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Comparing Micro and Macro Sources for Household Accounts in the United States: Evidence from the Survey of Consumer Finances

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Abstract

Household income, spending, and net worth are key inputs in macroeconomic forecasting and economic research. Macro-level data sources are often used to measure household accounts, but lack important information about heterogeneity across different types of households that can be found in micro-level data sources. This paper compares aggregates computed based on one micro-level data source—the Survey of Consumer Finances (SCF)—with macro-level sources of information on household accounts. We find that on most measures, aggregates computed from the SCF line up well with macro-level data sources once we construct comparable series. Our results imply that researchers and policy makers can be confident in making macroeconomic inferences from household-level surveys like the SCF.

1. Introduction

Household income, spending, and net worth are key inputs in macroeconomic forecasting and economic research. To measure household accounts, economists typically rely on two distinct sources of information: micro-level data that contain detailed information on individual households -- and macro-level data -- which contains information on the household sector as a whole. This paper compares income, wealth, and spending aggregates computed based on one micro-level source—the Survey of Consumer Finances (SCF)—with macro-level sources of information on household accounts.

Both micro- and macro-level data have distinctive characteristics and strengths. Micro-level data describe the unique experiences of many households, which differ in income, demographics, credit market experiences, and expectations. Micro-level data permits users to examine how different types of households respond to the economic environment in which they live. The collection of this type of data, however, is costly and time-consuming and the data are often produced with a lag and at relatively low frequency. For example, the Survey of Consumer Finances (SCF)—the focus of this paper—is collected triennially with a typical production lag of one to two years. Macro-level data, on the other hand, describe the household sector as whole. Because households are modelled as a monolithic entity, it is impossible to study heterogeneity in household responses to changes in their respective economic environment. But modeling the household sector as a whole allows the data to be produced in a timely and frequent manner, permitting up-to-date and regular analysis of the movement of aggregate household behavior.

Our comparison of the SCF with macro-level aggregates finds that aggregates from the SCF generally line up well in both levels and trends with macro-level data sources. In cases in which SCF aggregates differ from macro-level data, it is typically due to differences in the concepts, measurement, or definitions of the household sector. Once we put the two data sources on a common conceptual basis, adjusted SCF and macro-level aggregates line up extremely closely in levels and trends. Additional comparisons with administrative data sources lead to similar results.

Although in most cases we are able to reconcile the concepts in the SCF and macro-level aggregates, a few points of departure remain. One example is owner-occupied housing, which has grown more in the SCF than the macro-level aggregates since 2004. This divergence is the result of differences in measurement—the SCF uses owner reported home values, while the macro-level aggregates use a transaction-based home price index. Another example is interest income. Unlike the SCF, macro-level aggregates include interest earned on assets held in individual retirement accounts and by non-profit entities, resulting in a higher interest income measure.

Our results have important implications for researchers and policy-makers using both micro- and macro-level data sources. First, because we find broad similarities between aggregates computed in the SCF and macro-level data, we can be confident in our ability to make reliable inferences about the economy at large given results from micro-level studies using SCF micro data.[2] Many researchers also use the SCF to calibrate life-cycle and other models, and our results suggest that moments found in the data indeed corroborate aggregate moments. Second, our analysis also provides researchers a simple and useable framework for constructing conceptually comparable aggregates using SCF data. We outline which concepts match (and which do not) and provide methods for constructing comparable aggregates. The accompanying appendix also provides conceptually comparable data on many commonly used income, wealth and spending aggregates. Third, knowing how to construct comparisons between the SCF and macro aggregates can permit researchers to exploit the strength of both surveys in tandem. For example, Krimmel, Moore, Sabelhaus and Smith (2013) use the SCF, in combination with aggregates to "age" households forward in time, which permits investigation into heterogeneity in household responses to economic shocks in a timely and up-to-date manner between survey waves.[3]

[2] There are numerous recent papers using SCF data to study trends in components of income and wealth. Topics include, for example, student loans and financial distress (Bricker and Thompson, 2014), young adult's balance sheets (Dettling and Hsu, 2014b), retirement wealth (Devlin-Foltz, Henriques, and Sabelhaus, 2015), income and wealth shares (Bricker et al., 2015), and economic shocks and household spending (Devlin-Foltz and Sabelhaus 2015).

[3] Ampudia, Pavlickova, Slacalek and Vogel (2014) conduct a similar exercise for the euro area.

An important caveat to our analysis is that we have limited our study to just one micro-level data source: the SCF. While the SCF is representative of most aggregates, other micro-level data sources may not be. Indeed, the design of the SCF lends itself to aggregation: the SCF specifically oversamples higher-wealth individuals who tend to have low response rates to surveys and make up a relatively large share of aggregate consumption and net worth. Thus, surveys that miss the very wealthy may not line up as well to aggregates. Indeed, Sabelhaus et al. (2012) show that other large-scale household surveys do not match consumption aggregates, in large part because the very wealthy are not surveyed.

2. Data and Methodology

Our primary source of data for this paper is the Survey of Consumer Finances (SCF), a widely used micro-level data source for household accounts that is considered the gold standard for household-level wealth data in the United States. The SCF is produced triennially and includes information on income, assets, liabilities, spending and interactions with credit markets. Bricker et al. (2014) describe the data and summary statistics in detail.

Our analyses will compare the SCF with various commonly used macro-level data sources on net worth, income, and spending. For income and spending, we will use the National Income and Product Accounts (NIPA). The NIPA are produced by the Bureau of Economic Analysis (BEA) and provide information concerning economic output and uses of income generated by that output, including information on household income and spending.[4] For net worth, as well as several asset and liability subcategories, we use the Financial Accounts of the United States (FA). The FA provide information balance sheet items by sector, including information on assets and liabilities held by the household sector.[5]

[4] See BEA's National Accounts Methodology Papers at http://www.bea.gov/methodologies/index.htm#national_meth for more information.
[5] See http://www.federalreserve.gov/apps/fof/ for more information.

We supplement our analyses and compare the SCF with several administrative data sources, including income data from the Internal Revenue Service (IRS) Statistics of Income (SOI), which contains income information collected directly from tax returns, and liability data from the FRBNY Consumer Credit Panel/Equifax (FRBNY CCP/Equifax), which contains liability information obtained from credit reports. We also use the Current Population Survey (CPS) as a source of comparison for household survey-based information on income.

Many of the macro-level data sources we use are available quarterl, while the SCF is triennial. It is not completely obvious which observations from each series ought to be compared to the SCF, because the SCF is in the field for approximately 10 months. For example, a respondent in the 2013 data may have been interviewed as early as April 2013 or as late as February 2014. Thus, for a quarterly comparison, it is not clear which quarter of macro-level data we should compare with the SCF aggregates. Our proposed method for dealing with this uncertainty is to choose the time period that is closest to the average SCF respondent interview date, which is the third quarter of the survey year. For illustrative purposes, we then place bounds on this date representing the entire SCF field period, or the second quarter of the survey year through the first quarter of the following year. For SCF questions that are retrospective and refer to the previous calendar year, such as income, we do not have this problem and simply use annual data for the year prior to the survey.

While this convention for identifying the appropriate comparison date accounts for the length of the field period, it does not account for the possibility that respondents may use a longer "look back" period. For example, respondents often use documents such as account statements to assist with the interview. If those account statements are several months old, then respondents may be using out-of-date information (relative to the macro-level data sources). Moreover, some balance sheet items—such as the value of a residence—may be difficult for respondents to ascertain in an up-to-date manner. Thus, we additionally expand our bounds to encompass the first quarter of the survey year. We acknowledge, however, that this period may still be too short if respondents look further back in time when trying to ascertain the value of

balance sheet items. This may be particularly pronounced for net worth components which are very volatile over time.

3. Income

Our primary data source for macro-level income data is the NIPA, a commonly used annual income data source. Figure 1 displays trends in unadjusted total income over time in the SCF and NIPA data. Both data sources display a similar general upward trend in aggregate incomes over time, with a decline in the 2007-10 period. Throughout the period, the NIPA income estimate is above the SCF estimate.

Figure 1 does not account for the fact that the SCF and NIPA data do not measure equivalent income concepts, and, thus, are not an "apples to apples" comparison with one another. While the SCF collects income data for households, the NIPA are designed to measure current production in the economy and uphold certain national accounting identities. Thus, in order to conduct more appropriate comparisons, we construct a conceptually comparable measure across both data sources. This exercise mainly involves removing inconsistent income sources from both the NIPA and the SCF, as well as adjusting for any reconcilable differences in measurement and the definition of the household sector. Examples of income sources included in the NIPA and not the SCF include imputed rent on owner-occupied housing and supplements to wages and salaries, neither of which is included in the household income concept measured in the SCF. Examples of income sources included in the SCF and not the NIPA include alimony, child support, and other transfers between individuals. More details of the reconciliation exercise can be found in appendix A.

Figure 2 displays trends in our conceptually similar measure of total income over time in the SCF and NIPA data. In this case, the SCF and NIPA aggregates line up quite closely in trends and levels. Compared to figure 1, both the SCF and NIPA measures of aggregate total income fall when various income components are removed, however, the NIPA series falls more than the SCF, and the two series

diverge by less than $3 trillion throughout the time period. Table 1 indicates that in 2012, total income in the SCF amounted to $9.9 trillion in the SCF and $11.5 trillion in the NIPA.

Figure 3 breaks down the conceptually comparable measure of income into its wage and nonwage components. Wage income includes wages, salaries, tips, and other compensation. Nonwage income can be separated into capital income and transfer and retirement income. Capital income includes business income, interest, and dividend income, while transfer and retirement income includes social security income, unemployment insurance income, pension account withdrawals, and IRA distributions.

Figure 3 indicates that both wage and nonwage income line up well in both levels and trends in the SCF and NIPA, although the discrepancy is larger for nonwage income than wage income. Table 1 indicates that in 2012, wage and nonwage income amounted to $6.5 trillion and $3.3 trillion, respectively, in the SCF and $6.9 trillion and $4.6 trillion, respectively, in the NIPA.

Figure 4 further homes in on wage and salary income in the SCF and NIPA. In both series, wage and salary income is the largest component of aggregate total income, comprising 67 and 62 percent of total income in the SCF and NIPA in 2012, respectively. For comparison, figure 4 also plots wage income calculated from an administrative data source, the IRS SOI data, which is based on tax returns, and an alternative household survey, the CPS.[6] Several observations emerge. First, aggregate wage income in all four sources is similar in both levels and trends. Second, the SCF measure comes closest to the aggregate NIPA measure, and both the SOI administrative data and the CPS household survey data fall below the SCF and NIPA measures. These gaps highlight the strength of the SCF sampling frame: by oversampling the wealthy, the SCF captures the top of the income distribution, which is an area in which the CPS income data falls short. The SCF also captures more income than the SOI measure because the SCF collects income for non-filers.[7]

[6] Wage and salary concepts in the SCF, SOI and CPS are similar so we make no adjustments to those series. Appendix A describes the components of wage and salary income in more detail. Note that the IRS SOI data is only available electronically since 1993.

[7] The NIPA data includes an adjustment for income from non-filers, as noted in Chapter 10 of U.S. Bureau of Economic Analysis (2014).

Figure 5 displays trends in the nonwage income in the SCF and NIPA, as well as trends in nonwage income calculated in the IRS SOI data for comparison. The SCF and SOI data line up extremely closely in both levels and trends, differing by less than $300 billion throughout. While the trends are similar in all three series, the NIPA measure is consistently above the SOI and SCF measures, typically between 20 and 30 percent. As discussed earlier, nonwage income consists of capital income (including interest and dividend income and business income), retirement income, transfer income, and other income. Table 1 describes these subcomponents of nonwage income in detail for 2012.[8] The largest gap between the SCF and NIPA nonwage income measures are in interest/dividend income, which is $392 billion in the SCF and $1.1 trillion for the NIPA.[9] This gap can be explained by interest income on assets held in individual retirement accounts and interest earned on assets held by nonprofit institutions, which the SCF (and SOI) cannot capture. The other subcomponents of nonwage income typically differ by less than $400 billion.

