Consumption and Income Inequality in the U.S.: 1960-2008*

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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. over the past 45 years 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 using data from the Current Population Survey (CPS-ADF/ASEC) from 1963 through 2008 and consumption inequality using data from the Consumer Expenditure (CE) Interview Survey over this same time period. 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 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.

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 both income and consumption for the period from 1960 to 2008. 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 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.

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), etc.). 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 earnings are an important component of overall economic well-being other factors also contribute to well-being such as 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. 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, showing that taxes reduce inequality, but that inequality still rises over time (Piketty and Saez, 2003).

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. Krueger and Perri (2006) find that consumption inequality increased only moderately between 1980 and 2003, and Heathcote, Perri, and Violante (2009) show that disposable income inequality rises more than nondurable consumption inequality between 1980 and 2005. Slesnick (2001) finds that consumption inequality was roughly constant between 1970 and 1995. 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, 2007). Conceptual arguments as to whether income or consumption is a better measure of the material well-being of the poor almost always favor consumption.[1] For example, consumption captures permanent income (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 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, for homeowners the CE Survey provides self reported values of the rental equivalent of the 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, and second, one can better account for relative price changes. Even more importantly, subcategories of consumption such as nondurable consumption have been used extensively in past work. In this paper, we will report results for what we call core consumption, a measure that closely approximates essentials and only includes items that are well measured over time. Furthermore, we can

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[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.

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, 2007) 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 ASEC/ADF Supplement to the Current Population Survey (CPS) for 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 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 ASEC/ADF 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 on these imputed noncash benefits.

We use data from the 1964 and 1972-2009 ASEC/ADF 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. 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

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

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 imputed values for 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 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

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[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.

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). Because information on health insurance coverage is not available in 1960-1961, 1972-1973 and from 1984 to 1987, we do not report consumption measures that include health insurance for these years. The CE Survey provides annual or annualized data for 13,728 families in 1960-1961 and 19,975 families in 1972-1973. The survey is a rotating panel that includes about 5,000 families each quarter between 1980 and 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.

To convert reported expenditures into a measure of consumption, we make a number of adjustments. First, expenditures on durable goods tend to be large and infrequent because the entire cost of new durables is included in current expenditures. In the case of vehicle expenditures, we are able to convert vehicle spending to a service flow equivalent. Second, consumption does not include 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.[5] 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. Third, to convert housing expenditures to housing consumption for homeowners, we subtract housing outlays such as mortgage interest payments, property tax payments, and spending on insurance, maintenance and repairs, and add the reported rental equivalent of the home. Because respondents living in government or subsidized housing do not report a rental equivalent, we use detailed housing characteristics in the CE Survey to impute a rental value for these units. Each of these adjustments has several steps and involves important methodological improvements. We consider these adjustments in turn.

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. This procedure provides two important improvements upon previous work. First, we impute a

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[5] We also exclude spending on individuals or entities outside the family, such as charitable contributions and spending on gifts to non-family members. This category is very small relative to total consumption.

current market value for all vehicles without purchase prices based on the observed price paid for vehicles of the same make, model, year, and age, and with comparable features such as air conditioning, power steering, or a sunroof. Such a procedure accounts for amenities and quality improvements through what purchasers are willing to pay. Second, we estimate depreciation rates by comparing the reported purchase prices for similar vehicles of different ages. We validate the predicted vehicle values for those observations where we do not have a purchase price by comparing the predicted values to published values in National Automobile Dealers Association (NADA) guides.[6] We find a correlation of 0.88 between our predictions and the published values. See Meyer and Sullivan (2009) for more details.

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.[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 than high well-being. The worker and firm cost of employer provided insurance is obtained from a combination of sources including the National Medical Care Expenditure Survey and the Mercer/Foster Higgins National Survey of Employer Sponsored Health Plans. From these surveys we calculate a cost of employer provided health insurance that varies by year and nine geographic regions. The cost of Medicaid and Medicare is taken from expenditures per person in a given state and year. For Medicaid we calculate these expenditures separately for children, adults under 65, and adults 65 and over.[8]

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. The compromise that we consider here is to count desired health expenditures. Assuming that desired health

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[6] We impute vehicle values using prices for similar vehicles reported in the CE Survey, rather than using the published NADA value, because our regression approach is more flexible, allowing us to impute values for more than 700,000 vehicles, and because in many cases a vehicle in the CE Survey does not have an exact match in the NADA guides.

[7] Because measuring the value of public and private health insurance requires a number of strong assumptions, we also usually report alternative resource measures that exclude health insurance and medical spending.

[8] We have collected health insurance cost data through 2005. We impute costs for 2006 through 2008 by adjusting the 2005 cost data using the CPI for medical care.

expenditures by those with few resources can be characterized by Cobb-Douglas preferences with a coefficient of 0.33 on health and 0.67 on other goods, only health expenditures up to one-third of total expenditures are included. This compromise values health coverage at cost for those with substantial resources as they likely spend less than one-third of consumption on health, but at much less than cost for those with few other resources.

Housing consumption is measured as the reported rental equivalent of the home for home owners, and as the reported out of pocket spending on rent for non-homeowners. Although the rental equivalent is not reported in the 1960-1961 and 1980-1981 surveys, we can impute a rental equivalent using the reported market value of the home. One approach would be to impute a rental equivalent using home values for all years. This approach has the advantage of using a comparable method over time (Cutler and Katz 1991). Because we are particularly interested in the period since 1984 when a rental equivalent is always available and we expect that these reported values will be better than our imputations, we only impute for the two missing surveys rather than all years. We briefly report below how this choice affects our results.

A rental equivalent is also not available for respondents living in government or subsidized housing, and the CE Survey collects information on only the out of pocket portion of rent. To measure appropriately consumption for these families, we impute a rental value using reported information on their living unit including the number of rooms, bedrooms and bathrooms, and the presence of appliances such as a microwave, disposal, refrigerator, washer, and dryer. Specifically, for renters who are not in public or subsidized housing we estimate quantile regressions for log rent using the CE Survey housing characteristics mentioned above as well as a number of geographic identifiers including state, region, urbanicity, and SMSA status, as well as interactions of a nonlinear time trend with appliances (to account for changes over time in their price and quality). We then use the estimated coefficients to predict the 40th percentile of rent for the sample of families that do not report full rent because they reside in public or subsidized housing. We use the 40th percentile because public housing tends to be of lower quality than private housing in dimensions we do not directly observe. Evidence from the PSID indicates that the average reported rental equivalent of public or subsidized housing is just under the predicted 40th percentile for these units using parameters estimated from those outside public or subsidized housing.

We considered subtracting estimated monetary work expenses from consumption. However, work related expenses that are reported in the CE Survey, such as child care and domestic services, 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.[9]

We measure consumption 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.[10] This unit of analysis is more appropriate than the CPS family for measuring well-being because the unit includes not only individuals who are related by blood and marriage (as is done in the CPS), but also those who share resources. The consumer unit includes cohabitors who share responsibility for housing, food, or other living expenses, but excludes cohabitors who do not contribute to these expenses. As with income, we adjust for differences in consumer unit size and composition using the NAS recommend equivalence scale described in the previous subsection.

