,000 households annually (60,000 households prior to 2002).[2] For the previous calendar year, respondents report the income amounts for a number of different sources that are included in the money income

[2] The ASEC is currently administered to the March sample of the CPS as well as a subsample of the respondents in the February and April CPS. Prior to 2002, the supplement was only included in the March survey.

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 ADF/ASEC 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. There are important limitations to these imputed values that are discussed in Meyer and Sullivan (2011) and below. See the Data Appendix for more details on these imputed noncash benefits.

We use data from the 1964-2009 CPS ADF/ASEC 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.[3] 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 1977-2008. 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.[4] 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

[3] 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.

[4] The ASEC/ADF 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.

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 ADF/ASEC 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 (CE) 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 1984-2008 (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 1980-2008 the survey is a rotating panel that includes about 5,000 families each quarter until 1998 and about 7,500 families thereafter. Each family in the survey reports spending on a large number of expenditure categories for up to four consecutive quarters. Expenditure data are reported at the level of the consumer unit, which 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.[5]

To convert reported expenditures into a measure of consumption, we make a number of adjustments. First, we convert expenditures on vehicles to a service flow equivalent. Otherwise, large and infrequent vehicle expenditures would distort the flow of resources received, because the entire cost of purchases is included in current expenditures. We use detailed information on the characteristics of vehicles of over 300,000 vehicles (generally including make, model, year, age, and options including air conditioning, sunroof, power

[5] 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.

steering, power breaks, four-wheel drive, automatic transmission, diesel engine, and turbo charge) to calculate a flow that reflects the value that a consumer receives from owning a car during the period (see Meyer and Sullivan, 2010 for more details). This approach accounts for amenities and quality improvements through what purchasers are willing to pay. We also estimate depreciation rates by comparing the reported purchase prices for similar vehicles of different ages.

Second, we convert housing expenditures to housing consumption for homeowners by subtracting housing outlays such as mortgage interest payments, property tax payments, and spending on insurance, maintenance and repairs, and adding the reported rental equivalent of the home. Because respondents living in government or subsidized housing do not report a rental equivalent, we impute a full market rent value for these units using reported information on housing characteristics including the number of rooms, bedrooms and bathrooms, and the presence of appliances such as a microwave, disposal, refrigerator, washer, and dryer.

Third, we impute a measure of the value of public and private health insurance using the coverage information in the CE Survey and data on insurance costs (see Meyer and Sullivan, 2010 for more details). While estimating the cost of different types of coverage is conceptually clear, what should be included in consumption is not straightforward. The value a family places on health coverage may exceed its cost because of its insurance value. On the other hand, this in-kind transfer may be valued at much less than cost given the one size fits all nature of insurance and the lower value of purchases of most goods by the poor. To address this, we cap the value of health insurance at a third of total consumption. In the results that follow we examine how the inclusion of the value of health insurance affects inequality trends.

Finally, consumption does not include spending that is better interpreted as an investment such as spending on education and outlays for retirement including pensions and social security.[6] 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 than high well-being.

[6] 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.

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 consumption is split. For most people, income is easier to report given administrative reporting and a small number of sources of income. 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 appears to be substantially under-reported, especially for categories of income important for those with few resources. Furthermore, the extent of under-reporting appears to have changed over time. Meyer and Sullivan (2003, 2011) and Meyer, Mok and Sullivan (2008) 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 survey micro-data to administrative micro-data for the same individuals also indicate severe under-reporting of government transfers in the CPS (Meyer and Goerge, 2010). 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, 2011). Under-reporting of transfers likely leads to an overstatement of dispersion in the bottom part of the income distribution.

5.B. Consumption Under-Reporting

Consumption tends to exceed income at the bottom even for those without assets or debts. Thus, we might be more concerned about over-reporting of consumption. Previous

research has found evidence of under-reporting of consumption, but little evidence of over-reporting. Past work (Giesman 1987, Slesnick 1992, Garner et al. 2006, Attanasio et al. 2006) has emphasized a discrepancy between CE aggregates and Personal Consumption Expenditure (PCE) data from the National Income and Product Accounts (NIPA). Some of this evidence is easily misinterpreted and is less applicable to the current analyses for several reasons. Many published comparisons are based on the integrated data that combine CE Diary and CE Interview data rather than the Interview data used exclusively here. It is not clear whether the integrated CE Survey data should compare more favorably to the PCE. For example, while we might expect food expenditures to be reported more accurately in the Diary Survey, these data appear to have greater downward bias. Between 1998 and 2003, average spending on food at home in the Interview Survey exceeded the average from the Diary Survey by more than 20 percent (BLS 2005).[7] Also, the PCE numbers cover a different population, are defined differently from the CE, and are the product of a great deal of estimation and imputation that is subject to error.

PCE numbers differ from CE Survey data for reasons besides under-reporting. PCE coverage is wider, including purchases by nonprofits, purchases by those abroad, on military bases and in institutions, free financial services, and employer-paid insurance—all categories not included in CE Survey expenditures. In addition, the PCE estimates come from business records reported on the economic censuses and other Census Bureau Surveys. These business surveys are subject to a number of sources of error and are adjusted using input-output tables to add imports and subtract sales that do not go to domestic households. These totals are then balanced to control totals for incomes earned, retail sales, and other benchmark data. One indicator of the potential error in the PCE is the revisions that are made from time to time (Slesnick 1992). The Bureau of Economic Analysis reported that in 1992 more than half of the difference between PCE and CE Survey consumer spending was due to coverage and definitional differences (summarized in GAO 1996). Thus, unlike comparisons of income

[7] The fact that food at home from the Interview Survey compares more favorably to PCE numbers than does food at home from the Diary Survey does not necessarily imply that the former is reported more accurately. For example, the Interview Survey numbers may include non-food items purchased at a grocery store. Battistin (2003) argues that the higher reporting of food at home for the recall questions in the Interview component is due to over-reporting, but as Browning et al. (2003) state, this is open to question.

components to administrative aggregates, there are important conceptual incompatibilities between expenditure data from the CE Survey and PCE aggregates.

Subject to the caveats above, we examine the ratio of CE Interview Survey values weighted by population to corresponding categories of PCE data. We have followed the approach of Garner et al. (2004) who report that they chose the categories in the PCE and CE Survey data that are most comparable based on concepts and comprehensiveness. In Appendix Table 1, we report CE/PCE ratios for the Interview data for ten categories of expenditures, including the three largest: housing, food, and transportation. To improve comparability, we combine rent with utilities since rent often includes some utilities and space rent (exclusive of utilities) cannot be obtained in the CE Survey. We divide food consumption into food consumed at home and food consumed away from home. As shown in Appendix Table 1, the numbers indicate fairly steady ratios of CE to PCE expenditures on food at home and rent plus utilities.[8] For food at home, on average the CE/PCE ratio is over 0.85 and for rent plus utilities the ratio is nearly 1.00. The numbers do indicate a noticeable decline over time in the ratio for food away, which leads to a decline in overall food.

The disparity in these ratios across consumption categories suggests that the extent of consumption under-reporting is likely to differ considerably for different parts of the consumption distribution. The ratios are smallest for consumption categories that are perhaps more discretionary or are purchased at irregular intervals such as food away from home, alcohol, tobacco, and clothing, suggesting that under-reporting of consumption is more likely to bias measures of consumption inequality for the top of the distribution. Taking the PCE data as truth, the numbers suggest that just over half of food away from home is reported in the CE Interview Survey in recent years. In the recent data, under forty percent of clothing and tobacco consumption is captured by the CE Survey, under fifty percent of alcoholic beverages is obtained, while over seventy-five percent of audio, video and computers is included. This result is consistent with the general conclusion from Garner et al. (2006) that nondurable goods and non-housing services are not well-captured in the CE Survey data.