4. Net Worth

Our primary source of macro-level data on net worth and its components is the Financial Accounts of the United States (FA),[10] which produces quarterly estimates of aggregate net worth, assets, and liabilities held by the household sector. We compute net worth in the SCF as in Bricker et al. (2014), as the sum of all assets less the sum of all liabilities. Figure 6 displays trends in unadjusted aggregate net worth in the SCF and the FA over time, indicating that aggregate household net worth in the two series were similar in levels and have followed roughly similar trends over time: growing in the 1989-2007 period, followed by a dip in 2010 and growth from 2010 to 2013. The two series converge in the 2001-10 period, and diverge

[8] We focus on the following categories of nonwage income in this decomposition: interest/dividend income, business income, retirement, transfer, and other income. It is also possible to obtain estimates of capital gains income from the Congressional Budget Office, which produces estimates of capital gains for its Economic and Budget Forecast publication. These estimates can be found at https://www.cbo.gov/publication/45010. A comparison with the SCF capital gains measure is included in appendix A.

[9] Similar differences occur throughout the period studied. Appendix Table A6 describes total capital income and Table A7 describes interest and dividend income in both series over time.

[10] This data set was formerly known as the Flow of Funds Accounts.

by less than $1 trillion in other time periods. In 2013Q3, FA aggregate net worth was $76.2 trillion and SCF aggregate net worth was $65.5 trillion.

The comparison shown in figure 6 does not account for the fact that the FA definition of net worth diverges conceptually from the SCF definition of net worth in several important ways, which are described in more detail in appendix B. Most notably, the FA definition of household net worth includes the nonprofit sector, the value of defined benefit pension plans, and a broader scope of consumer durables, none of which are comparably measured in the SCF. Thus, our next exercise is to create an equivalent version of household net worth, in which we remove irreconcilable asset and liability categories from both FA and the SCF to put the two data sources on level footing.

Figure 7 displays the conceptually equivalent definitions of aggregate net worth, computed in SCF survey years 1989-2013. As in figure 6, the two series are roughly similar levels and trends over time, particularly prior to 1998 when the two series followed one another closely. Interestingly, once we adjust concepts, the SCF series is above the FA series in the 2001-13 period. In 2013:Q3, aggregate net worth was about $61.3 trillion in the SCF and about $55.8 trillion in the FA, indicating that in 2013, SCF net worth was about 10 percent higher than FA net worth.

We can also decompose aggregate net worth into total assets and liabilities. Table 2 indicates that in 2013, total asset holdings in the SCF and FA amounted to $72.4 trillion and $68.2 trillion, respectively, while total liabilities amounted to $11.1 trillion and $12.5 trillion, respectively. Figure 8 plots total assets and liabilities in the two series over time, indicating that SCF and FA assets and liabilities follow similar trends. Prior to the 2001 survey, asset holdings in the SCF were slightly below asset holdings in the FA, and this pattern reversed from 2001 to 2010, when aggregate SCF assets were between 10 and 20 percent higher than FA assets; in 2013, SCF assets were about 6 percent higher than FA assets . Liabilities are typically slightly lower in the SCF than in the FA throughout the entire time period.

4.1 Assets

Our next exercise is to further examine total assets and their subcomponents in the SCF and FA. The top panel of table 2 lists the total values of each subcomponent in 2013 in each data set, as well as each component's share of total assets.[11] Owner-occupied housing and directly held financial assets (which includes transaction accounts, corporate equities, mutual funds and bonds held outside of retirement accounts) make up approximately 65 and 72 percent of all asset holdings in the SCF and FA, respectively. The remaining assets are composed of business assets and retirement assets (including 401(k)'s and IRAs, but not defined benefit pensions).

Figure 9 displays trends in each of the asset types listed in table 2 over time in the SCF and FA. Several patterns emerge. First, both retirement assets and directly held financial assets follow one another closely in both levels and trends in both data sets. Second, in the 1989- 2001 period, owner-occupied housing was similar in levels and trends in both data sets, but from 2004 onwards, SCF housing assets grew relative to FA housing assets. Third, SCF business assets tend to be slightly larger than FA business assets throughout, and SCF business assets grew relative to FA business assets in the 2004-13 period.

Figure 9 indicates that SCF owner-occupied housing was larger than FA owner-occupied housing in the 2004-13 period. In 2013, total FA owner-occupied housing was roughly 80 percent of total SCF owner-occupied housing. Henriques and Hsu (2014) provide a detailed discussion of this divergence and find that much of it can be explained by methodological differences in the production of the data and how each series values owner-occupied housing. Henriques and Hsu (2014) also point out that because real estate holdings compose a large fraction of assets held by non-corporate businesses, these methodological changes in the valuation of real estate also contribute to the relative growth of the total business assets in the SCF since 2004.

[11] Disaggregating into further subcategories is somewhat problematic, especially when attempting to match specific types of assets in the SCF to their counterparts in the FA. Henriques and Hsu (2014) provide a detailed discussion of how this uncertainty and potential for cross-classification yield significant variation in the SCF-to-FA ratios across more detailed asset subcategories.

To value housing, both the SCF and FA used owner-reported housing values prior to 2005.[12] After 2005, the FA began using a perpetual inventory equation to estimate the value of owner-occupied housing, which incorporates net investment and a national transaction-based house price index to measure changes in prices.[13] This change meant that after the 2004 survey, the FA is based on changes in prices among houses that have transacted, while the SCF series continues to be based on home owners' perceptions of their homes' value.[14] Henriques (2013) provides a detailed discussion of the differences between the two methodologies for valuing housing. Owner misreports can account for, at most, 30 percent of the gap between owner-reported home values and transaction-based indices values; thus, much of the divergence can be accounted for by sample selection: owner reports capture homes that are occupied and not transacted, while the home price indices capture homes that do transact.

Figure 8 indicates that prior to the 2001 survey, the SCF and FA aggregate total assets were extremely close, but from 2001 onwards, SCF assets grew relative to FA assets. Figure 9 indicates that the relative growth in owner-occupied housing can explain most of that gap since 2004, but housing does not explain the emergence of the gap between the two series that occurred between 1998 and 2001. There are two explanations for this change in 2001. First, Henriques and Hsu (2014) point out that a change in the questionnaire in 2001 led to an increase in the amount of retirement assets collected in the SCF. Second, the SCF recorded relatively more directly held financial assets than the FA in 2001, which is the result of a combination of asset price volatility and interview dating. The period surrounding the 2001 field period was an especially volatile time due to the dot-com bubble and ensuing bust, and directly held assets fell substantially in value in the periods leading up to and during the SCF field period. If

[12] The FA used owner-reported values based on the American Housing Survey (AHS), a bi-annual household survey. Henriques and Hsu (2014) show that the AHS and SCF report similar values for owner-occupied housing. To estimate housing values between survey years, the FA used a national house price index from CoreLogic to estimate price changes and net investment from BEA.

[13] The perpetual inventory equation uses the CoreLogic HPI to measure price changes and net investment from BEA. Henriques and Hsu (2014) provide a more detailed discussion of the FA and SCF methodologies for valuing owner-occupied housing.

[14] FA also adjusted their owner-reported aggregate values down by 5.5 percent in 2001, 2003, and 2005 to account for upward bias in reported home values in survey responses. This contributes to the relative growth of SCF owner-occupied housing in 2004.

respondents used slightly out of date financial statements, we would expect values of these assets to be higher than in the FA, which uses up-to-date asset price information. Moreover, an inspection of interview dates indicates that respondents who held these assets tended to be interviewed relatively early in the field period that year: by the end of the first quarter of 2001, 65 percent of all directly held financial assets had been collected.

4.2 Liabilities

Figure 8 indicates that SCF and FA liabilities follow similar trends, although total liabilities in the SCF tend to be slightly lower than total liabilities in the FA. Henriques and Hsu (2014) point out that methodological differences in data collection explain much of this gap: because the FA data are based on data collected from lenders while the SCF data are collected from borrowers, the SCF collects information on consumer *debt*, while the FA collects information on consumer *credit*. In the case of credit card debt, for example, this distinction is an important one: consumers who use credit cards for convenience and pay off bills each month are counted in the consumer credit measure, but not the consumer debt measure.

In order to further examine trends in aggregate total liabilities and its subcomponents we turn to an additional source of administrative data on liabilities: the Federal Reserve Bank of New York Consumer Credit Panel/Equifax dataset (FRBNY CCP/Equifax), a nationally representative sample of individuals with credit reports available from 1999 to the present.[15] Like the FA, these data represent a lender-reported version of debt, not a borrower-reported version; as a result, the FA and FRBNY CCP/Equifax series follow nearly identical trends. The advantage of the FRBNY CCP/Equifax for this exercise is that it is possible to construct more disaggregated comparable subcomponents of total liabilities than in the FA.[16]

[15] See Lee and van der Klauw (2010) for more on the data.
[16] See Henriques and Hsu (2014) for an analysis of the two comparable subcomponents of FA and SCF total liabilities: consumer credit and mortgages. Appendix table B2 lists values in those categories for 2013.

There are several reasons that the lender- and borrower-reported versions of liabilities might differ. As discussed earlier, convenience credit card users who pay off their balance in full each month are not counted in SCF total liabilities but are counted in the CCP/Equifax. The CCP/Equifax also does not include individuals without credit report-worthy debt (such as personal loans). The SCF does not include debt held by individuals who are not financially dependent on the head of households (such as roommates and financially independent adult children or parents). The SCF also requests that respondents exclude business-related debt from household liabilities, while lenders may not be able to distinguish between the two. Indeed, Brown et al. (2015) find that 46.5 percent of small business owners used personal cards for business expenses in 2003.

Figure 10 plots total liabilities calculated in the SCF and CCP/Equifax, indicating that total liabilities were similar in the two series in 2001, 2004, and 2013, and SCF total liabilities were slightly below the CCP/Equifax in 2007 and 2010. Overall, however, similar to what was found in the comparison with FA in figure 8, liabilities in the SCF and CCP/Equifax are similar in levels and trends over time. Brown et al. (2015) conduct a similar comparison and also find that aggregate debt levels implied by the two data sets for the 2001-10 period are similar.

Next, we break down total liabilities into specific subcomponents. Values of each component in 2013 are displayed in the bottom panel of table 2. The bulk of total liabilities is housing-related debt, which includes primary mortgages, home equity loans, and home equity lines of credit. Student loans, auto loans, credit cards and other debt each constitute less than 10 percent of total liabilities.

Figure 11 plots trends in total liabilities by type in the CCP/Equifax and the SCF.[17] Because housing liabilities are much larger than any of the other categories, housing liabilities are displayed on the right axis and the other types of liabilities are displayed on the left axis. Several observations emerge. First, housing liabilities are similar in both series in levels and trends, and SCF housing debt is about 10 percent higher than the CCP/Equifax value. Second, levels of all other liabilities—including auto, student

[17] Student loan debt is not available in the CCP/Equifax until 2004.

loan, credit card and other debt—tend to be lower in the SCF than in the CCP/Equifax, although they follow similar trends.

Figure 11 indicates that auto loan balances in the SCF are consistently below CCP/Equifax values. In 2013, SCF auto debt was about 35 percent of CCP/Equifax auto debt. Part of this gap can be explained by the fact that the CCP/Equifax includes leased vehicles in auto debt, while leased vehicles are not included in SCF auto debt. Brown et al. (2015) adjust the SCF data to include leased vehicles and find the two sources come closer, but the SCF is still below the CCP/Equifax. This is potentially due to business vehicles, which the SCF instructs respondents to list as business assets/debts, but may appear on a personal credit reports.