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 2007).

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[9] To account for how work affects consumption more generally, one may want to examine the consumption of leisure (Aguiar and Hurst 2007, Meyer and Sullivan 2008).

[10] 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.

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, 2007) 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 other household surveys. 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, 2007). Under-reporting of transfers will lead to an understatement of dispersion in the bottom part of the income distribution.

5.B.   Consumption Under-Reporting

There is also under-reporting of consumption, but because consumption often exceeds income, we might be more concerned about over-reporting of consumption, of which there is little evidence.   Nevertheless, 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. First, 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).[11] Second, the poor

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[11] 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

consume a different bundle of goods than the general public, so that aggregate analyses do not reflect the composition of consumption for the poor. Third, 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 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

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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.

food at home and rent plus utilities.[12] 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. Since food away is a much smaller share of consumption for the poor, a share weighted ratio for total food expenditures for the poor would fall much less over time than for the non-poor. Since food plus housing account for 70 percent of consumption near the poverty line in 2004, we expect that consumption is understated somewhat on average for the poor, but not nearly as much as it is for other groups. 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 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

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[12] 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.

the rental equivalents are reasonable.[13] 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 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.   Core Consumption

Incorporating the lessons of the previous section, we construct a measure of core consumption that includes spending components that are primarily non-discretionary and have reporting ratios that are high and decline slowly over time. 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. This measure arguably approximates essential consumption spending. Food away from home is omitted, but that is largely a discretionary expenditure. Other omitted categories include clothing and personal care items that have both an essential and discretionary component. 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 consumption measure is 73 percent of total consumption, but is on average 80 percent of consumption for those near the poverty line.[14] 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

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[13] The rental equivalent and home value are highly correlated, at around 0.7 in a typical year. The ratio of the rental equivalent to home value has been fairly stable, though it has declined in recent years, as one might expect with higher home prices.

[14] 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.

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).

5.D.   Predicted Consumption

To calculate predicted consumption (for either consumption or consumption excluding health insurance) we regress 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 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 measure of income equality 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 lower level of inequality. Since this series goes back to 1963 we can more clearly see the fall in inequality in the 1960s. The rise in inequality is steeper in the late 1970s and early 1980s than with the official measure. Between the early 1980s and 2008, the two series are roughly parallel.

After tax money income inequality has a very different pattern. As with the pre-tax measure, after-tax money income inequality rises noticeably in the early 1980s, although the rise is not as sharp as for the pre-tax measure. There is very little increase in after-tax money income inequality after the early 1980s. There is a small temporary increase centered around 1993 and a small more persistent increase in 2003, but nothing nearly as large as we see in the pre-tax series. For the years since 1980, we also have information on noncash benefits. Inequality in after-tax money income plus noncash benefits is slightly lower than inequality in the measure that does not include noncash benefits but the patterns for these two measures are very similar.

Changes in inequality at the bottom half of the income distribution differs 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 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 in the case of the measure that does not incorporate noncash benefits. 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.

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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. Adjusting for family size flattens out or even reverses the increase through around 1980, but the steady increase in inequality in the years after the early 1980s remains.

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 we convert this spending to a service flow for our measures of consumption. 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. It then slowly drifts downward, 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. We examined these patterns further by looking at predicted consumption, using core consumption to predict total consumption as explained in Section 5.D. We find a fairly similar patter with a sharp increase in inequality in the early 1980s, but the decline in inequality in the later years is muted (Figure 5). These measures, with or without an accounting for health insurance and health expenditures, 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). 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.

To examine the role that changes in observable characteristics play in changes in income and consumption inequality, we decompose our inequality measures into a component explained by demographics and an unexplained component. Specifically, for each year we regress log income or consumption on 40 mutually exclusive demographic cell indicators defined by family type, race, and education. We then calculate the percentiles of the distribution of the residuals from each of these regressions. In Figures 10 and 11, we report the ratio (or more specifically, the log difference) of the 90th percentile to the 10th percentile of the distribution of residuals for each year. The 90/10 ratio for the "Demographics" series is then the difference between the overall 90/10 ratio and the 90/10 ratio of the residuals.

The decompositions of the consumption change into demographics and unobservables indicate that changing demographics can explain some of the overall change in inequality (Figure 10). Changing demographics can account for part of the rise in equality in the early 1980s and most of the small, gradual decline in inequality between 1984 and 2005. Changing demographics, however, cannot explain the decline in consumption inequality after 2005. Demographics are less important for explaining changes in overall income inequality (Figure 11). Changing demographics account for only a small fraction of the sharp rise in income inequality in the early 1980s. Moreover, changing demographics indicate a decline in inequality in the 1990s and 2000s, while actual income inequality rises during this period.