Reporting ownership of houses and vehicles is very different from reporting the small, discretionary purchases that seem to be badly reported in the CE Survey, but validating the

[8] In a comprehensive study of survey data on food spending, Browning et al. (2003) conclude that, in general, respondents are “remarkably good” at reporting food at home.

value of owner occupied housing and owned vehicles requires methods besides those of Appendix Table 1. The average value of these flows depends on the product of the ownership rate and the value of the flow conditional on ownership. Estimates of homeownership rates in the CE Survey match up very closely with those from the CPS (see Meyer and Sullivan, 2009). We know from past work that respondents seem to report house values fairly accurately in household surveys (Kiel and Zabel 1999; Bucks and Pence 2006). We have compared the reported rental equivalent of homes to the reported house values to confirm that the rental equivalents are reasonable.[9] For automobiles, we have compared ownership rates to administrative data on motor vehicle registrations. These comparisons indicate that the CE Survey captures about 90 percent of all cars and trucks and this rate does not vary substantially over time. We have also verified that the purchase price of vehicles in the CE Survey is reported fairly well. We find a high correlation between the reported purchase prices of cars and blue book prices. Furthermore, Garner et al. (2006) note that there has not been a deterioration in the reporting of new car purchases. Thus, these flows seem less likely to be under-reported or exhibit increased under-reporting over time than other spending components in the CE Survey.

5.C. Addressing Under-Reporting of Consumption

To address concerns about under-reporting of consumption and changes in reporting rates in the CE Survey for some components of consumption over time, we construct two alternative measures of consumption. The first is a measure that includes spending components that have reporting ratios that are high and 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. Important omitted categories include food away from home, alcohol and tobacco products, clothing, and entertainment spending. We could add health care to this measure, but there is less agreement about how to measure the value of health insurance than there is about measuring any other category of consumption. Overall, our core

[9] The rental equivalent and home value are highly correlated, at around 0.6 in a typical year. The ratio of the rental equivalent to home value has been fairly stable, though it declined appreciably in the mid 2000s, as one might expect during a period of rising home prices.

consumption measure is 73 percent of total consumption in the early 1980s.[10] The results in Appendix Table 1 indicate that the components of core consumption are reported well. For food at home, rent plus utilities, transportation, and gasoline and motor oil, the reporting rates are high and there is only a slow decline in these ratios over time except for gasoline and motor oil. The average reporting ratio for the sum of these four components is 0.944 with a range between 1.03 and 0.867 (see Core consumption excluding flows in Appendix Table 1).

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 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 2008. We report ratios of percentiles of the distribution of income and consumption for each year. We focus on measures such as the 90/10 ratio, the 50/10 ratio, and the 90/50 ratio rather than the variance of the logarithm of income or the Gini coefficient because the ratios are not sensitive to the extreme tails of the distribution that we expect may be poorly measured in survey data.

6.A. Income Inequality

In Figure 1 we report the 90/10 ratio for the official measure of income inequality, which is based on household pre-tax money income without an adjustment for household size

[10] 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.

or composition. We also report 90/10 ratios for other income measures that better capture disposable resources. The 90/10 ratio for the official measure shows a pattern with no discernable trend from 1967 through the mid 1970s. Between the late 1970s and the early 1990s, inequality rises steadily, and continues to rise, but more modestly, between 1993 and 2008.

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.[11] Our pre-tax income measure shows a fairly similar pattern, but with a significantly lower level of inequality. In 2008, for example, the 90/10 ratio for our measure is 18 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 2008.

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.

[11] One inconsequential additional difference is that our samples exclude individuals under the age of 15 who are not related to any other member in the household. This exclusion is made in official Census poverty tabulations, but not inequality tabulations. We exclude this small share of individuals who are not members of any family because we base our income inequality measures on family income.

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 early 1980s through the 1990s, although there is a small temporary increase centered around 1993. After-tax income inequality shows a small, more persistent increase in the 2000s, but the rise is not nearly as large as what we see in 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 for these two measures are very similar.

Changes in inequality at the bottom half of the income distribution differ considerably from that of the overall distribution, as shown in Figure 2. The official pre-tax measure shows a decline in the 1960s and early 1970s and then is nearly constant for the next 35 years. The pre-tax measure at the family level that is equivalence scale adjusted and person weighted shows a decline in the 1960s, a rise in the late 1970s and early 1980s and then little change afterword. The after-tax measures show a similar pattern, except that there is a decline in inequality in the bottom half of the distribution in the early 1990s that seems to persist 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.

The results in Figure 3 show that income inequality has a very different pattern in the top half of the distribution as compared to the bottom half. The official measure shows a steady increase beginning in the late 1960s and continuing through 2008. Adjusting for family size and person weighting flattens out or even reverses 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 discernable 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 various measures of consumption in Figure 4. As expected, the consumption distribution is less dispersed than that of after-tax income. 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. Overall consumption inequality has a very different pattern over time than income inequality. Consumption inequality shows very little change over the 1960s, and 1970s, but increases sharply in the early 1980s. During the 1980s, consumption inequality rises by 12 percent, as compared to a 26 percent rise in after-tax income inequality. Consumption inequality slowly drifts downward after the early 1980s, followed by a sharper decline after 2006. We see this pattern for consumption, consumption excluding the value of health insurance and health insurance expenditures, and for core consumption. A similar pattern can be seen in expenditures, although expenditures are roughly flat from the early 1980s to the early 2000s. Between 1990 and 2008, the 90/10 ratio for consumption falls by 12 percent, while for after-tax income it rises by 6 percent.

We examine these patterns further by looking at predicted consumption, using core consumption to predict total consumption as explained in Section 5.C. We find a fairly similar patter with a sharp increase in inequality in the early 1980s. The decline in inequality in the later years, however, is muted (Figure 5). These measures, either accounting for health insurance and health expenditures or not, suggest little change in overall inequality since the early 1980s.

Consumption inequality in the bottom half of the distribution (Figure 6) shows a similar pattern to overall consumption inequality, with a rise in the early 1980s and then a slow drift downward, followed by a sharper decline in the last few years. Again this pattern is somewhat muted by using predicted consumption, but the decline in recent years is still apparent (Figure 7). 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 2008,

the 50/10 ratio for after-tax income is more than 40 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, forthcoming).

In the top half of the consumption distribution, we again see a rise in inequality during the early 1980s and a decline in inequality in recent years (Figures 8 and 9). However, unlike the bottom half, inequality in the top half of the consumption distribution remains flat between the mid 1980s and the mid 2000s. The pattern for consumption inequality for the top half of the distribution is very similar to that for after-tax income inequality during the 1980s, but after 1992, after-tax income inequality continues to rise while consumption inequality falls slightly.

6.C. Decompositions

In this section we consider potential explanations for changes in income and consumption inequality. We being by decomposing 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 quanitle, 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 qth 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 actual observable characteristics in 1990. Consider the following decomposition, which is similar to equation 2 from Melly (2005),

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

Where $q(\hat{\beta}^{m90,r80}, x^{90})$ is the qth 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 2008. 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.

7. Conclusions

This paper examines inequality in the United States from 1960 through 2008. We show that both the level and pattern of inequality are sensitive to how inequality is measured. After-tax income inequality falls during the 1960s, remains fairly flat in the 1970s, rises sharply in the 1980s, falls modestly during the 1990s, and then rises again 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 remains flat. Both consumption and income indicate rising inequality during the early 1980s, but income inequality rises in recent years while consumption inequality falls. Differences between income and consumption are also evident for different parts of the distribution. Income inequality in the top half of the distribution rises steadily between 1980 and 2008, while consumption inequality for the top half of the distribution remains flat for most of this period, falling somewhat in recent years. Although changing demographics can account for some of the changes in consumption inequality, they do a poor job of explaining 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 compare favorably with aggregate data.

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Data Appendix

A. CE Survey and CPS ASEC/ADF Samples

Income data primarily come from the ASEC/ADF Supplement to the Current Population Survey (CPS), which is the source for official measures of poverty and inequality in the U.S. We use data from the 1964-2006 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 Survey

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 part D of this appendix.