Figure 11 also indicates that credit card debt calculated in the SCF consistently falls below credit card debt in the CCP/Equifax. In 2013, SCF credit card debt was 40 percent of the value of CCP/Equifax credit card debt. As described earlier, several important methodological reasons contribute to this divergence. Most importantly, the CCP/Equifax captures debt at an arbitrary point in the billing cycle, while the SCF records only the debt that is left after a payment is made. Thus, the CCP/Equifax will include balances that are paid off in full each month by "convenience" users of credit cards while the SCF will not. Henriques and Hsu (2014) find that once this type of convenience usage is included in SCF credit card balance measure, the fraction of SCF respondents with credit card balances, as well as the distribution of balances, are quite similar between the SCF and CCP/Equifax.[18] The authors additionally provide an adjustment for business usage of credit cards to narrow, but not completely erase the gap. Potential explanations for the remaining gap include dormant credit card accounts and credit cards held by financially independent household members.

Finally, figure 11 indicates that throughout the period for which we have information on education debt (2004 onwards), total education debt is larger in the CCP/Equifax than in the SCF. In

[18] In appendix figure B2, we add in all new charges captured in the SCF—including all new charges by individuals who pay in full, as well as individuals who revolve debt—which closes the gap between the SCF and CCP/Equifax by about $100 billion.

2013, SCF education debt was approximately 70 percent of CCP/Equifax education debt. One explanation for the gap in student loan debt evidenced in figure 11 is debts held by financially independent household members such as roommates and adult children. The SCF collects very limited information on assets and debts held by these types of individuals. Since young people are relatively more likely to live in these arrangements, and also to be recent graduates holding relatively large student loan balances, this issue may be especially problematic for student loan aggregates computed in the SCF. To further investigate the possible magnitude of this undercount, we use mean student loan balances from Bricker et al. (2014), in combination with population counts in various living arrangements from the CPS, to construct a back of the envelope estimate of the amount of education debt held by financially independent roommates and children that would be missing from the SCF aggregate.[19] When we add this debt to the SCF totals, SCF and FA aggregate student loan debt lines up closely, with 2013 values of $1.1 trillion and $1.0 trillion, respectively.[20] An additional explanation for the gap between the two series is debt held by individuals in institutional settings such as dormitories, who are not included in the SCF sampling frame.[21]

5. Spending

Although the SCF asks for relatively little information on consumption, there are two categories of spending for which we are able to construct aggregates: car spending and food spending. Car spending is inferred from information on the characteristics of vehicles owned by families and food spending is

[19] We are making the strong assumption that student loan balances are the same for individuals who live independently and those who do not. Dettling and Hsu (2014a) provide evidence that individuals with more student loan debt are more likely to enter parental co-residence, suggesting this could be an undercount.

[20] We calculate the total population age 18-40 residing as a household head, spouse, or cohabitating partner, and those who are not in the 2013 CPS. We consider the first group individuals who would be part of the primary economic unit (PEU) in the SCF and the second group individuals who would be in the non-primary economic unit (NPEU). We apply mean student loan debt among individuals under age 40 from Bricker et al. (2013) to estimate total student loan debt held by individuals in the two types of living arrangements. In 2013, this estimate indicates there is $694 billion in student loan debt held by members of the PEU and $404 billion held by individuals in the NPEU, or a total of $1.1 trillion in student loan debt. In 2013, the CCP/Equifax recorded $1.3 trillion in student loan debt and the SCF recorded $710 billion.

[21] Brown et al. (2015) also finds a gap between SCF and CCP/Equifax student debt. Those authors suggest that the gap between the SCF and FRBNY CCP/Equifax may also be attributable to the respondent's uncertainty about remaining balances.

calculated based on direct questions on spending. We compare these aggregates to those found in the NIPA.

5.1 Car Spending

Our primary source for macro-level motor vehicle spending is the NIPA, which contains information on total number of vehicles sold as well as total expenditures on motor vehicles. The SCF collects data on make, model, and year of vehicles owned by the household, as well as how each vehicle was financed and if each vehicle was new or used at the time of purchase. To construct comparable aggregates, we begin by identifying a common definition of vehicle transactions in the two datasets, which is described in detail in appendix C. Most notably, we limit the NIPA data to only include what are most likely personal use vehicles and remove leased vehicles from the SCF data.[22] For our comparison, we focus on vehicles purchased the year prior to the survey.

To begin our comparison, we calculate the number of vehicles purchased each year in the SCF and NIPA. The results of that exercise can be found in appendix C. Then, we incorporate information on the value of SCF vehicles in order to calculate total expenditures in each year. The SCF does not ask respondents about the price paid for a vehicle, so we cannot assign a sales price as is done in the construction of the NIPA data. Instead, we use information on the make, model and year of the vehicle in order to assign a value based on the National Automobile Dealers Association Data, as described in appendix C. Although we take steps to account for depreciation, because we do not have information on the exact price paid we acknowledge that we do not expect the SCF data to necessarily line up exactly with the NIPA data.

Figure 12 displays trends in vehicle spending from the NIPA and the SCF. The two series indicate similar levels and trends over time, although NIPA tended to be above the SCF in the 1994-2000 period.

[22] The SCF separates personal-use and business-use vehicles in its questionnaire; the NIPA does not include leased vehicles in personal consumption expenditures of motor vehicles because the leases are owned by financial institutions; leased vehicles are only included in unit sales, and not in spending (see Chapter 5: Personal Consumption Expenditures of the NIPA Handbook at http://bea.gov/national/pdf/chapter5.pdf. for details).

Since 2003, the two series have converged. In 2012, the SCF shows total new vehicle spending of $227 million and the NIPA shows a total of $237 million.

5.2 Food Spending

Our primary source for macro-level food spending is the NIPA, which contain separate information on food spending for off-premises consumption and purchased meals and beverages. The SCF began to collect information on household food spending in 2004, and asks respondents to report how much was spent on food used at home, delivered to the home and eaten away from the home. We compare the food used at home category to the NIPA category of food spending for off-premises consumption, which we will collectively refer to as "food at home." We combine the delivery and eaten out categories in the SCF to compare to the NIPA purchased meals and beverages category, which we will collectively refer to as "food away from home." More details on these categories can be found in appendix C.

Figure 13 displays trends in food spending by type in the SCF and NIPA since 2004. Spending on food at home lines up well in the two series in both levels and trends. In 2013, food at home spending in the SCF and NIPA was $713 billion and $747 billion, respectively. Spending on food away from home is similar in trends in the two series, but the FA values are considerably higher. In 2013, food away from home spending in the SCF and NIPA was $273 billion and $594 billion, respectively. This gap may be explained by differences in the types of spending that are included in the two series and respondent underreporting. The NIPA measure includes lunches and dinners eaten out, school lunches, alcohol purchased at restaurants and bars, and meals for delivery. The SCF question simply asks how much is spent eating out and on food delivery, and it seems likely that respondents may underreport some of this spending—for example, by omitting school lunches and alcoholic beverages, which are not explicitly referred to in the SCF question.

6. Conclusion

Measurement of household income, spending, and net worth are key inputs in macroeconomic forecasting and economic research. Macro-level data sources are often used to measure household accounts; however, those data lack important information about heterogeneity across different types of households that can be found in micro-level data sources. This paper compares aggregates computed based on one micro-level data source—the Survey of Consumer Finances (SCF)—with macro-level sources of information on household accounts.

We find that aggregates and household data differ in their concepts, measurement, and definitions of the household sector. However, once we construct conceptually comparable aggregates, we find that the SCF and macro-level aggregates line up well in both levels and trends with few exceptions. For those aggregates that do not line up well, we find those differences to be due to irreconcilable differences in measurement or concepts.

Our results have important implications for researchers and policy-makers using both micro- and macro-level data sources. Because we find broad similarities between aggregates computed in the SCF and macro-level data, we can be confident in our ability to make reliable inferences about the economy at large given results from micro-level empirical studies and models calibrated using moments from SCF micro data. Moreover, knowing that the SCF lines up well with macro aggregates can also permit researchers to exploit the strength of both surveys in tandem—for example, by aging households forward in time. This type of "nowcasting" exercise would permit analysis of heterogeneity across households in real time.

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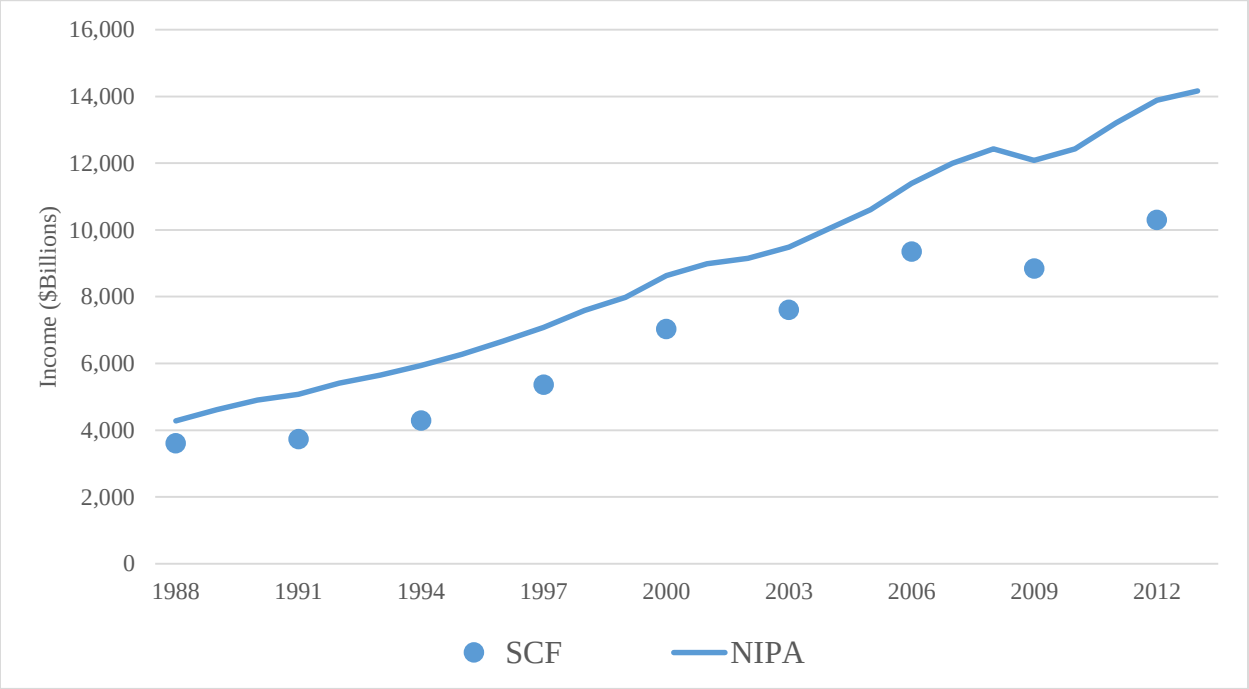
7. Tables and Figures