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 nation 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.
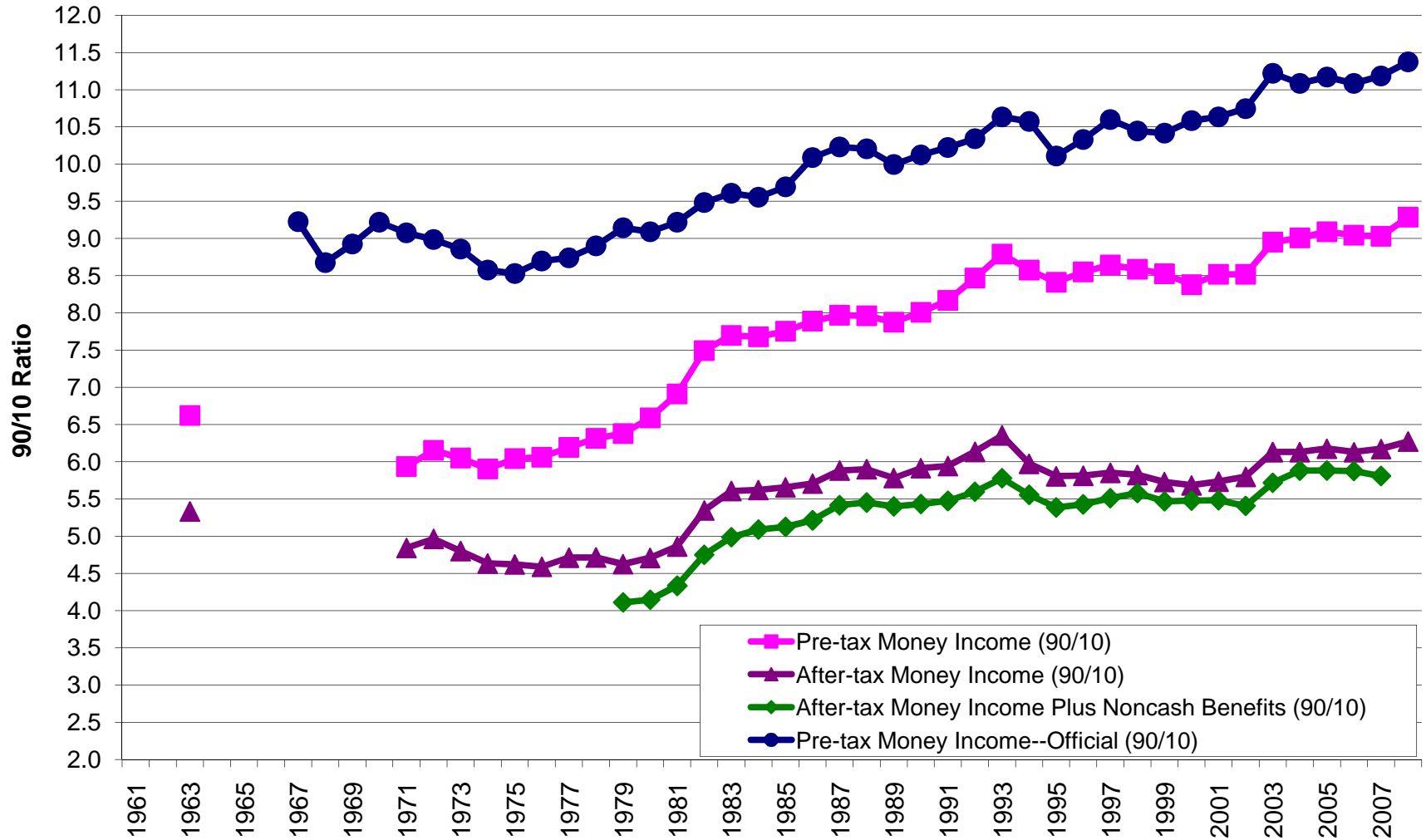
Fungible Values of Medicaid and Medicare: The Census imputes a "fungible" value of Medicaid or Medicare for families that include an individual who is reported to be covered by Medicaid or Medicare.   Fungible means that "Medicare and Medicaid benefits are counted as income to the extent that they free 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.
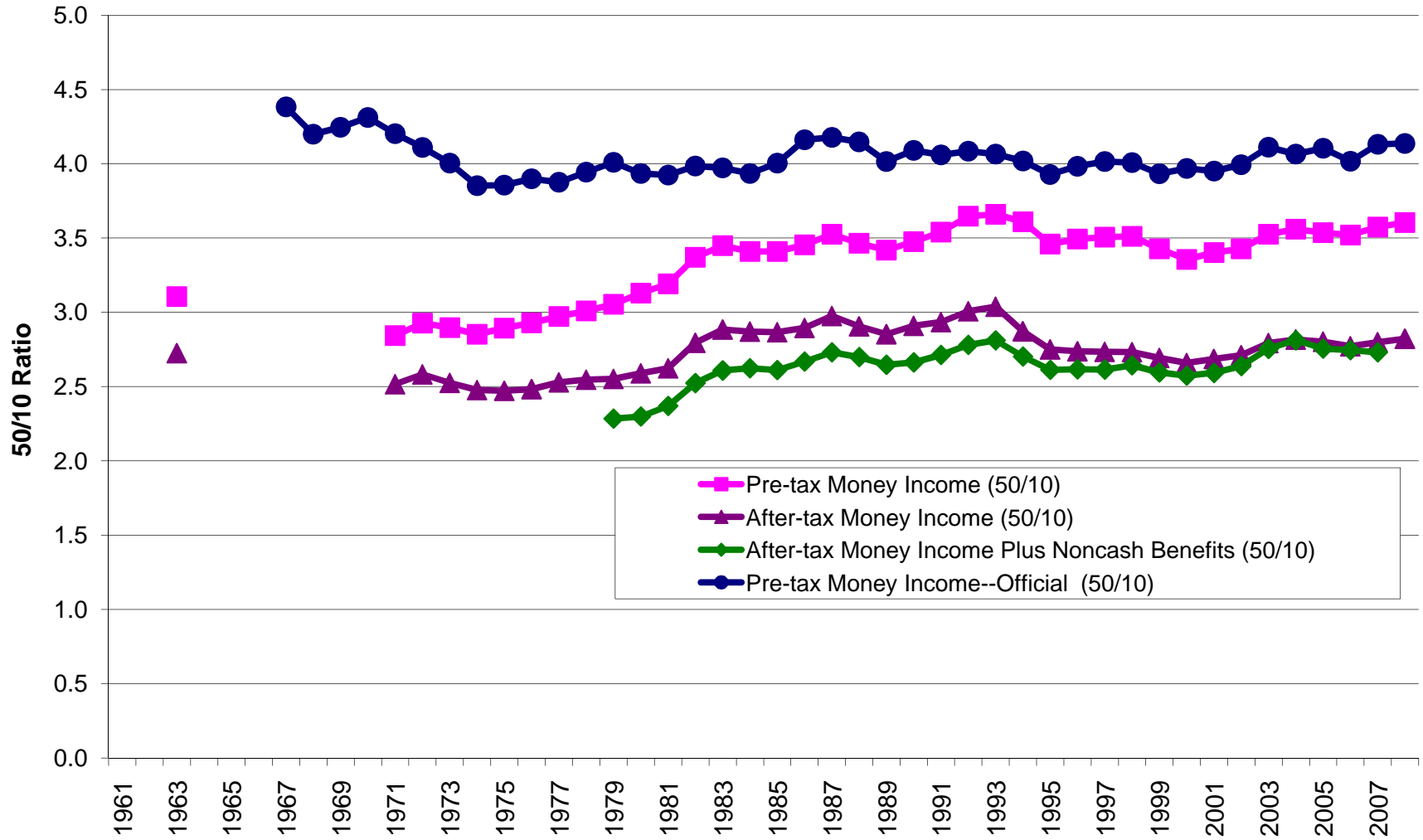
Net Return on Home Equity (annuitized value): Using data from the 1985 or 1989 AHS, a value of home equity is imputed for each ASEC/ADF household by statistically matching the two surveys on observable characteristics including geographic location, income, household size, number of living quarters, and 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.