Comparability over Time:

We make two minor adjustments to the measure of total expenditures provided in the CE Survey to maintain a comparable definition of expenditures across our sample period. First, we add in insurance payments and retirement contributions for the 1960-1961 and 1972-1973 surveys because these categories were not treated as expenditures in these years. Second, the wording for the question regarding spending on food at home in surveys conducted between 1982 and 1987 differed from other years. Several studies have noted that this wording change resulted in a decrease in reported spending on food at home (Battistin 2003; Browning et al. 2003). To correct for the effect of this change in the questionnaire, for the years 1984-1987 we multiply spending on food at home by an adjustment factor which is equal to the ratio of average spending on food at home from 1988 through 1990 to average spending on food at home from 1984 through 1987. These adjustment factors, which we estimate separately for different family types, range from 1.12 to 1.30.

Additional adjustments are necessary to maintain a consistent definition of consumption across our sample period. Because a rental equivalent is not reported in the 1960-1961 and 1980-1981 surveys, we impute a rental equivalent for these years. Using data from the 1984 survey, we regress log reported rental equivalent on the log market value of the home, log total non-housing expenditures, family size, and the sex and marital status of the family head. Estimates from these regressions are used to impute a value of the rental equivalent for respondents in the 1980-1981 surveys. A similar approach is used to impute a rental equivalent value for the 1960-1961 surveys using data from the 1972-1973 surveys. In addition, the reported rental equivalent is top coded, and the threshold value of this top code changes over time. In each year, we top code the reported rental equivalent at the real value of the most restrictive of these top code thresholds ($1000 per month in 1988). Also, we do not observe whether a consumer unit resides in public or subsidized housing prior to 1982, so a rental equivalent value for those in such housing is not included in consumption prior to 1982. Estimates of the rental equivalent for those in public or subsidized housing in the mid 1980s are small relative to total consumption, suggesting that this exclusion is not likely to significantly bias our estimates of inequality. Finally, the availability of information on vehicles also changes during our sample period. See Section D below for more details.

C. Measures of Income in the CPS ASEC/ADF

ASEC/ADF 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.

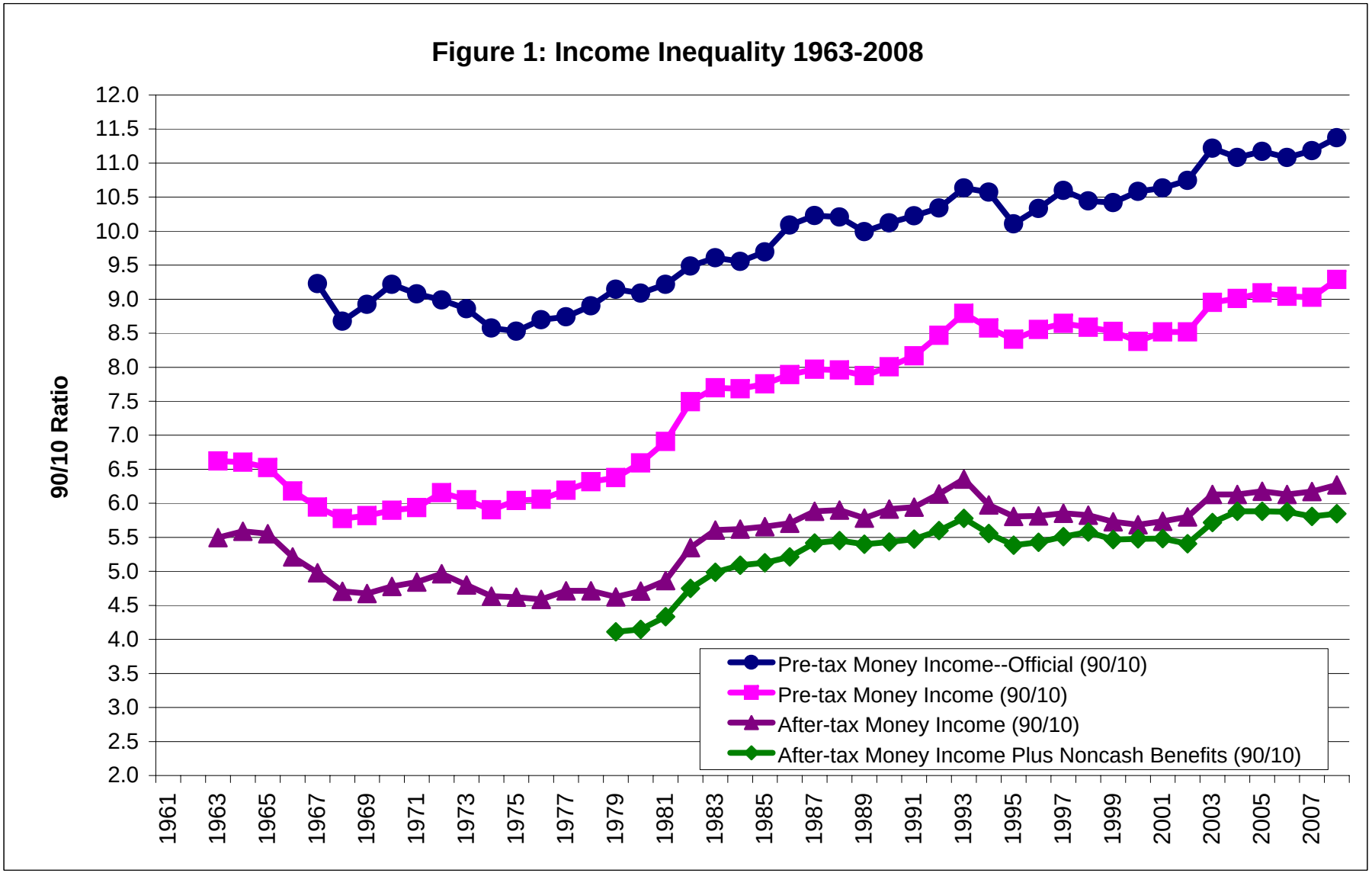
Fungible Values of Medicaid and Medicare: The Census imputes a "fungible" value of Medicaid or Medicare for families that include an individual who is reported to be covered by Medicaid or Medicare. Fungible means that "Medicare and Medicaid benefits are counted as income to the extent that they free 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