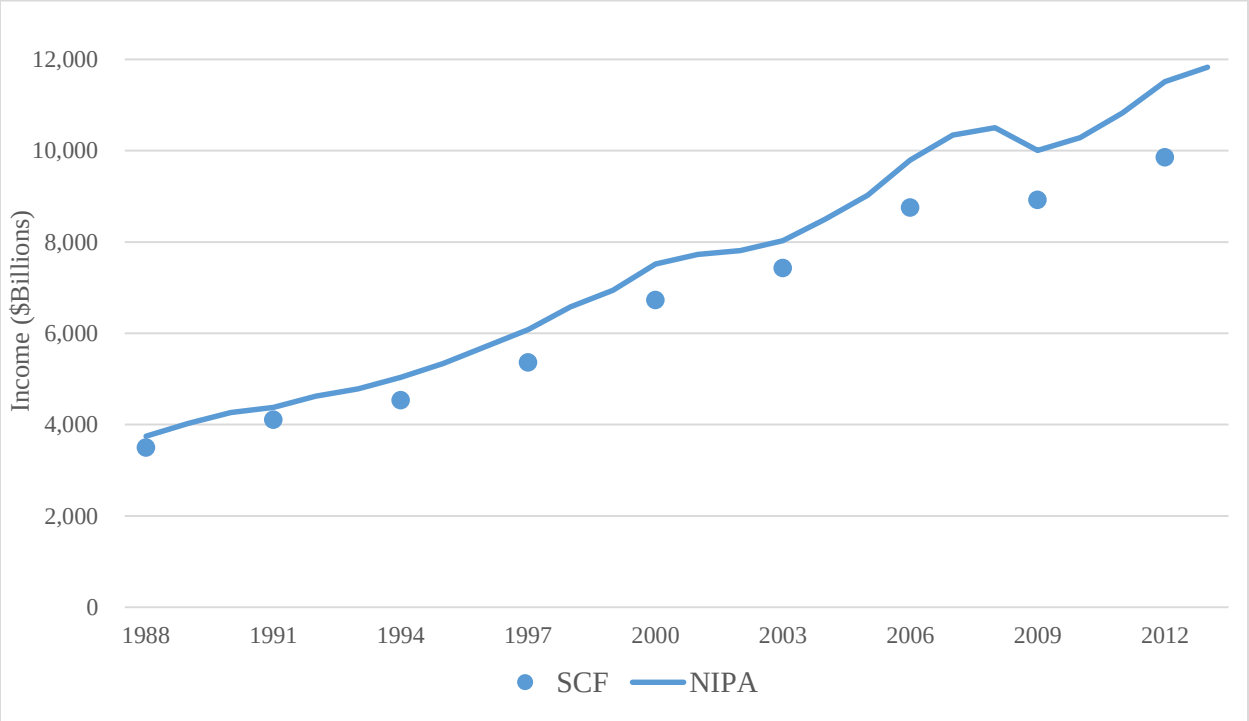
Figure 1: Aggregate Income in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA), Unadjusted



Sources: Federal Reserve Board and Bureau of Economic Analysis.

Notes: Displayed are aggregate total income calculated in the SCF and NIPA. The data are described in more detail in appendix A.

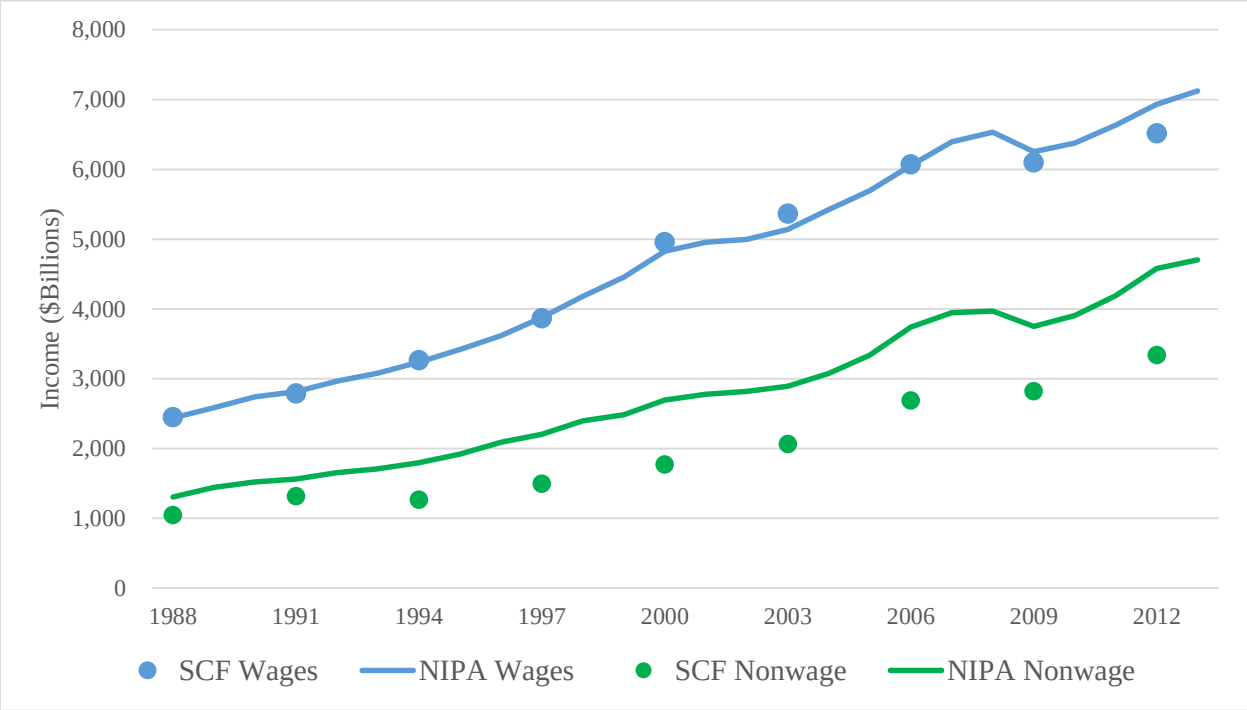
Figure 2: Aggregate Income in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA), Adjusted



Sources: Federal Reserve Board and Bureau of Economic Analysis.

Notes: Displayed are aggregate total income calculated in the SCF and NIPA using the adjusted income concepts described in appendix A.

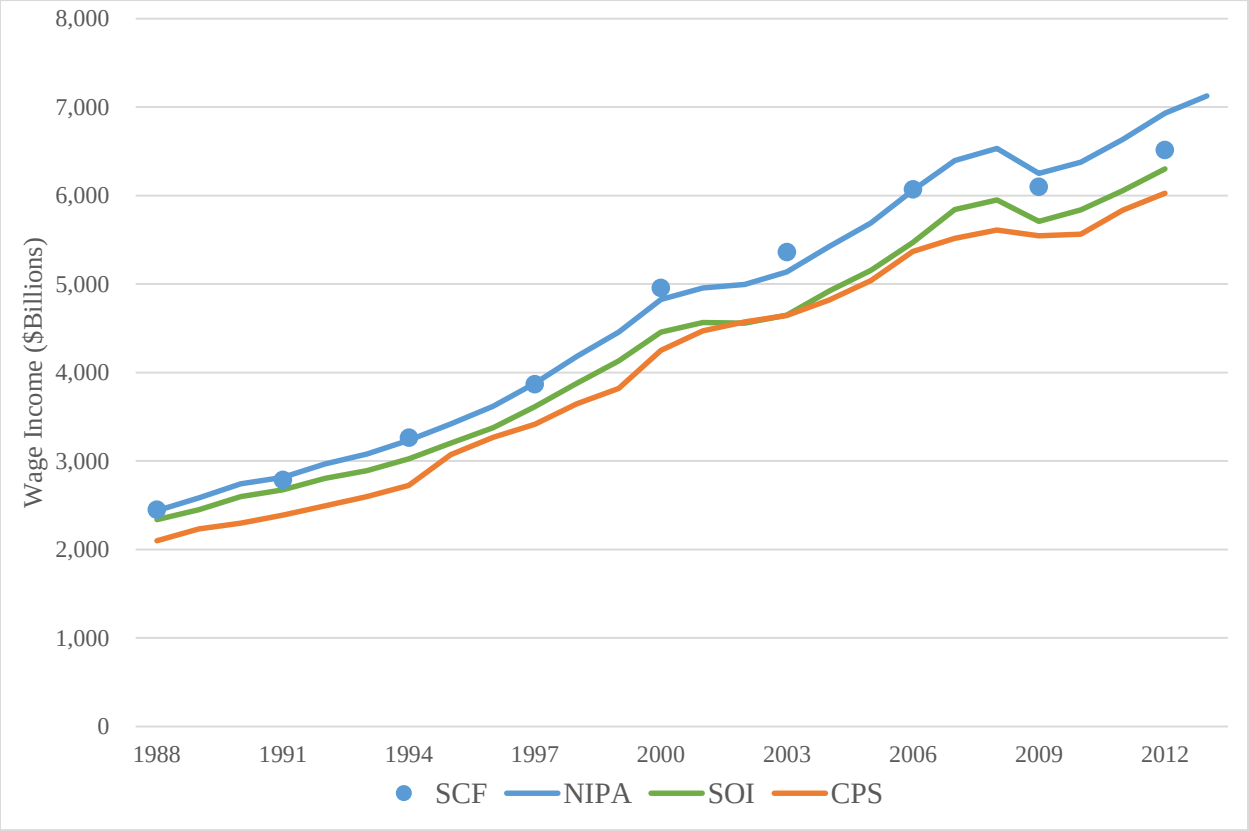
Figure 3: Aggregate Wage and Nonwage Income in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA), Adjusted



Sources: Federal Reserve Board and Bureau of Economic Analysis.

Notes: Displayed are aggregate wage and nonwage income calculated in the SCF and NIPA using the adjusted income concepts described in appendix A.

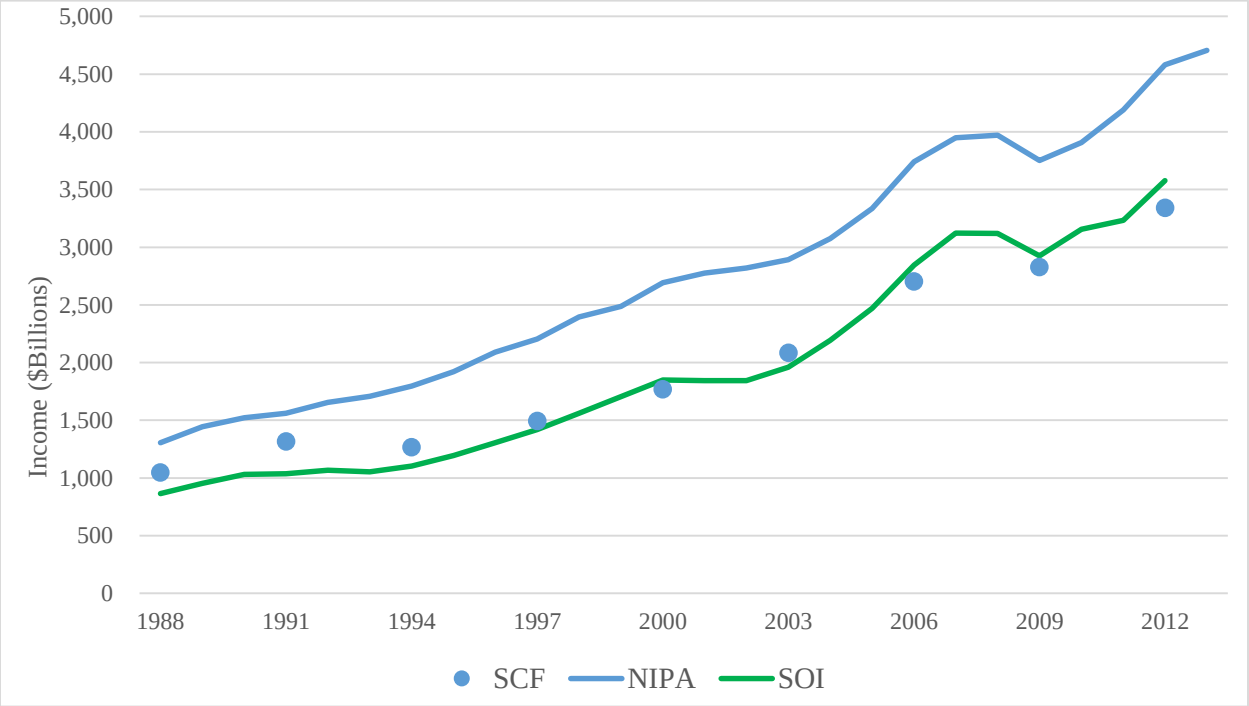
Figure 4. Aggregate Wage and Salary Income in Survey of Consumer Finances (SCF) National Income and Product Accounts (NIPA), Statistics of Income (SOI), and Current Population Survey (CPS), Adjusted



Sources: Federal Reserve Board, Bureau of Economic Analysis, Internal Revenue Service, and Bureau of Labor Statistics.