Figure 1: Income Inequality 1963-2008

Legend:
- Pre-tax Money Income (90/10)
- After-tax Money Income (90/10)
- After-tax Money Income Plus Noncash Benefits (90/10)
- Pre-tax Money Income--Official (90/10)
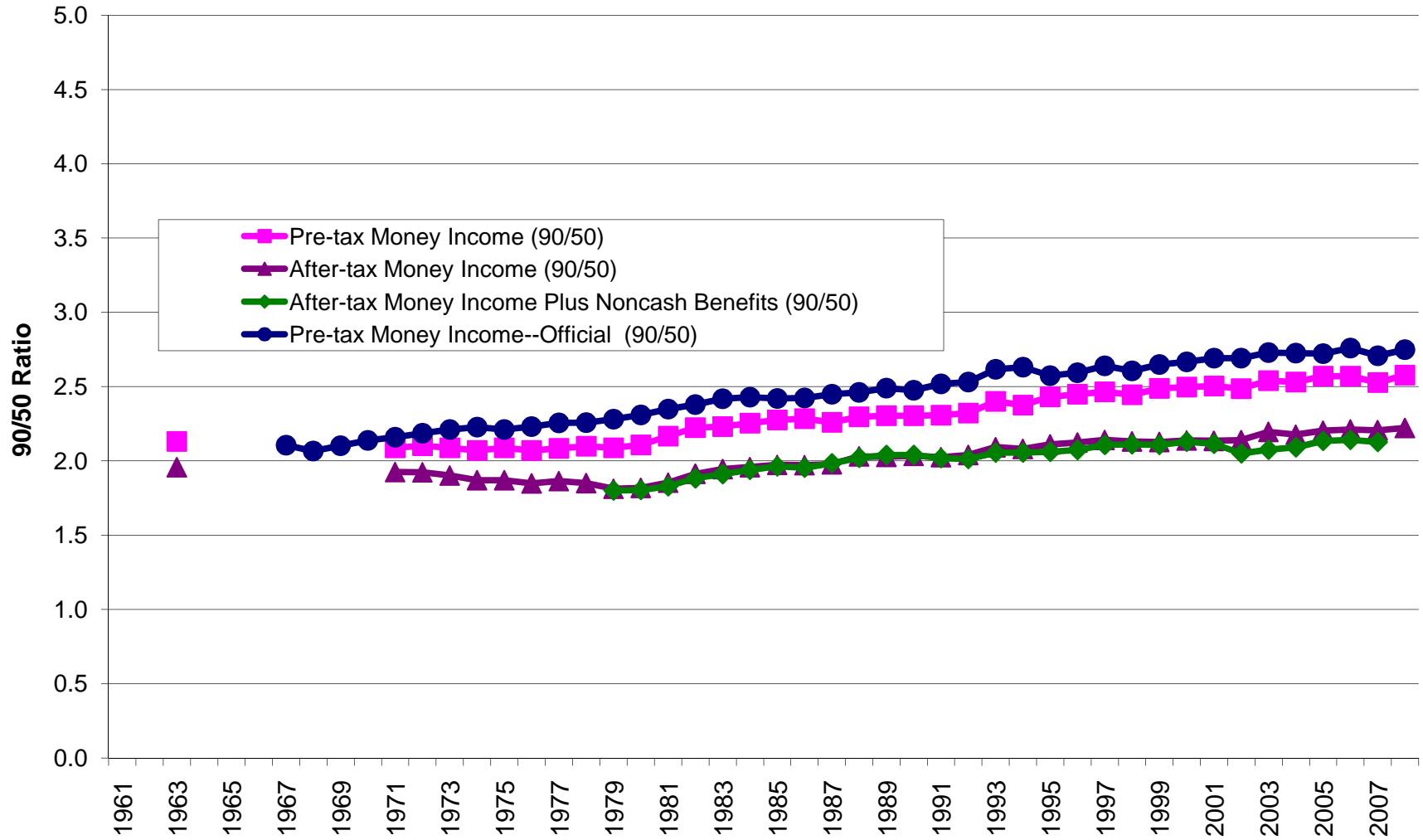
Y-axis: 90/10 Ratio

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 1963-2008

Legend:
- Pre-tax Money Income (50/10)
- After-tax Money Income (50/10)
- After-tax Money Income Plus Noncash Benefits (50/10)
- Pre-tax Money Income--Official (50/10)

Y-axis: 50/10 Ratio (0.0 to 5.0)

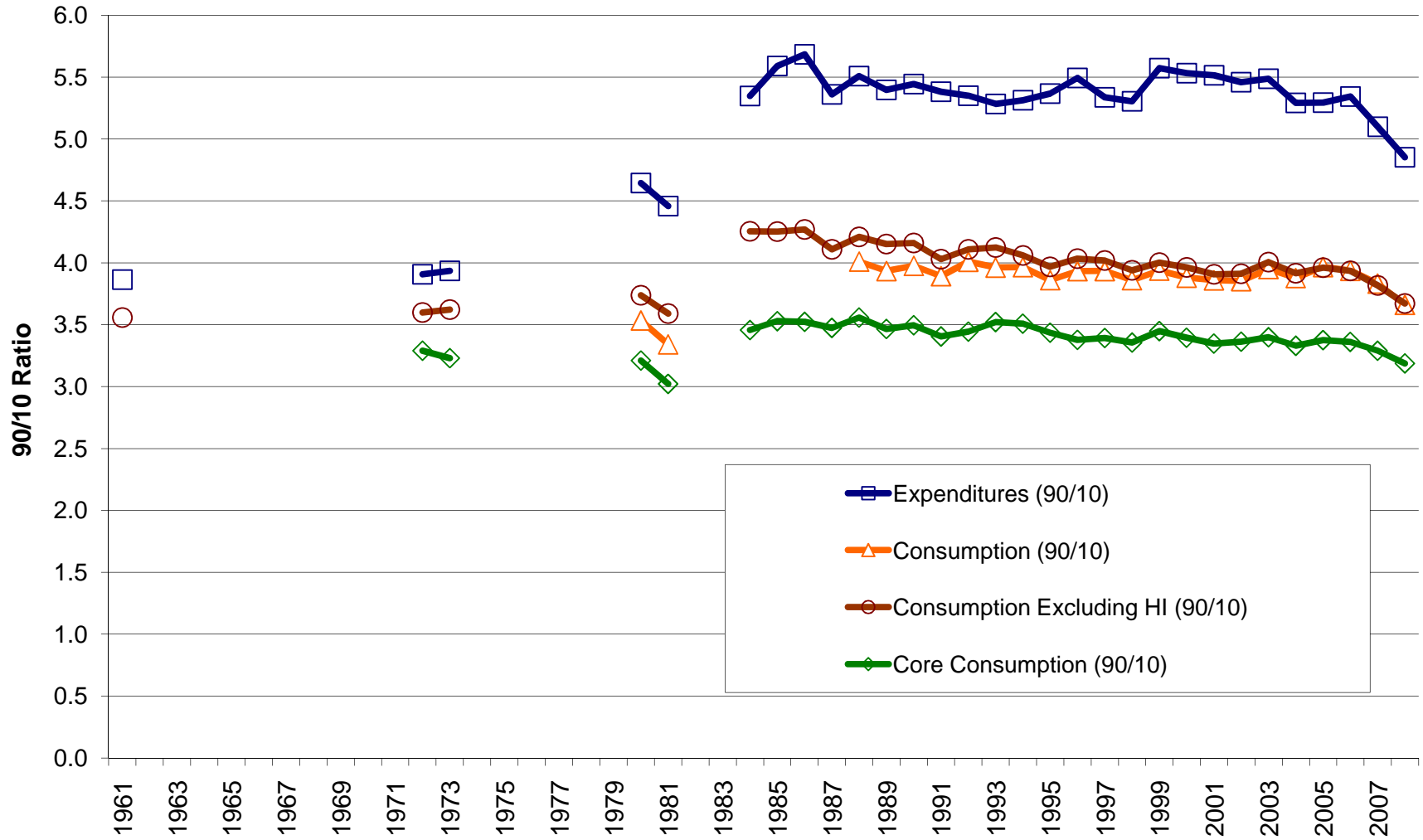X-axis: years 1961 to 2007

Notes: See notes to Figure 1.