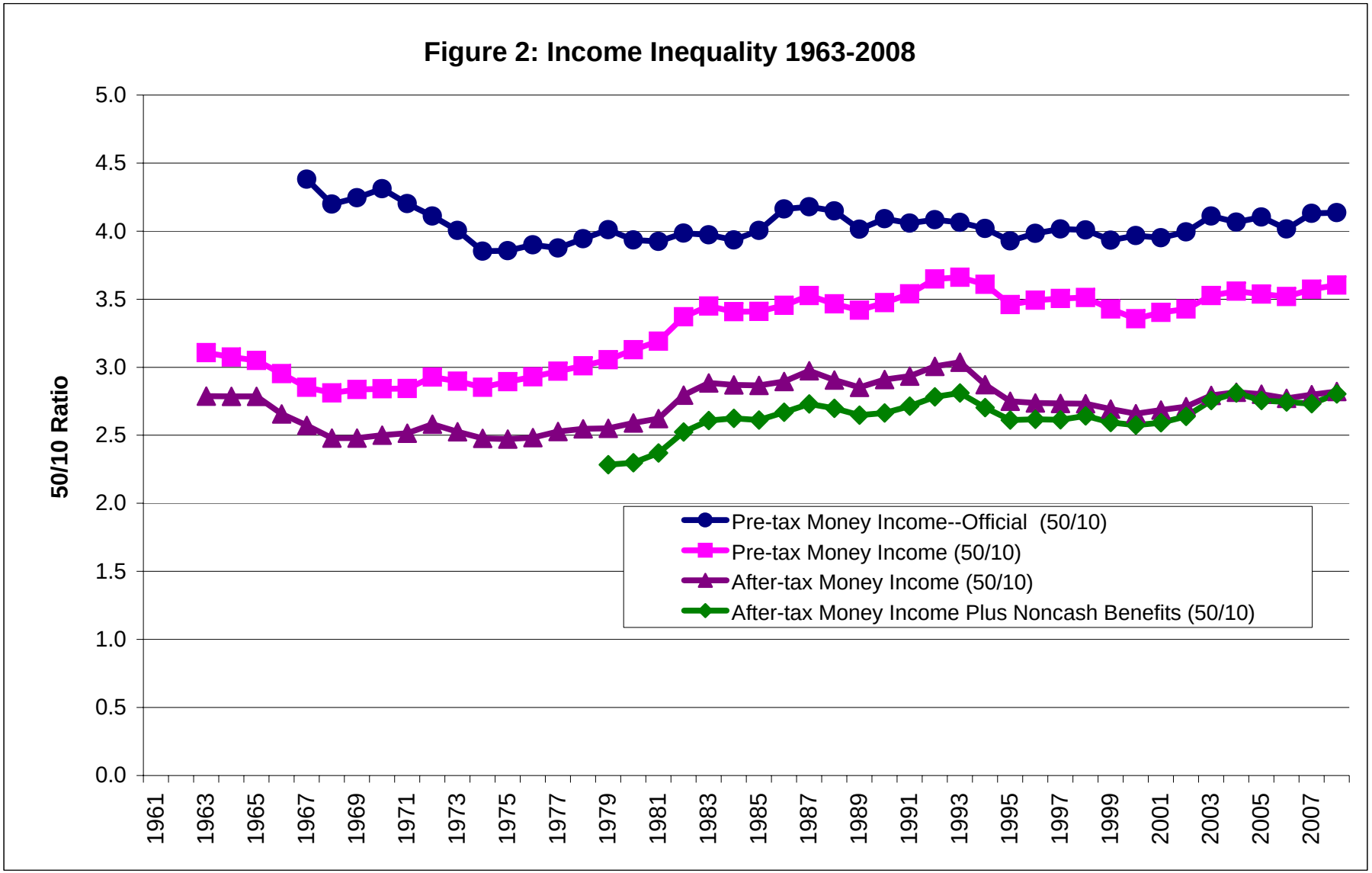
observed in the ASEC/ADF, this is imputed from family composition. Subsidy values for each year are based on estimates using the 1985 data, but are updated to reflect changes in shelter costs using the CPI residential rent index. Before 1985 housing subsidies in the ASEC/ADF were imputed using the 1979 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.

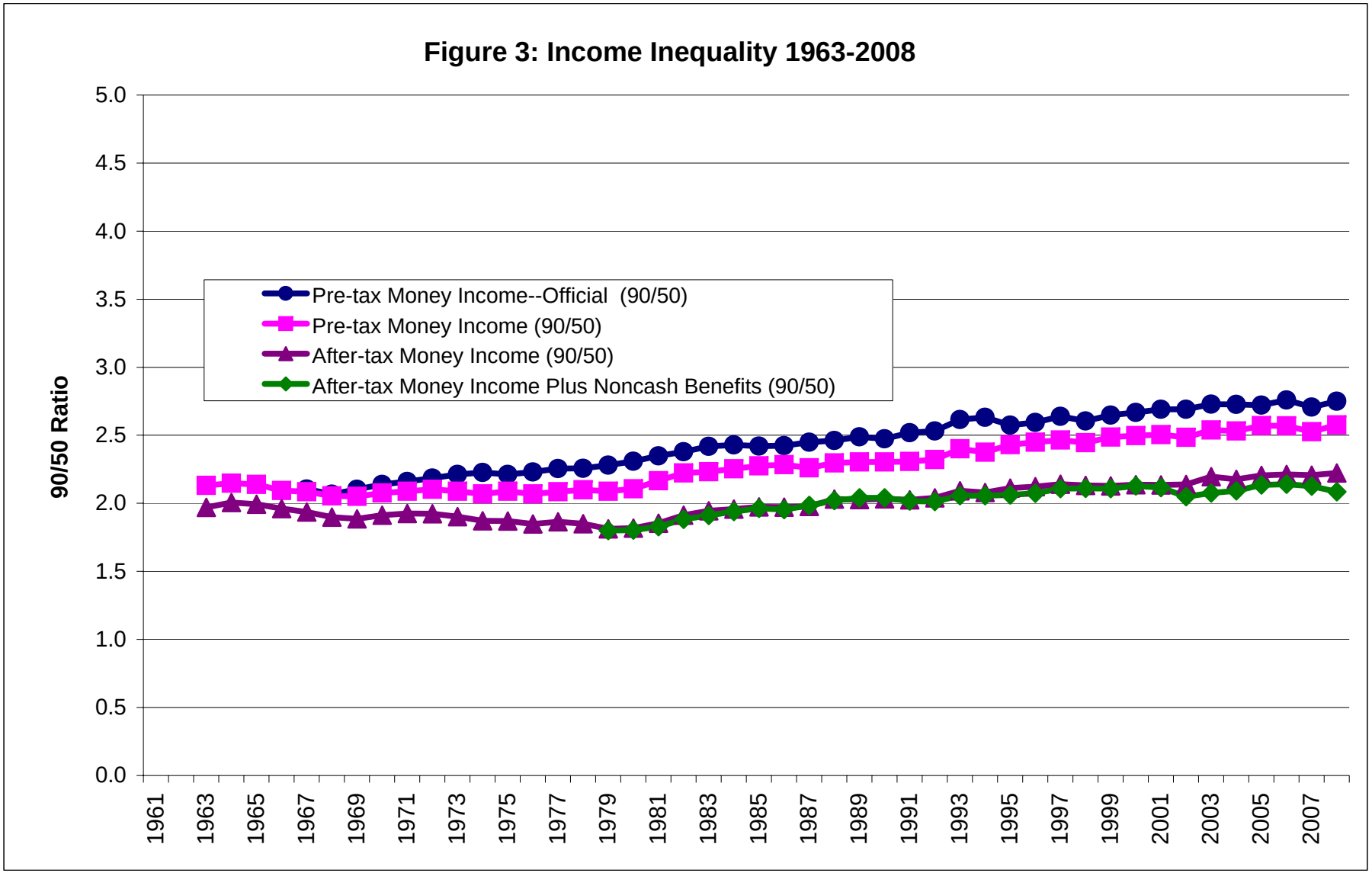
Net Return on Home Equity (annuitized value): Using data from the 1985 or 1989 AHS, a value of home equity is imputed for each ASEC/ADF household by statistically matching the two surveys on observable characteristics including geographic location, income, household size, number of living quarters, and the age, race, sex, and education of the household head. The equity value of the home and property taxes for homeowners in the ASEC/ADF 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.