Notes: Displayed are aggregate wage and salary income calculated in the SCF, NIPA, SOI and CPS using the adjusted income concepts described in appendix A.

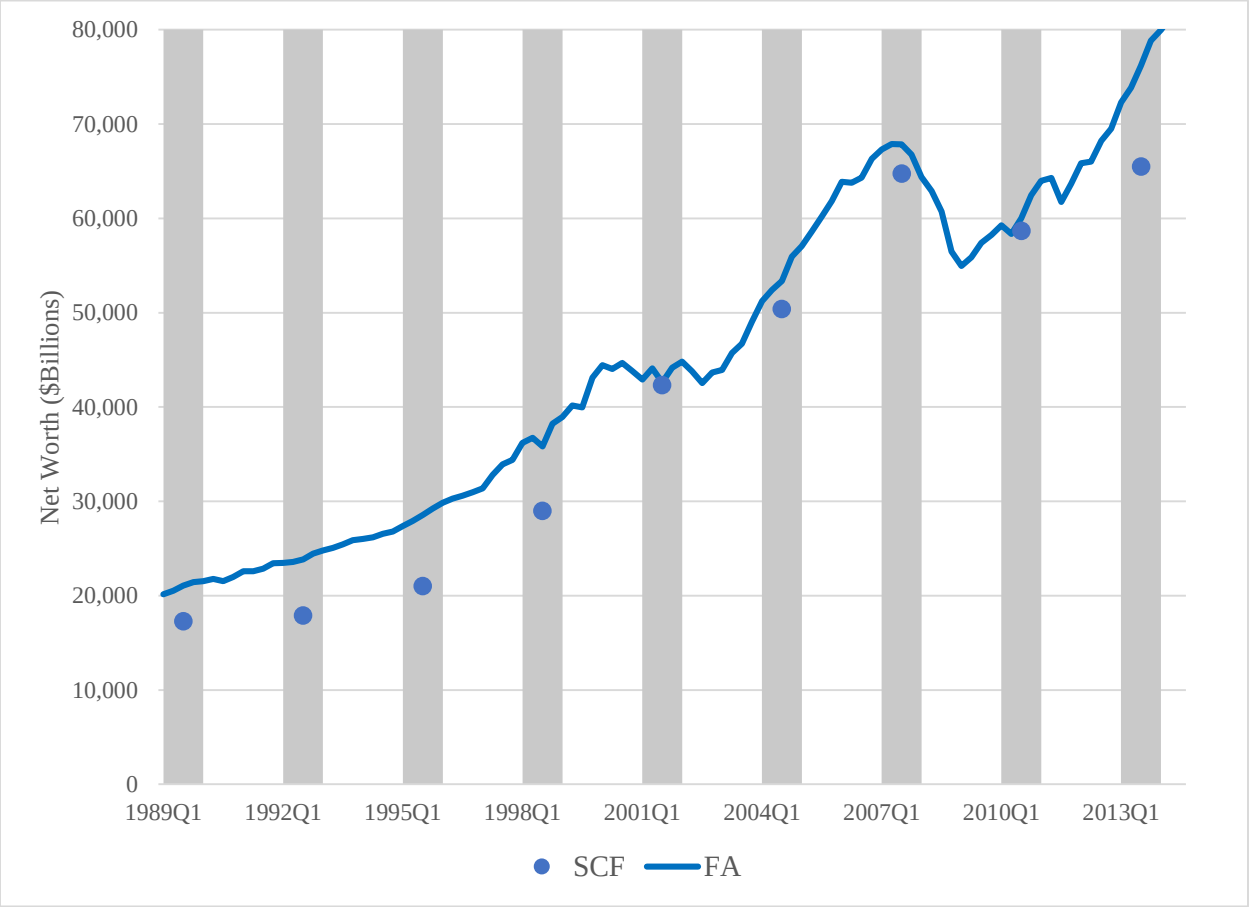
Figure 5: Nonwage Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI), Adjusted



Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service.

Notes: Displayed are aggregate non-wage income calculated in the SCF, NIPA and SOI data using the adjusted income concepts discussed in appendix A.

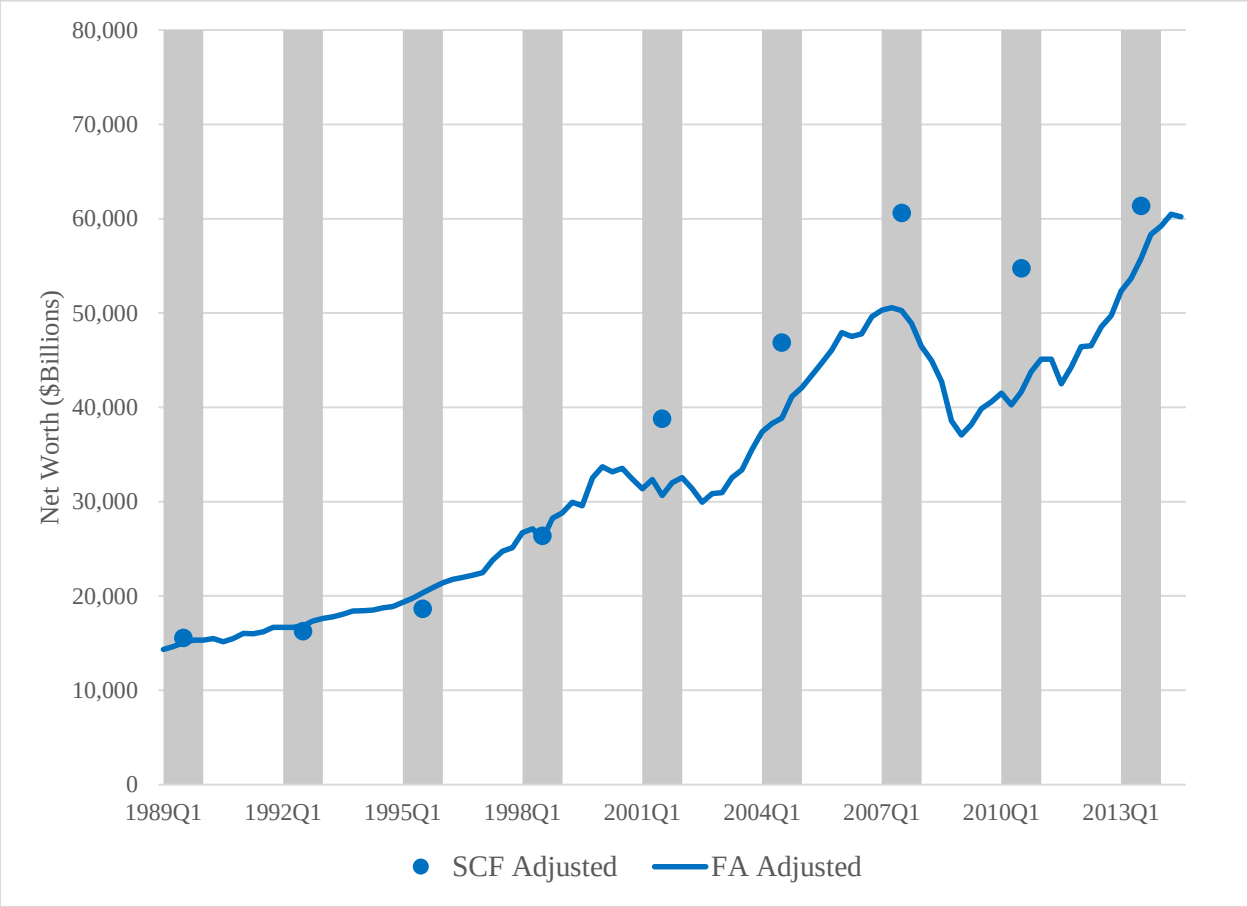
Figure 6: Aggregate Household Net Worth in the Survey of Consumer Finances (SCF) and Financial Accounts (FA), Unadjusted



Source: Federal Reserve Board.

Notes: Displayed are aggregate net worth calculated in the SCF and FA. The data is described in more detail in appendix B. The grey bars signify the length of the SCF field period plus a one quarter lookback period, as described in the text.

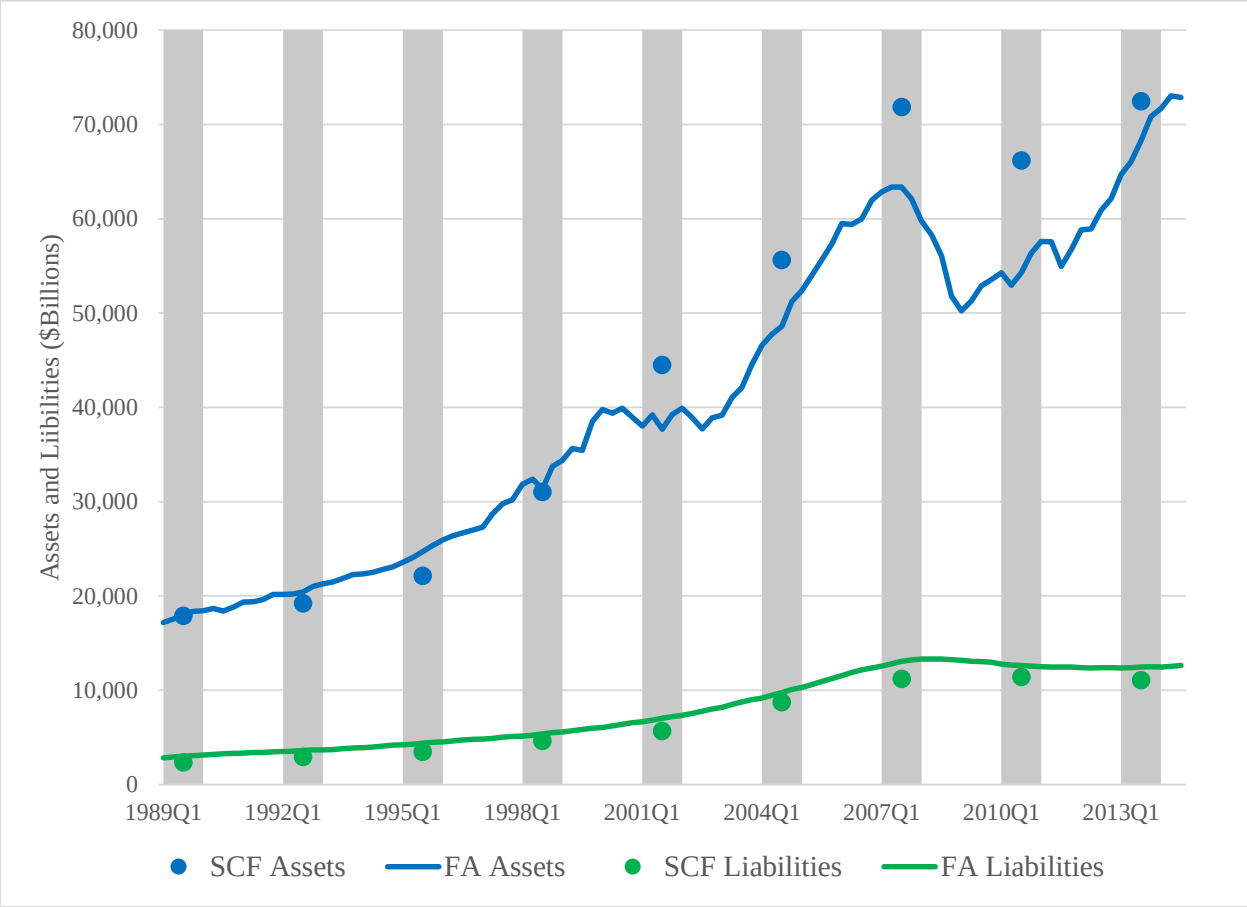
Figure 7: Aggregate Household Net Worth in the Survey of Consumer Finances (SCF) and Financial Accounts (FA), Adjusted



Source: Federal Reserve Board.