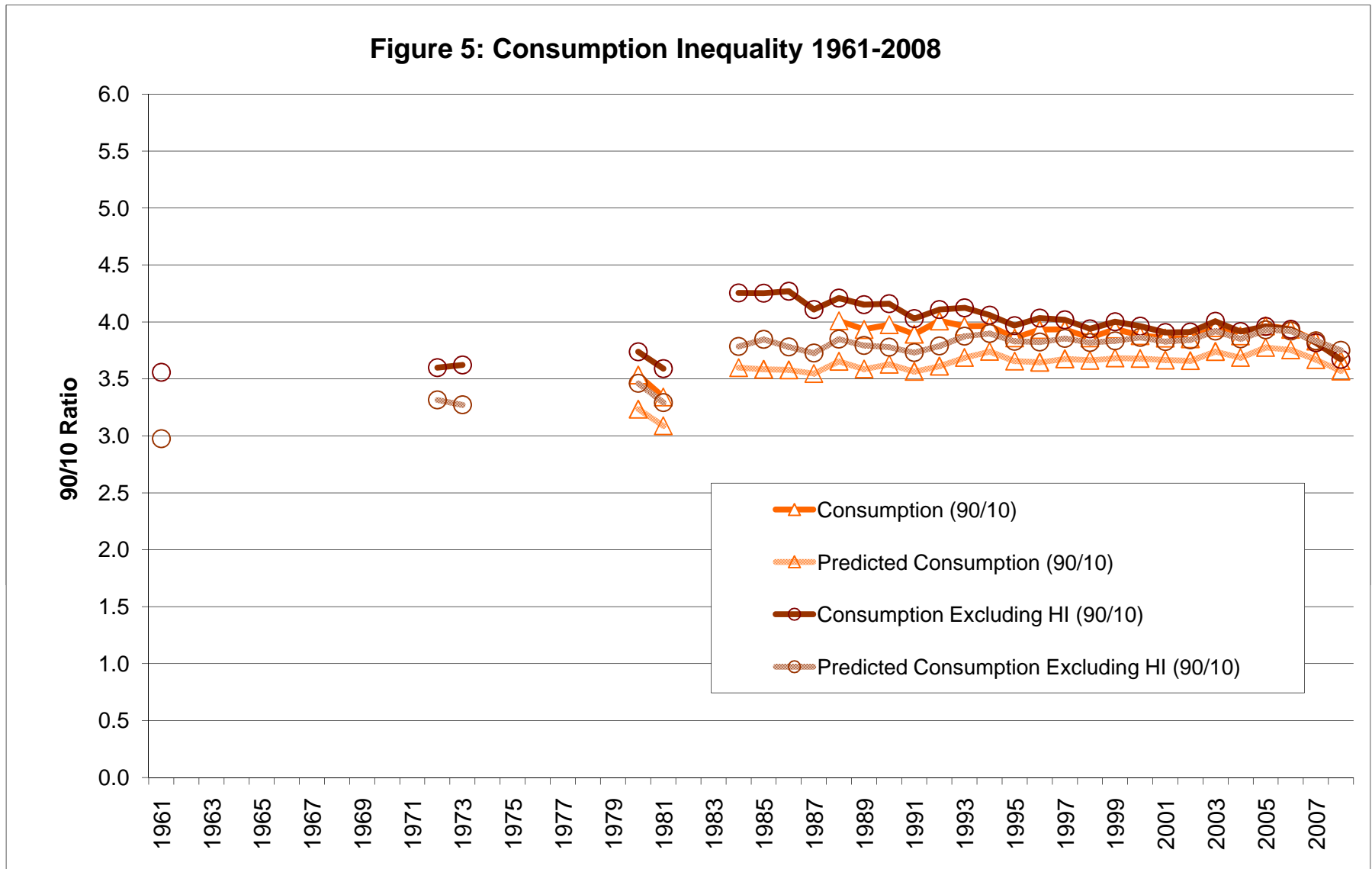**Figure 3: Income Inequality 1963-2008**

Notes: See notes to Figure 1.
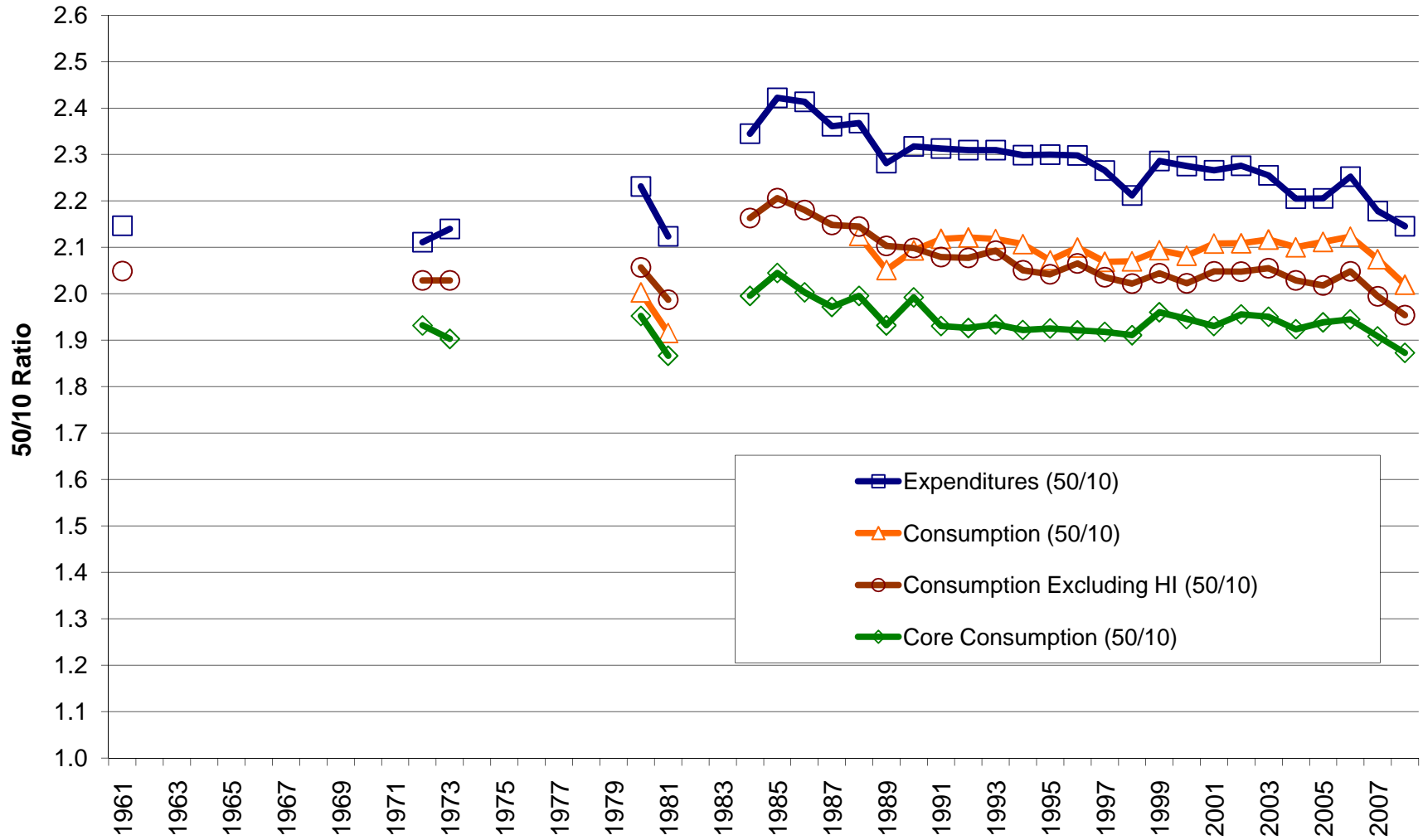
Figure 4: Consumption Inequality 1961-2008