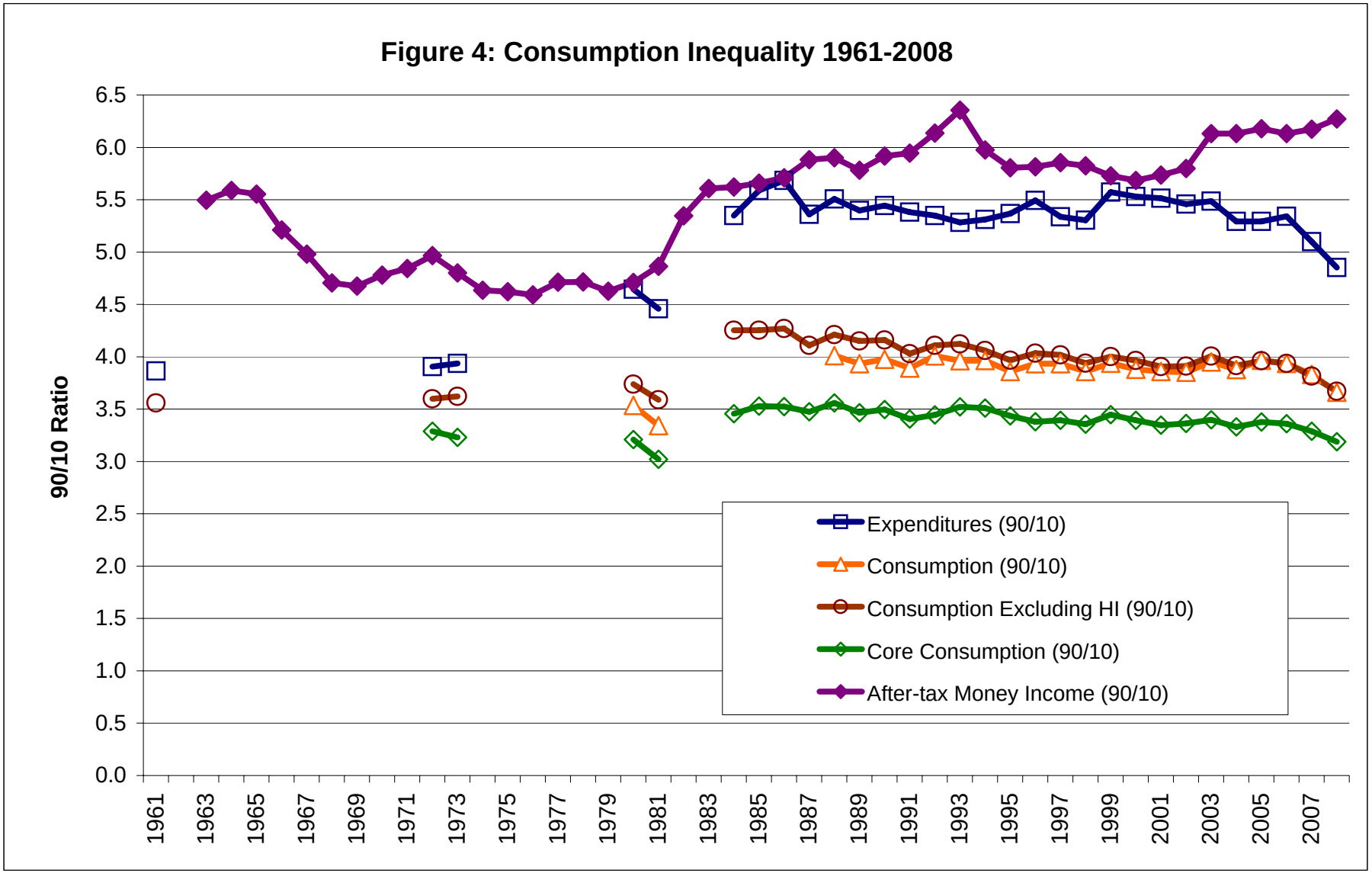
Notes: All measures other than the official measure, are adjusted for differences in family size using the NAS recommended equivalence scale. The unit of observation for the official measure is the household, while it is the family for the other income measures.



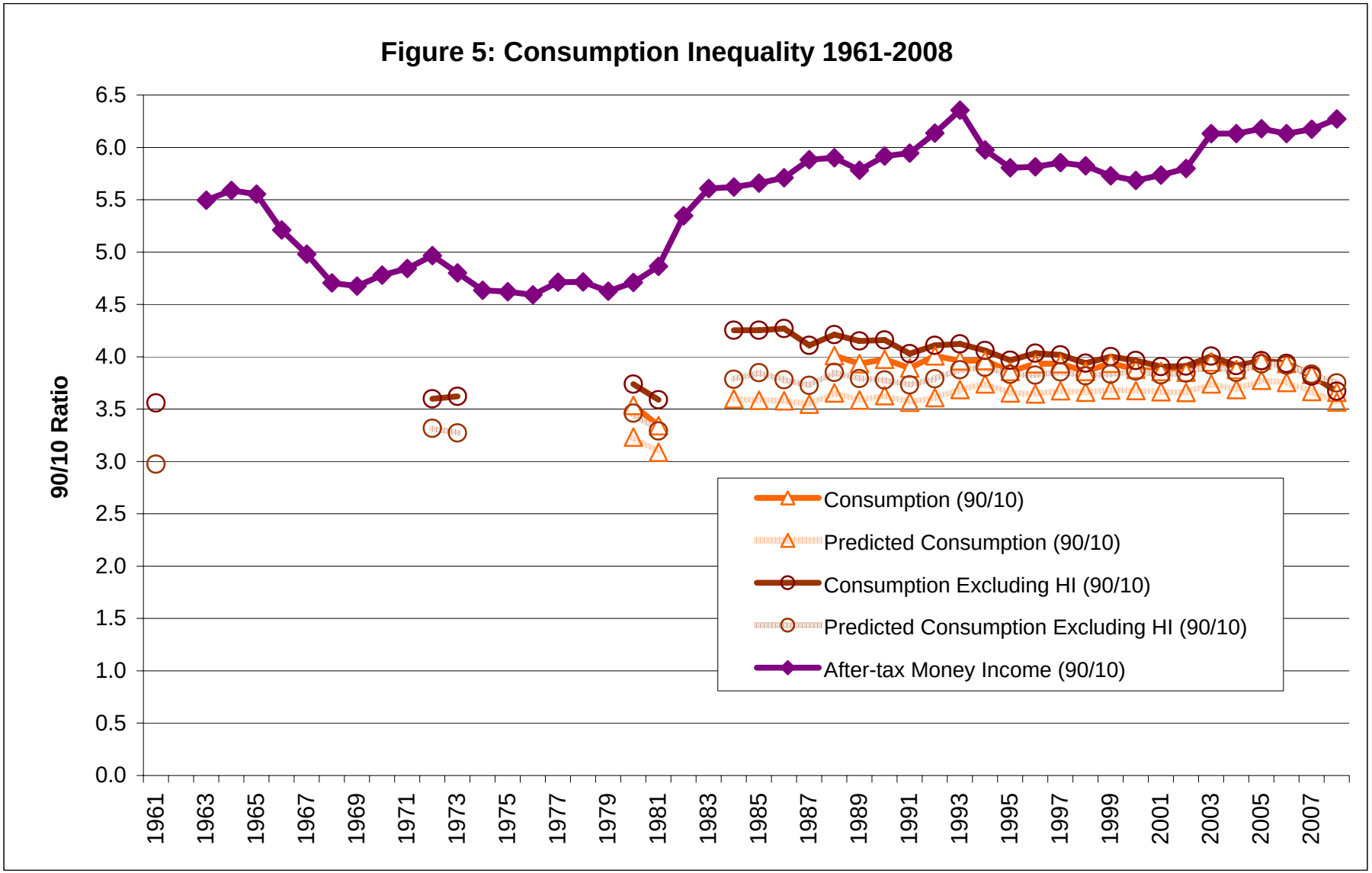
Notes: See notes to Figure 1.