Notes: Displayed are aggregate net worth calculated in the SCF and FA using the adjusted net worth concepts described in appendix B. The grey bars signify the length of the SCF field period plus a one quarter lookback period, as described in the text.

Figure 8: Aggregate Assets and Liabilities in the Survey of Consumer Finances (SCF) and Financial Accounts (FA), Adjusted



Source: Federal Reserve Board.

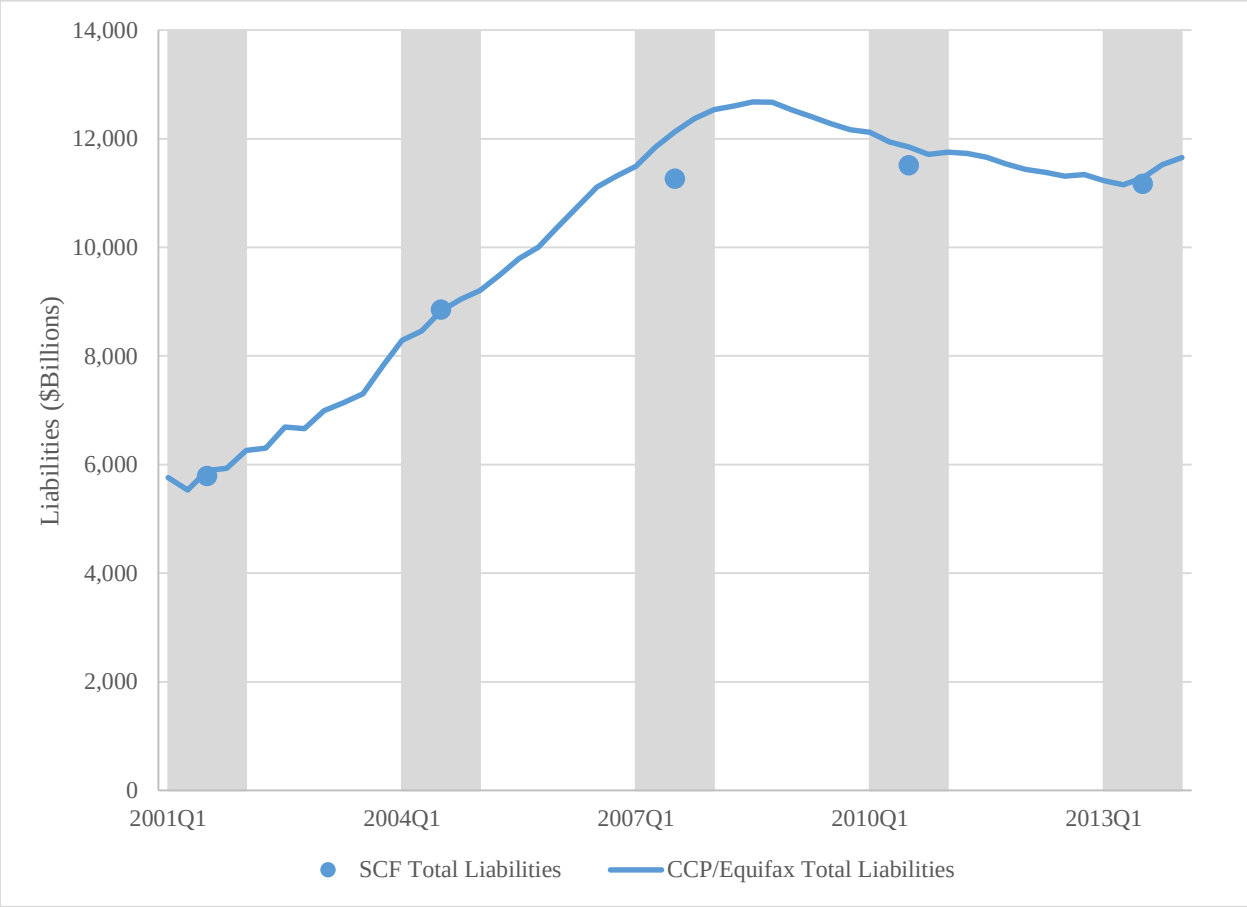
Notes: Displayed are aggregate assets and liabilities calculated in the SCF and FA using the adjusted concepts described in appendix B. The grey bars signify the length of the SCF field period plus a one quarter lookback period, as described in the text.

Figure 9: Aggregate Assets by Type in the Survey of Consumer Finances (SCF) and Financial Accounts (FA), Adjusted

Source: Federal Reserve Board.

Notes: Displayed are aggregate assets by type calculated in the SCF and FA using the adjusted concepts described in appendix B. The grey bars signify the length of the SCF field period plus a one quarter lookback period, as described in the text.

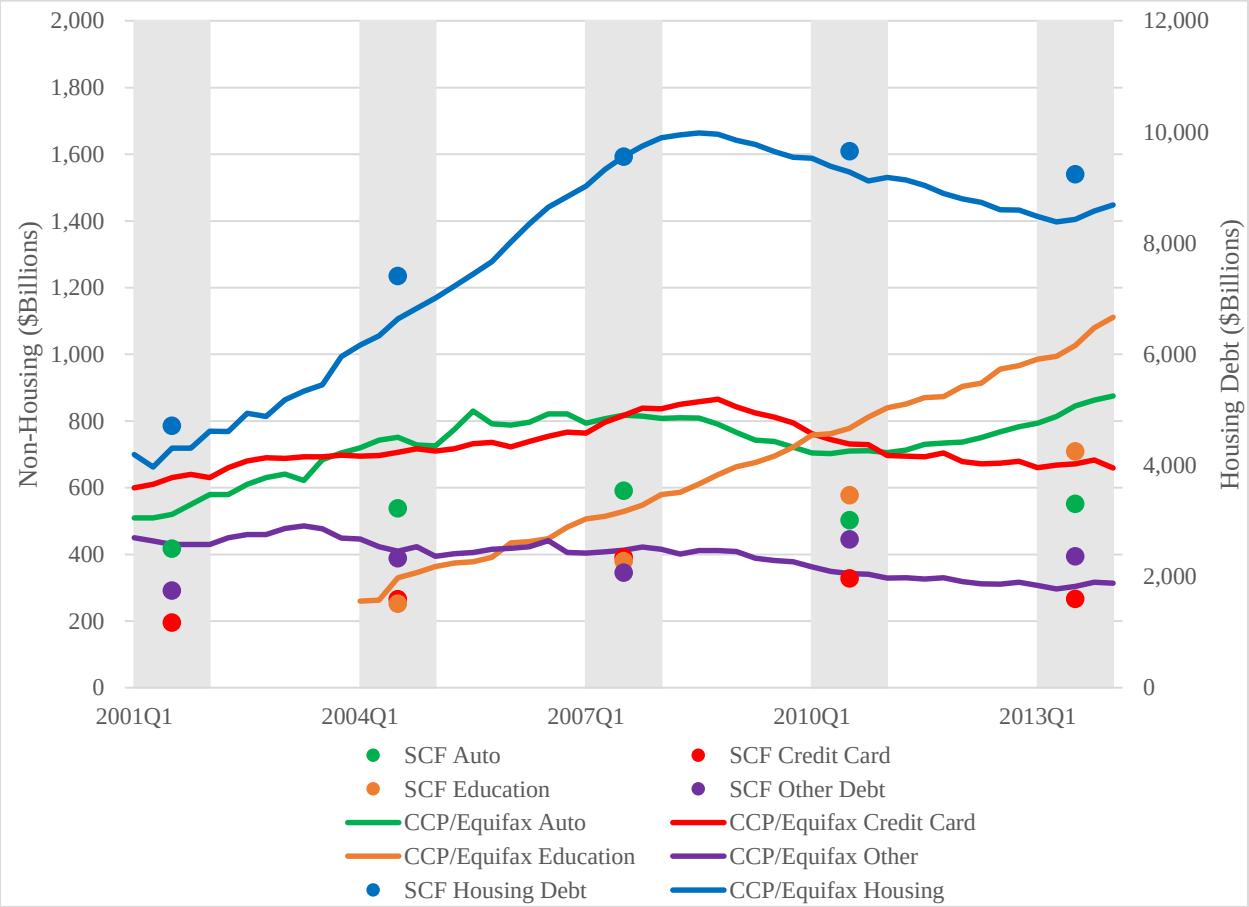
Figure 10: Aggregate Liabilities in the Survey of Consumer Finances (SCF) and Consumer Credit Panel (CCP) / Equifax, Unadjusted



Sources: Federal Reserve Board and Federal Reserve Bank of New York CCP/Equifax.

Notes: Displayed are aggregate liabilities calculated in the SCF and CCP/Equifax. The grey bars signify the length of the SCF field period plus a one quarter lookback period, as described in the text.

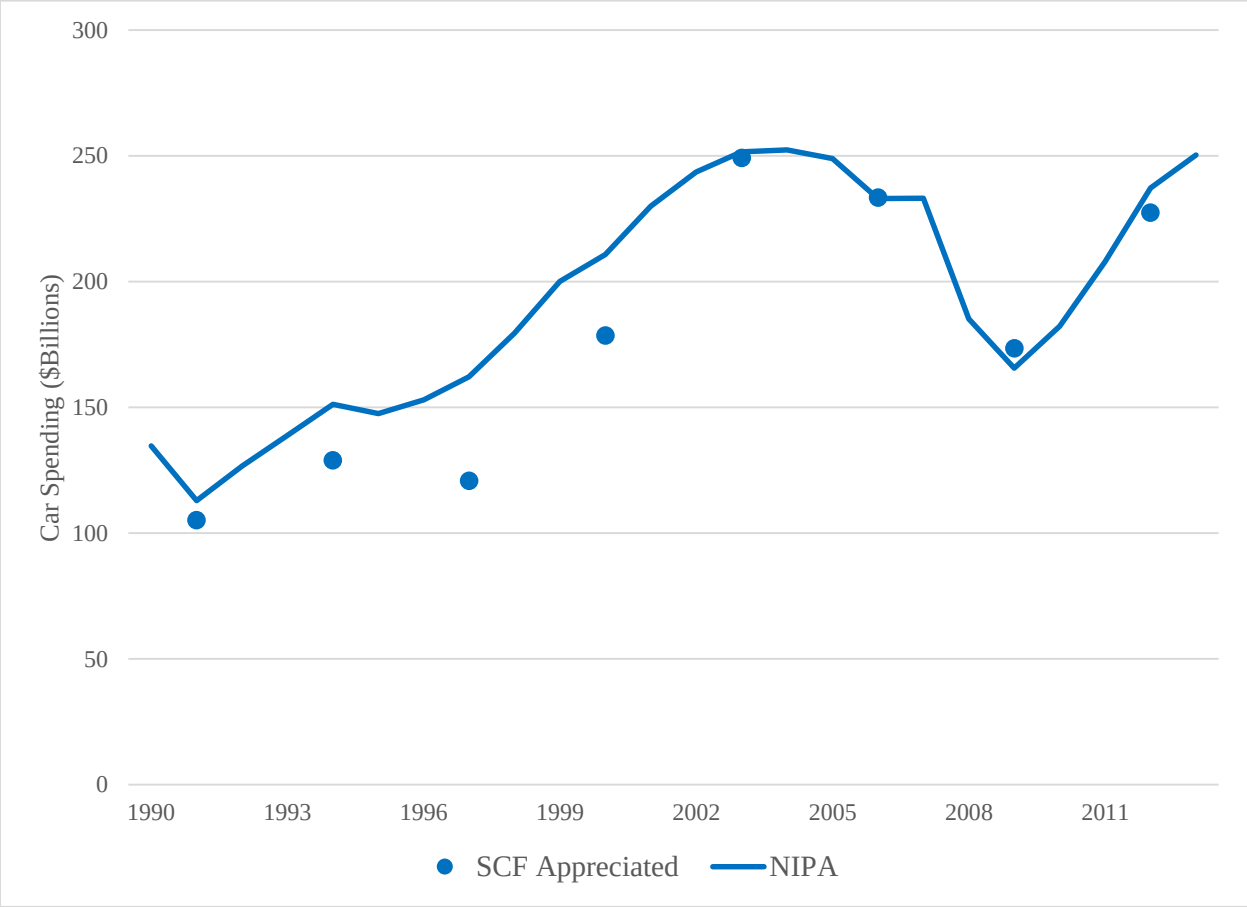
Figure 11: Aggregate Liabilities by Type in the Survey of Consumer Finances (SCF) and Consumer Credit Panel (CCP) / Equifax



Sources: Federal Reserve Board and Federal Reserve Bank of New York CCP/Equifax.