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

Figure 5: Consumption Inequality 1961-2008

Legend:
- Consumption (90/10)
- Predicted Consumption (90/10)
- Consumption Excluding HI (90/10)
- Predicted Consumption Excluding HI (90/10)

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.

Figure 6: Consumption Inequality 1961-2008

Notes: See notes to Figure 4.

Figure 7: Consumption Inequality 1961-2008
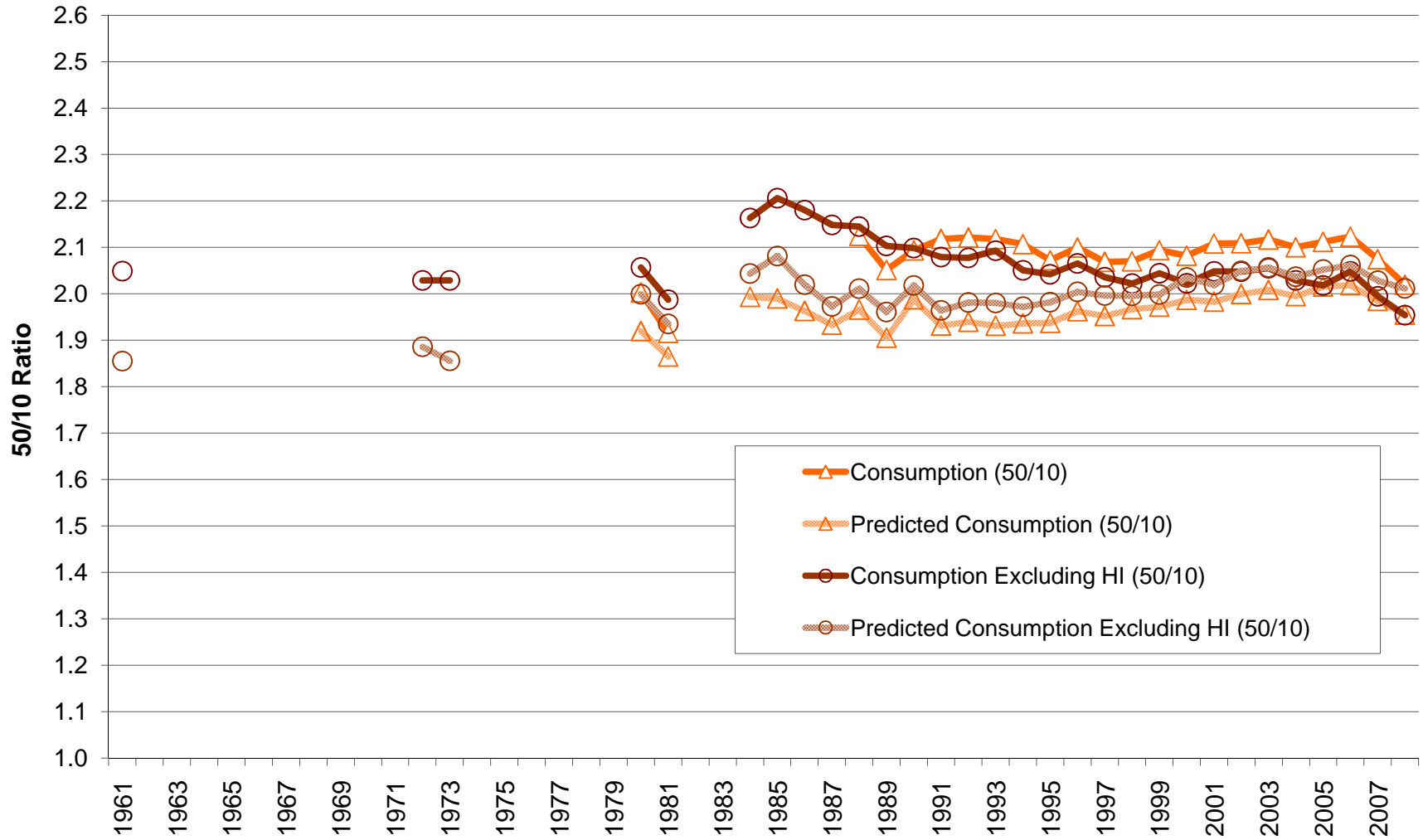
Notes: See notes to Figure 5.