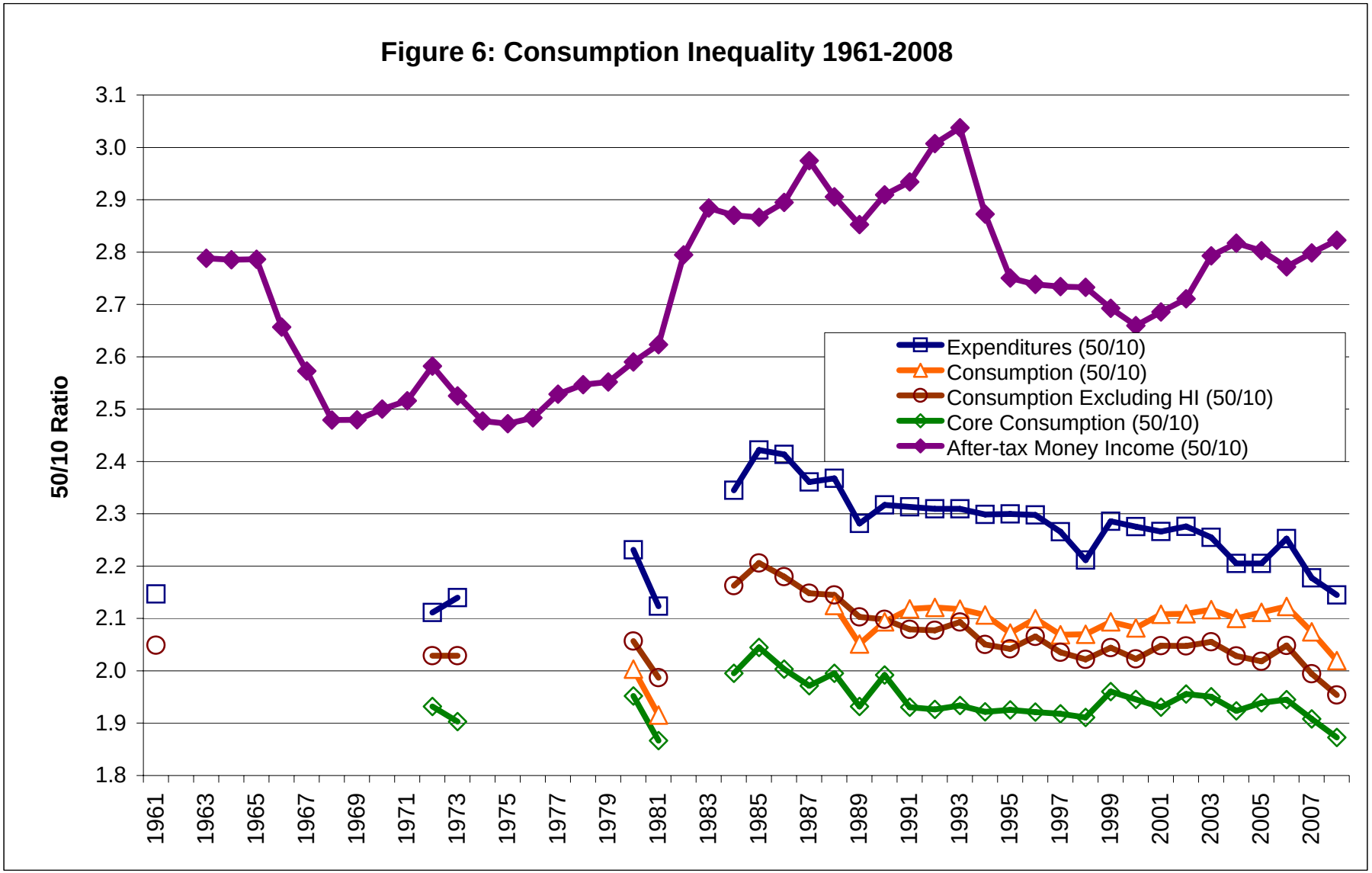
Notes: See notes to Figure 1.



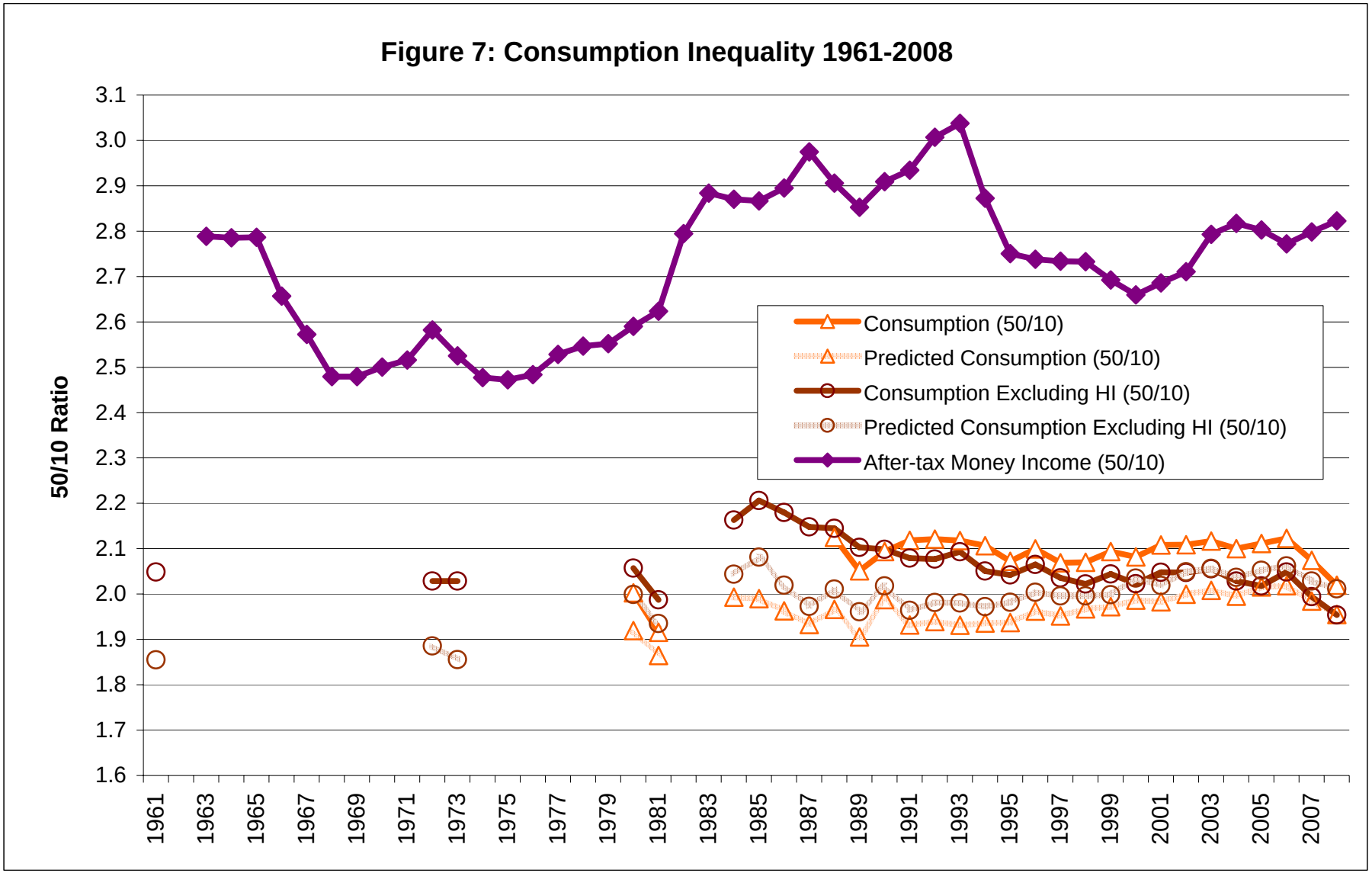
Notes: Core Consumption includes consumption of housing, food at home, vehicles, and other transportation. See text for more details.