Notes: Displayed are aggregate liabilities calculated in the SCF and CCP/Equifax. The grey bars signify the length of the SCF field period plus a one quarter lookback period, as described in the text.

Figure 12: New Vehicle Spending Aggregates in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA)



Source: Federal Reserve Board and Bureau of Economic Analysis.

Notes: Displayed are aggregate new vehicle purchases calculated in the SCF and NIPA using the concepts described in appendix C.

Figure 13: Aggregate Total Food Spending in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA)

Sources: Federal Reserve Board and Bureau of Economic Analysis.

Notes: Displayed are aggregate food spending at home and away from home calculated in the SCF and NIPA using the concepts described in appendix C.

Table 1. Value of Income Subcomponents in Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI) in 2012, Adjusted

	Total ($Billions)	Share of Total	Total ($Billions)	Share of Total	Total ($Billions)	Share of Total
	SCF		NIPA		SOI	
Wage Income	6,516	66%	6,932	60%	6,301	64%
Non-Wage Income	3,338	34%	4,580	40%	3,578	36%
Capital Income	1,795	18%	2,410	21%	1,774	18%
Interest/ Dividend	390	4%	1,119	10%	648	7%
Business	1,404	14%	1,291	11%	1,126	11%
Retirement	1,378	14%	1,773	15%	1,733	18%
Unemployment	59	1%	97	1%	71	1%
Transfer & Other	107	1%	300	3%	n.a.*	
Total Income	9,854		11,512		9,879	

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

Notes: Displayed are aggregate income by category and shares of total aggregate income in 2012, calculated using the adjusted income concepts described in appendix A. SOI does not include the transfer income found in the SCF and NIPA data sources because most of this income is not taxable.

Table 2: Value of Asset and Liability Subcomponents in Survey of Consumer Finances (SCF), Financial Accounts (FA), Consumer Credit Panel (CCP) / Equifax in 2013, Adjusted

	Total ($Billions)	Share of Total	Total ($Billions)	Share of Total	Total ($Billions)	Share of Total
Assets	SCF		FA		CCP/Equifax	
Real Estate	24,612	34%	19,212	28%	n.a	n.a
Business Assets	13,304	18%	9,260	14%	n.a	n.a
Directly Held Financial Assets	22,413	31%	25,433	44%	n.a	n.a
Retirement Assets	12,141	17%	14,394	37%	n.a	n.a
Total	72,469	100%	68,299	100%		
Debts	SCF		FA		CCP/Equifax	
Housing Debt	9,276	83%	n.a	n.a	8,432	75%
Education Debt	710	6%	n.a	n.a	1,027	9%
Credit Card Debt	268	2%	n.a	n.a	672	6%
Auto Debt	553	5%	n.a	n.a	845	7%
Other Debt	277	4%	n.a	n.a	304	3%
Total	11,083	100%	12,471		11,280	100%
Net Worth	**61,386**		**55,828**		n.a	

Sources: Federal Reserve Board and Federal Reserve Bank of New York CCP/Equifax

Notes: Displayed are aggregate assets and liabilities by category and their share of the total of 2013Q3, calculated using the adjusted asset and debt categories described in appendix B.

Appendix A: Reconciling Income Concepts

The primary macro data source we use for household income is the National Income and Product Accounts (NIPA), provided by the Bureau of Economic Analysis. The NIPA are a macro data source designed to measure current production in the economy and uphold certain national accounting identities. The SCF collects "total income . . . from all sources, before taxes and other deductions" (SCF Codebook, 2013)[23] and the NIPA estimates personal income (NIPA table 2.1, line 1).[24] To compare these income measures, we create conceptually similar concepts by only including comparable income components, as summarized in table A1.

To begin, we remove the SCF measure of capital gains[25] because the NIPA do not define capital gains as current production, and therefore do not explicitly include them in the national accounts.[26] We also remove the SCF variable for alimony and child support because the NIPA only reports alimony.[27, 28]

The SCF income concept includes a variable for other income, some of which can be reconciled with the NIPA and some of which cannot.[29] These sources of other income that do not have a comparable concept in the NIPA, and we therefore remove from the SCF, include: settlements; gambling income; inheritance income; honorariums; support from relatives; income from the repayment of debts; income from the care of foster children; trustee, executor, director, and other miscellaneous fees; gifts; payment from former employers; foreign earned income; net operating loss carry forward; referral fees; and other miscellaneous income. We discuss the remaining components of other income in later sections.

[23] See variable X5729 in the SCF Codebook for specific survey question text at www.federalreserve.gov/econresdata/scf/files/codebk2013.txt.
[24] Note that the NIPA data are published monthly, quarterly and annually. We use the annual frequency because the SCF income data are available as an annual measure.
[25] See variable X5712 in the SCF Codebook for specific question text.
[26] See NIPA FAQ "Why do the NIPA excludes capital gains from income and saving?" at www.bea.gov/faq/index.cfm?faq_id=67.
[27] The NIPA and SOI both only report alimony, but not child support, as it is not taxable.
[28] See variable X5718 in the SCF Codebook for specific question text.
[29] See variables X5724 and X5725 for specific question text regarding other income in the SCF Codebook.

Table A1. Reconciling Survey of Consumer Finances (SCF) and National Income and Product Account (NIPA) Aggregate Income, 2012

Income SCF	**10,680**	**Personal Income NIPA**	**13,888**
Less: SCF Income not included in NIPA Personal Income	*183*	*Less: NIPA Income not included in SCF Income*	*2,778*
(-) Capital Gains (X712)	0	(-) Supplements to Wages & Salaries (2.1.6)	1,674
(-) Child Support / Alimony (X5718)	46	(-) Medicare (2.1.19)	555
(-) Other (X5724)	137	(-) Medicaid (2.1.20)	417
(-) Inheritance (X5725=12)	96.71	(-) Other (2.1.23)	132
(-) Support from relatives (X5725=13)	18.46	(-) Pension Benefit Guaranty (3.12.13)	2.40
(-) Other (x5725≠12 or 13)	21.65	(-) Military Medical Insurance (3.12.16)	5.50
		(-) Black Lung Benefits (3.12.22)	0.40
		(-) Direct Relief	---
		(-) Other (3.12.26)	66.30
		(-) Other Medical Care (3.12.34)	13.90
		(-) Other current transfer receipts, from business (net) (2.1.24)	43.1
		Less: NIPA Imputations and Adjustments	*1,472*
		(-) Owner-Occupied / Nonprofit Rental Income (7.9.9)	366
		(-) Imputed Interest Received by Sole Prop & Partnerships (7.11.59)	11
		(-) Imputed Interest Received by HH & NP (7.11.63)	831
		(-) Imputed Dividends Received by Persons (7.10.14)	128
		(-) CCAdj & IVA Proprietors' Income (1.12.33+1.12.36 + 1.12.37)	150
		(-) CCAdj & IVA Rental Income (1.12.40)	(14)
Plus: Difference Between INCOME and Sum of Components	*111*	*Plus: Income not included in Personal Income*	*1,875*
(+) Difference	111	(+) Contributions Government Social Insurance (2.1.25)	951
		(+) Benefit Payments and Withdrawals (7.20.21)	924
Conceptually Equivalent Income	**10,386**	**Conceptually Equivalent Income**	**11,512**

Sources: Federal Reserve Board and Bureau of Economic Analysis

Notes: We include income when X5725=3, 7, 11, 15, 22, 30, 31, 41, 42, 43, and 44 in the SCF internal dataset.

Finally, we also must add back in the difference between the SCF total income variable and the sum of all income components, which differ due to the SCF imputation process,[30] as well as only including positive income values in this exercise to remain consistent with national accounting conventions; survey respondents can report negative income (losses) for business, farm, rental, and certain types of other income.

To construct the comparable income concept in the NIPA we begin by removing income concepts that SCF respondents are not asked to report, including supplements to wages and salaries (such as health insurance coverage), Medicare, and Medicaid. We also remove other current transfer receipts, from business (net), which primarily consists of personal-injury liability payments to individuals other than employees and adjustments for net insurance settlements.[31]

Next we remove the components of the NIPA concept of other government social benefits to persons (NIPA line 2.1.23), that we cannot reconcile with income components in the SCF. Those components are pension benefit guaranty, military medical insurance, black lung benefits, direct relief, other federal social benefits (primarily payments to nonprofit institutions, aid to students, and payments for medical services for retired military personnel and their dependents at nonmilitary facilities), and other medical care, which includes general medical assistance and state child health care programs.[32] We discuss the remaining components with comparable SCF counterparts in a later section.

Finally, we remove from the NIPA income concept several sources of imputed income that are not in the SCF. BEA uses imputations to "approximate the price and quantity that would be obtained for a good or service if it was traded in the market place" (BEA FAQ 488). We first remove the imputation for owner-occupied/nonprofit rental income ($366 billion), which is an estimate of the rental income a household or nonprofit would receive if it rented its house to a tenant rather than occupy it. The largest

[30] See the "Imputation" section of the SCF Codebook for details on the imputation process www.federalreserve.gov/econresdata/scf/files/codebk2013.txt.
[31] For more information, see BEA's Local Area Methodology: Personal Current Transfer Receipts at www.bea.gov/regional/pdf/lapi2003/transfer.pdf.
[32] NIPA Table 3.12 Government Social Benefits details the components contained in NIPA line 2.1.23

imputation we remove is imputed interest received by sole proprietorships, partnerships, households, nonprofits, and persons ($842 billion). Lastly, we remove imputed dividends received by persons ($128 billion). Imputed interest and dividends are a measure of the difference the interest a depositor receives from a bank and the interest he could have earned by investing in government securities; similarly, for the borrower it is calculated as the difference between the interest charged by the bank and the interest the bank could have earned by instead investing in government securities.[33]

Imputations for interest received by persons who are not included in the SCF definition of interest and dividend include interest received by sole proprietorships and partnerships (farm and nonfarm); households for the market value of owner-occupied housing; persons from banks, credit agencies, and investment companies; life insurance carriers; and property and casualty insurance companies (see NIPA table 7.11.59 and 7.11.63). Imputations for dividends received by persons includes dividends received from employee defined benefit and defined contribution plans (see NIPA table 7.10.14).