Figure 8: Consumption Inequality 1961-2008
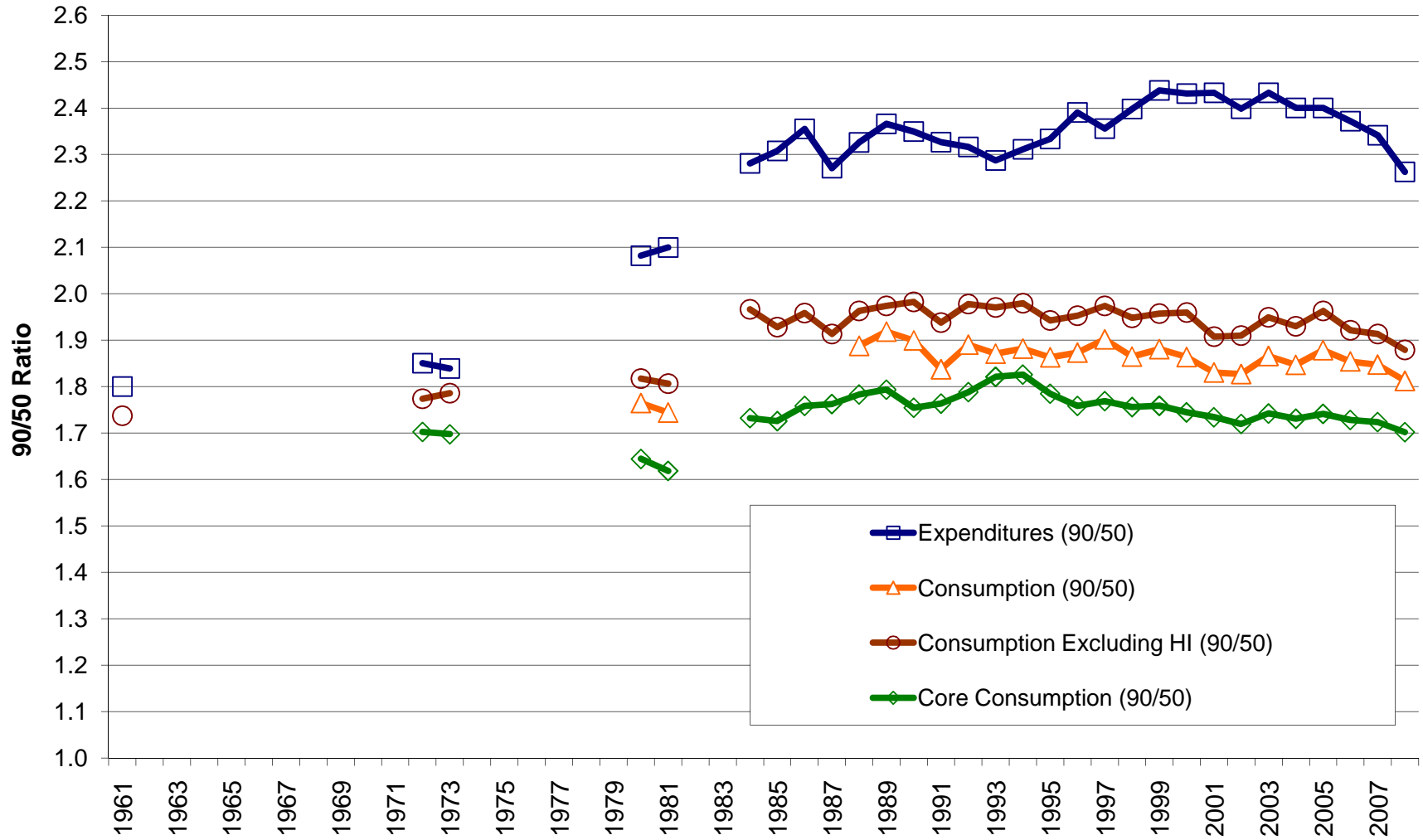

Notes: See notes to Figure 4.

Figure 9: Consumption Inequality 1961-2008
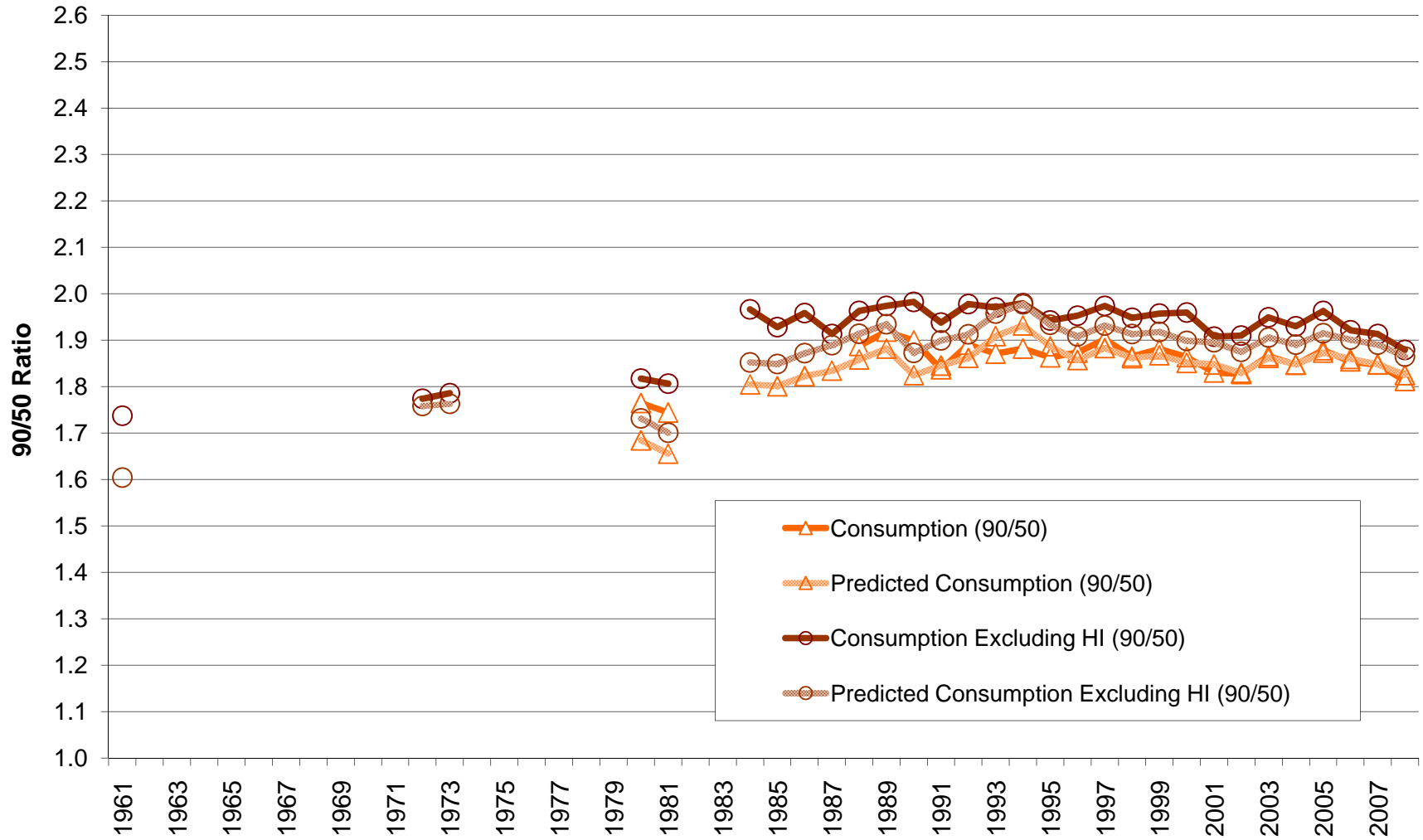
Notes: See notes to Figure 5.