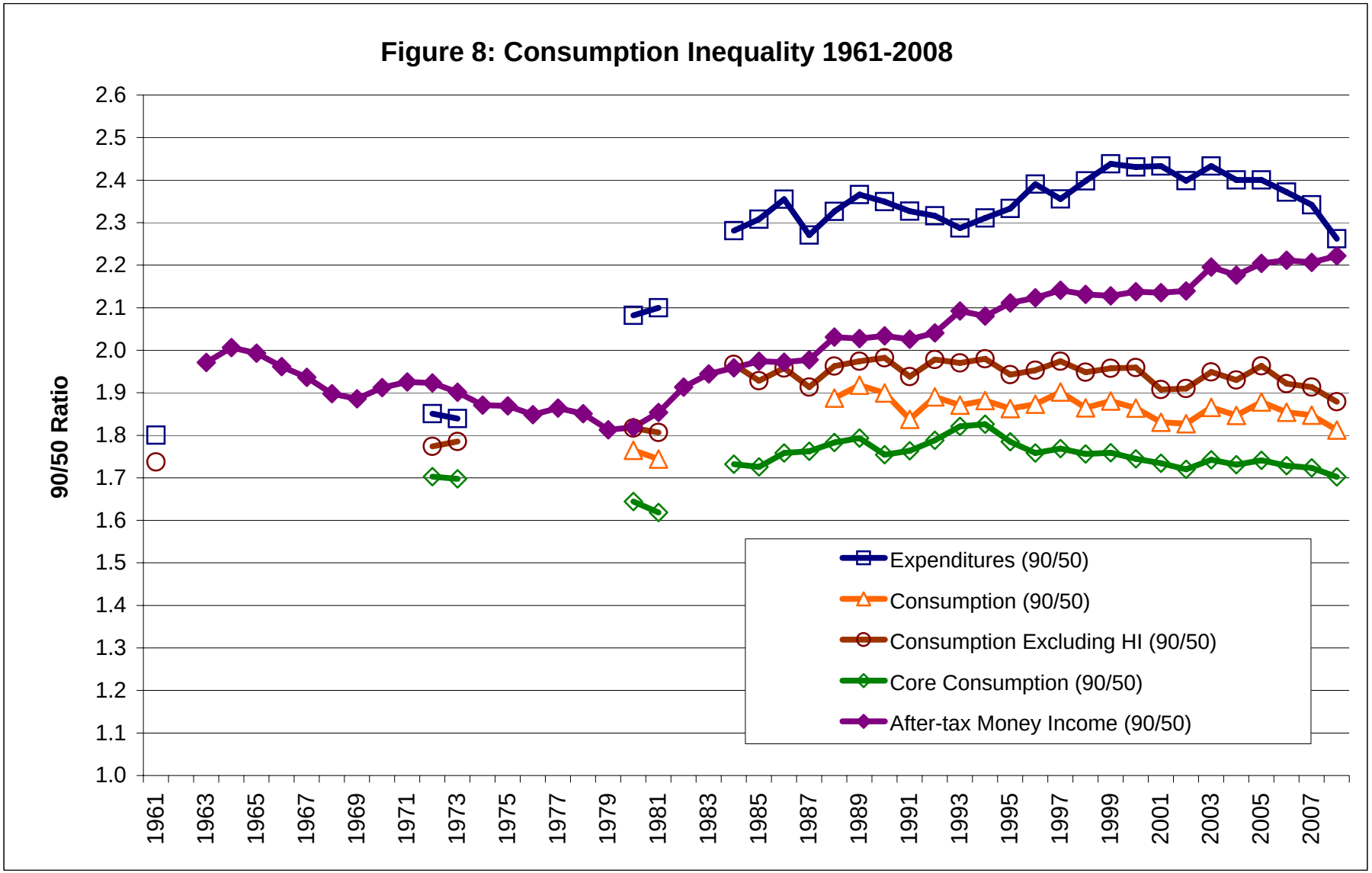
Notes: Predicted Consumption is the predicted value of consumption from a regression of total consumption on core consumption and demographic characterisitcs using data from 1980 and 1981. See text for more details.



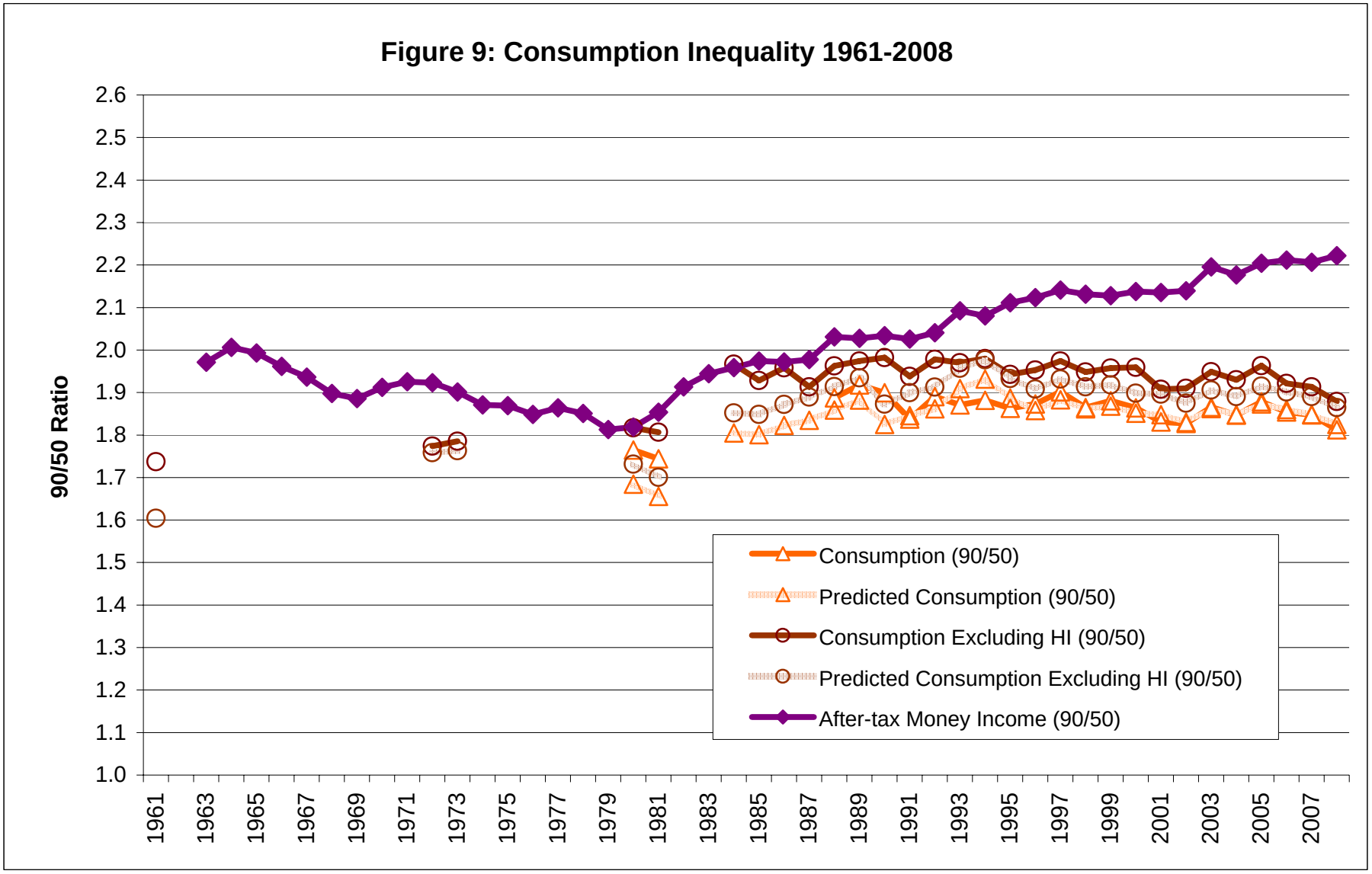
Notes: See notes to Figure 4.



Notes: See notes to Figure 5.



Notes: See notes to Figure 4.



Notes: See notes to Figure 5.

Table 1: Decomposition of Changes in Consumption Inequality

	Total Change	Residuals	Coefficients	Characteristics
1961-1972				
90-10	0.017	0.054	-0.128	0.091
		318.6%	-751.9%	533.3%
50-10	0.005	0.044	-0.117	0.078
		843.8%	-2246.2%	1502.4%
90-50	0.012	0.010	-0.011	0.013
		87.4%	-94.1%	106.7%
1972-1980				
90-10	0.040	0.013	-0.006	0.033
		31.9%	-13.8%	81.9%
50-10	-0.004	-0.018	0.000	0.013
		422.7%	-8.0%	-314.7%
90-50	0.044	0.031	-0.006	0.019
		69.5%	-13.3%	43.7%
1980-1990				
90-10	0.102	0.047	0.025	0.031
		45.9%	24.2%	29.9%
50-10	0.033	0.011	0.004	0.017
		34.6%	12.1%	53.3%
90-50	0.070	0.036	0.021	0.013
		51.2%	30.0%	18.8%
1990-2000				
90-10	-0.055	-0.041	-0.015	0.001
		74.7%	26.6%	-1.3%
50-10	-0.038	-0.026	-0.013	0.000
		67.7%	33.1%	-0.8%
90-50	-0.017	-0.015	-0.002	0.000
		90.7%	11.7%	-2.5%
2000-2008				
90-10	-0.077	-0.050	-0.039	0.012
		65.3%	50.4%	-15.7%
50-10	-0.038	-0.028	-0.021	0.011
		73.1%	55.3%	-28.4%
90-50	-0.039	-0.023	-0.018	0.001
		57.9%	45.7%	-3.6%

Notes:

Table 2: Decomposition of Changes in Income Inequality

	Total Change	Residuals	Coefficients	Characteristics
1961-1972				
90-10	-0.083	-0.109	-0.074	0.101
		132.2%	89.3%	-121.5%
50-10	-0.069	-0.080	-0.057	0.068
		116.1%	82.4%	-98.4%
90-50	-0.014	-0.030	-0.017	0.033
		211.3%	123.1%	-234.4%
1972-1980				
90-10	-0.045	-0.065	-0.046	0.067
		145.8%	103.7%	-149.5%
50-10	0.013	-0.004	-0.027	0.044
		-28.4%	-210.9%	339.3%
90-50	-0.057	-0.061	-0.019	0.023
		106.7%	33.2%	-40.0%
1980-1990				
90-10	0.249	0.099	0.126	0.024
		39.8%	50.6%	9.6%
50-10	0.125	0.044	0.062	0.018
		35.4%	49.8%	14.8%
90-50	0.124	0.055	0.064	0.006
		44.3%	51.3%	4.5%
1990-2000				
90-10	-0.028	0.029	-0.066	0.010
		-101.7%	236.5%	-34.8%
50-10	-0.068	-0.030	-0.054	0.016
		43.7%	79.4%	-23.1%
90-50	0.040	0.058	-0.012	-0.006
		146.2%	-31.3%	-14.9%
2000-2008				
90-10	0.093	0.035	0.047	0.011
		38.1%	50.3%	11.6%
50-10	0.061	0.042	0.018	0.002
		68.1%	28.5%	3.4%
90-50	0.031	-0.007	0.029	0.009
		-21.2%	93.4%	27.8%

Appendix Table 1: Comparison of CE Expenditure Measures to National Aggregates, 1972-2008

	1972	1973	1980	1984	1987	1992	1994	1997	2002	2004	2007	2008
Food at home[a]												
CE	87.5	98.1	199.2	211.9	236.4	324.9	338.7	376.2	436.8	477.4	545.9	587.1
PCE	100.7	112.1	213.7	260.6	290.7	366.8	392.8	431.3	540.1	603.4	630.3	669.8
Ratio	0.869	0.875	0.932	0.813	0.813	0.886	0.862	0.872	0.809	0.791	0.866	0.877
Food away from home[b]												
CE	24.3	26.9	75.8	104.0	120.1	136.4	150.8	164.9	191.8	217.8	371.5	340.3
PCE	35.7	40.2	90.2	123.6	154.9	212.3	234.5	262.7	339.4	388.2	440.9	456.6
Ratio	0.680	0.668	0.841	0.842	0.775	0.643	0.643	0.628	0.565	0.561	0.843	0.745
Total food												
CE	111.8	124.9	275.0	315.9	356.4	461.4	489.5	541.1	628.6	695.2	917.5	927.4
PCE	136.4	152.3	303.9	384.2	445.6	579.1	627.3	694.0	879.5	991.6	1071.2	1126.4
Ratio	0.819	0.820	0.905	0.822	0.800	0.797	0.780	0.780	0.715	0.701	0.856	0.823
Rent plus utilities[c]												
CE	66.7	73.6	132.0	202.3	235.1	306.7	334.2	380.7	438.5	485.1	601.3	636.1
PCE	58.6	64.8	144.2	209.9	250.0	315.0	347.0	387.7	469.6	504.5	619.1	657.5
Ratio	1.139	1.135	0.916	0.964	0.940	0.974	0.963	0.982	0.934	0.961	0.971	0.967
Gasoline and motor oil												
CE	27.4	31.1	98.6	95.4	83.6	97.5	100.8	115.9	138.5	185.7	286.4	328.0
PCE	24.4	28.1	86.7	94.6	85.4	112.4	116.2	134.4	164.5	231.4	343.9	386.4
Ratio	1.125	1.107	1.137	1.008	0.979	0.867	0.867	0.862	0.842	0.803	0.833	0.849
Alcoholic beverages												
CE	2.2	2.3	12.4	14.6	13.6	13.1	13.9	15.3	19.8	19.7	21.9	22.3
PCE	14.8	15.9	29.7	37.1	41.4	48.9	52.9	61.2	75.5	85.0	109.8	114.5
Ratio	0.149	0.147	0.417	0.393	0.329	0.267	0.263	0.250	0.262	0.232	0.199	0.195
Transportation[d]												
CE	38.0	39.3	72.3	106.0	128.0	177.4	203.3	240.5	268.1	279.9	308.8	309.5
PCE	29.6	31.6	65.3	93.2	120.8	157.6	190.7	245.7	288.4	308.2	369.1	369.7
Ratio	1.283	1.245	1.107	1.138	1.059	1.125	1.066	0.979	0.930	0.908	0.837	0.837
Tobacco												
CE	9.0	9.3	14.4	20.5	21.6	27.3	26.3	27.6	35.7	33.3	38.7	37.8
PCE	12.2	13.2	20.9	29.2	34.5	48.0	47.3	53.8	89.2	87.5	75.1	77.1
Ratio	0.734	0.708	0.689	0.701	0.626	0.568	0.556	0.512	0.400	0.380	0.515	0.491
Clothing												
CE	37.4	41.2	55.7	81.5	92.1	105.6	110.7	117.2	119.3	112.1	121.7	115.0
PCE	56.3	62.4	107.2	142.4	174.2	221.6	237.8	257.8	303.1	324.6	335.6	331.9
Ratio	0.663	0.660	0.520	0.572	0.529	0.477	0.465	0.455	0.394	0.345	0.363	0.346
Audio, video, and computers												
CE	8.1	8.4	15.1	26.5	32.8	49.6	62.6	74.4	90.1	102.7	125.5	132.5
PCE	10.1	11.3	20.6	32.0	46.2	57.0	73.7	92.3	120.0	133.3	181.9	184.0
Ratio	0.797	0.743	0.733	0.829	0.709	0.869	0.849	0.806	0.750	0.771	0.690	0.720
Core consumption (excluding flows)[e]												
CE core	219.7	242.1	502.1	615.6	683.1	906.5	977.0	1113.3	1281.8	1428.1	1742.4	1860.7
PCE core	213.3	236.6	509.9	658.3	746.9	951.8	1046.7	1199.1	1462.6	1647.5	1962.4	2083.4
Ratio	1.030	1.023	0.985	0.935	0.915	0.952	0.933	0.928	0.876	0.867	0.888	0.893
Non-core consumption												
CE non-core	72.8	79.8	158.4	220.6	247.5	282.4	301.7	325.0	366.6	382.9	553.7	515.4
PCE non-core	119.0	131.7	248.0	332.3	405.0	530.8	572.5	635.5	807.2	885.3	961.4	980.1
Ratio	0.612	0.606	0.639	0.664	0.611	0.532	0.527	0.511	0.454	0.433	0.576	0.526
Total												
CE total expenditures[f]	584.9	653.5	1,260.2	1,821.0	2,094.0	2,663.1	2,923.6	3,306.5	4,090.7	4,486.1	5,253.2	5,357.4
PCE	770.6	852.4	1,757.1	2,503.3	3,100.2	4,235.3	4,743.3	5,547.4	7,350.7	8,195.9	9,826.4	10,129.9
Ratio (CE/PCE)	0.759	0.767	0.717	0.727	0.675	0.629	0.616	0.596	0.557	0.547	0.535	0.529

Notes: All survey data come from the CE Interview Survey. The expenditure components reported here are those that align most closely with PCE categories.

a Food at home is food purchased for off-premise consumption minus alcoholic beverages purchased for off-premise consumption.

b Food away from home is purchased meals and beverages minus other alcoholic beverages.

c Rent plus utilities is rent on tenant-occupied nonfarm dwellings plus utilities excluding telephone.

d Transportation includes spending on public transportation, vehicle maintenance and repairs, insurance, and rentals and leases.

e Core consumption is the sum of the categories: food at home, rent plus utilities, gasoline and motor oil, and transportation.

f Total expenditures excludes miscellaneous expenditures and cash contributions which are not asked in all interviews.