Figure 10: Decomposition of 90/10 Ratio, Consumption Excluding HI 1961-2008
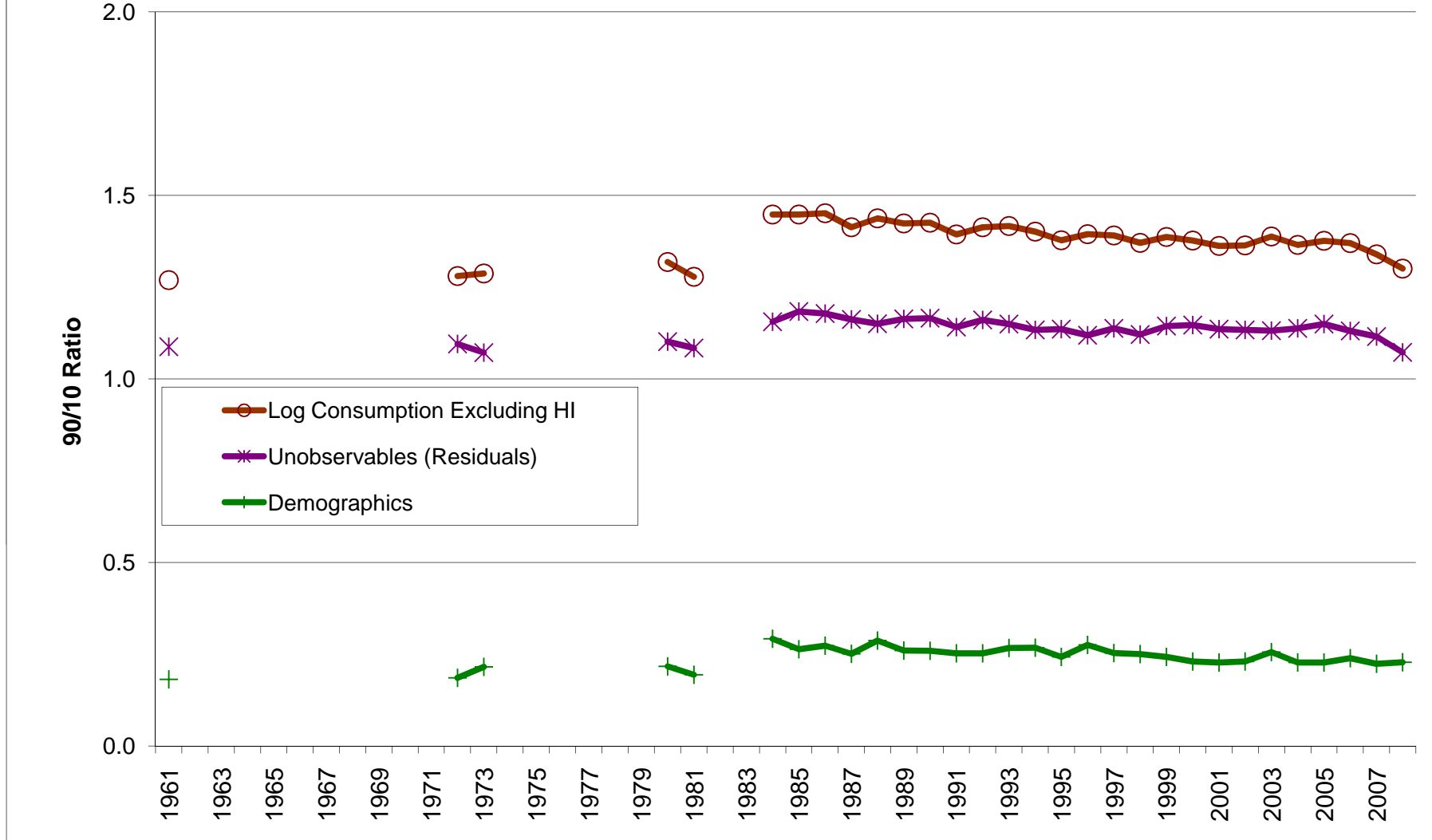
Notes: Unobservables reports the 90-10 difference of the residuals from a regression for each year of log consumption excluding health insurance on indicators for unique family type-education-race groups.

Figure 11: Decomposition of 90/10 Ratio, After-tax Income 1963-2008
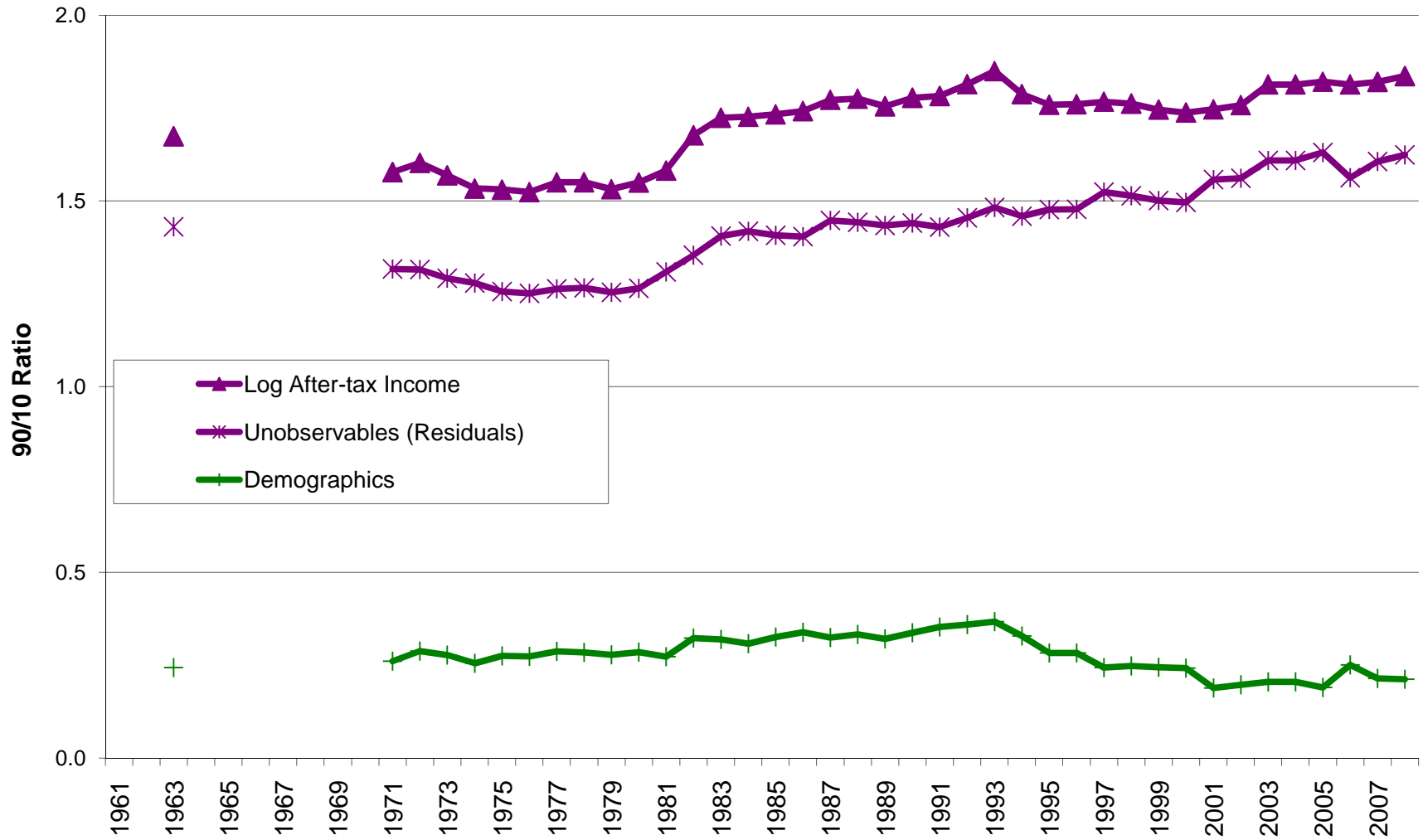
Notes: Unobservables reports the 90-10 difference of the residuals from a regression for each year of log after-tax income on indicators for unique family type-education-race groups.

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.