In addition to imputations, we also remove the NIPA capital consumption adjustments (CCAdj) and inventory valuation adjustments (IVA) (net value of $136 billion), both of which are made to reflect current rather than historical costs of production. The CCAdj is an adjustment for depreciation and the IVA is an adjustment to inventory withdrawals which accounts for price changes that can result in inventory profits or losses.[34] Table A2 summarizes the adjusted total income concepts in the SCF and NIPA by SCF survey year and table A3 describes the wage and nonwage shares of aggregate income by survey year.

[33] For more information, see the FAQ "Why does GDP include imputations?" at www.bea.gov/faq/index.cfm?faq_id=488.
[34] See "Chapter 11: Nonfarm Proprietors' Income" of the *NIPA Handbook* for more details on CCAds and IVA in national accounting practices: bea.gov/national/pdf/chapter11.pdf.

Table A2. Aggregate Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI) 1988 - 2012

	Aggregate Income ($Billions)			**Indexed (1994 = 100)**		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	3,500	3,745	3,203	0.77	0.74	0.78
1991	4,106	4,376	3,712	0.91	0.87	0.90
1994	4,536	5,034	4,131	1.00	1.00	1.00
1997	5,366	6,081	5,034	1.18	1.21	1.22
2000	6,728	7,519	6,306	1.48	1.49	1.53
2003	7,449	8,029	6,611	1.64	1.59	1.60
2006	8,776	9,798	8,314	1.93	1.95	2.01
2009	8,931	10,003	8,632	1.97	1.99	2.09
2012	9,859	11,512	9,879	2.17	2.29	2.39

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service.

Table A3. Wage & Nonwage Share of Aggregate Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI) 1988-2012

	Wage			**Nonwage**		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	0.70	0.65	0.73	0.30	0.35	0.27
1991	0.68	0.64	0.64	0.32	0.36	0.28
1994	0.72	0.64	0.73	0.28	0.36	0.27
1997	0.72	0.64	0.72	0.28	0.36	0.28
2000	0.74	0.64	0.71	0.26	0.36	0.29
2003	0.72	0.64	0.70	0.28	0.36	0.30
2006	0.69	0.62	0.66	0.31	0.38	0.34
2009	0.68	0.62	0.66	0.32	0.38	0.34
2012	0.66	0.60	0.64	0.34	0.40	0.36

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service.

A.1 Wage Income

We compare SCF wage and salary income to other commonly used data sources that are available annually: the NIPA, Statistics of Income (SOI), and the Bureau of Labor Statistics' (BLS) Current Population Survey (CPS) wage and salary statistics. The NIPA uses BLS' Quarterly Census of Wages (QCEW) and the CPS to derive their estimates of annual wages, salaries, tips, and other compensation for

private households.[35] NIPA table 2.1 (line 3) provides annual wages and salaries, which includes private industry and government wage and salary income.[36] The SOI data creates a sample using unaudited values of wages, salaries, tips, etc. (line 7) from Form 1040 of the U.S. Individual Income Tax Return to report total wages;[37] the SCF question regarding wages and salaries directs respondents to reference line 7 of their previous year's IRS Form 1040.[38]

All four data sources have similar concepts of wages and salaries, with respect to both definitions and timing, suggesting that no adjustments need to be made to provide an accurate comparison. According to IRS Form 1040, line 7 includes "wages, salaries, tips, other compensation."[39] The NIPA defines wages and salaries as "cash remuneration of labor (including sick or vacation pay, severance pay, commissions, tips, and bonuses), and in-kind remuneration of transit subsidies and meals."[40] Table A4 details aggregate wages and salaries for each of the data sources.

[35] For more details on BEA's methodology see "Chapter 10: Compensation of Employees" of *the NIPA Handbook: Concepts and Methodologies*; BLS produces both the QCEW and CPS data at www.bea.gov/national/pdf/chapter10.pdf.
[36] BEA wages and salaries includes a misreporting adjustment that is calculated using a judgmental trend beginning in 2007, as well as wages and salaries not covered by unemployment insurance. For more information, see the Chapter 10 of the *NIPA Handbook* at www.bea.gov/national/pdf/chapter10.pdf.
[37] For more information, see "Individual Income Tax Returns Publication" on the IRS Tax Statistics website: http://www.irs.gov/uac/Tax-Stats-2.
[38] The SCF Codebook www.federalreserve.gov/econresdata/scf/files/codebk2013.txt details the questions households answer; see variable X5702 for wages and salaries.
[39] See IRS Form W-2, Box , at www.irs.gov/pub/irs-pdf/fw2.pdf.
[40] Wages and salaries are included under the broader measure of compensation, which also includes supplements to wages and salaries in the NIPA. For more information, see pages 10-2 and 10-3 of the *NIPA Handbook* at www.bea.gov/national/pdf/chapter10.pdf.

Table A4. Wages and Salaries in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), Statistics of Income (SOI), and Current Population Survey (CPS), 1988-2012

	Wages & Salaries ($Billions)				**Indexed (1994 = 100)**			
Year	SCF	NIPA	SOI	CPS	SCF	NIPA	SOI	CPS
1988	2,451	2,440	2,338	2,101	0.75	0.75	0.77	0.77
1991	2,788	2,815	2,387	2,387	0.85	0.87	0.79	0.88
1994	3,266	3,237	3,027	2,723	1.00	1.00	1.00	1.00
1997	3,869	3,877	3,614	3,416	1.18	1.20	1.19	1.25
2000	4,958	4,826	4,456	4,251	1.52	1.49	1.47	1.56
2003	5,364	5,138	4,650	4,644	1.64	1.59	1.54	1.71
2006	6,071	6,057	5,469	5,369	1.86	1.87	1.81	1.97
2009	6,101	6,251	5,707	5,545	1.87	1.93	1.89	2.04
2012	6,516	6,932	6,301	6,028	1.99	2.14	2.08	2.21

Sources: Federal Reserve Board, Bureau of Economic Analysis, Internal Revenue Service, and Bureau of Labor Statistics

A.2 Nonwage Income

We compare SCF nonwage income—which consists of capital income, retirement, transfer, and other income—to NIPA and SOI nonwage income. The NIPA definition of personal income is significantly different from the IRS concept of AGI, with which the SCF closely aligns:[41] the NIPA measure personal income as it pertains to current production, while the SOI primarily measures taxable income and the SCF seeks to measure total income received. Table A5 describes total nonwage income by source and survey year. The components of the different types of nonwage income are described below.

[41] For information on the difference between the NIPA and IRS data, see Ledbetter (2007).

Table A5. Nonwage Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI), 1988-2012

	Nonwage ($Billions)			**Indexed (1994 = 100)**		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	1,049	1,305	865	0.83	0.73	0.78
1991	1,319	1,562	1,038	1.04	0.87	0.94
1994	1,269	1,798	1,104	1.00	1.00	1.00
1997	1,497	2,205	1,420	1.18	1.23	1.29
2000	1,769	2,693	1,850	1.39	1.50	1.68
2003	2,085	2,891	1,961	1.64	1.61	1.78
2006	2,705	3,741	2,845	2.13	2.08	2.58
2009	2,830	3,751	2,925	2.23	2.09	2.65
2012	3,344	4,580	3,578	2.63	2.55	3.24

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

A.2.1 Capital Income

The largest portion of nonwage income is capital income, which we examine as three separate components: business income, income on assets (i.e. interest and dividend income), and capital gains. The SCF, SOI, and NIPA all measure both business income and income on assets, while the SCF, SOI, and Congressional Budget Office provide measures of capital gains income. Table A6 describes capital income, excluding capital gains, in the SCF, NIPA and SOI.

Table A6. Capital Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI), 1988–2012

	Capital ($Billions)			Indexed (1994 = 100)		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	684	783	583	0.84	0.77	0.90
1991	910	910	646	1.12	0.89	1.00
1994	810	1,019	649	1.00	1.00	1.00
1997	991	1,275	825	1.22	1.25	1.27
2000	1,159	1,557	995	1.43	1.53	1.53
2003	1,160	1,618	1,050	1.43	1.59	1.62
2006	1,701	2,200	1,573	2.10	2.16	2.42
2009	1,561	1,854	1,427	1.93	1.82	2.20
2012	1,796	2,410	1,774	2.22	2.36	2.73

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

Even after the reconciliation process, definitional differences remain between the SCF, SOI and NIPA measures of interest and dividend income, resulting in a noticeably higher measure of capital income in the NIPA.

As noted in table A1, we remove a total of $970 billion in NIPA imputations for interest and dividend income to obtain a measure of income on assets that is more similar to the SCF definition;[42] however, some irreconcilable discrepancies still exist between the SCF and NIPA measures of interest and dividend income. The NIPA measure of interest and dividend income includes interest generated by IRAs, which the SCF does not include; the NIPA measure also includes interest income on assets held by nonprofit organizations. Because there is no direct estimate of the nonprofit portion of income on assets,[43] we cannot separate persons from institutions in the NIPA. Table A7 describes interest and dividend income in the SCF, NIPA, and SOI data.

[42] We include sales of assets and insurance dividends from the SCF Other Income Category (X5725=30 and X5725 = 42, respectively) in the SCF calculation of income on assets.
[43] See Brown (2004) for more information at https://www.bea.gov/about/pdf/Alternative_Measures_Income051404.pdf.

Table A7. Income on Assets in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI), 1988 – 2012

	Interest & Dividends ($Billions)			**Indexed (1994 = 100)**		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	237	445	297	0.96	0.88	1.16
1991	232	521	330	0.94	1.03	1.28
1994	247	506	257	1.00	1.00	1.00
1997	249	638	341	1.01	1.26	1.33
2000	303	773	400	1.22	1.53	1.56
2003	272	726	377	1.10	1.44	1.47
2006	351	1,115	632	1.42	2.20	2.46
2009	325	891	529	1.31	1.76	2.06
2012	392	1,119	648	1.59	2.21	2.52

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

The SCF, NIPA, and SOI data contain information regarding household or personal business income. The SCF surveys households on their net annual income from a sole proprietorship, a farm, other business or investments, rent, and trusts and royalties. The SCF questions refer respondents to IRS Form 1040 lines 12, 17, and 18, which correspond to reported SOI business income components.[44] SOI table 1.4 provides the number of tax returns and net income for business or professional income, farm income, rent, royalty, farm rental, and partnership and s-corporation income.

The NIPA include comparable business income on the income side of the accounts in table 2.1 (lines 9 and 12), including net annual income from a sole proprietorship or farm and annual income from other business or investments, net rent, trusts, or royalties. The estimate for proprietors' income includes income earned by sole proprietorships, partnerships, and other private nonfarm business that are organized for profit, but not classified as corporations. We remove the NIPA inventory valuation adjustment and capital consumption adjustment from farm and nonfarm proprietors' income;[45] these

[44] For specific survey questions, see variables X5704 and X5714 in the SCF Codebook at www.federalreserve.gov/econresdata/scf/files/codebk2013.txt.

[45] The NIPA only provides the value of the inventory valuation adjustment for nonfarm proprietors' income, so we are not able to make this adjustment for farm proprietors' income.

adjustments are included to align with BEA's definition of current production, and are not part of the income SCF respondents receive.

From rental income, we remove the NIPA capital consumption adjustment, as we do with proprietors' income, totaling about $136 billion (see table A1). Additionally, we remove the estimate of imputed rental income on owner-occupied housing and nonprofit rental income, totaling $366 billion, because the SCF does not include an equivalent measure. The SCF includes tenant-occupied rental income, but because homeowners do not directly receive payment for the market rent of their home, it is not considered income in the SCF. Lastly, we remove the NIPA value of rental income received by nonprofit institutions, who are not included in the SCF definition of a household. Table A7 describes the levels and growth trends of proprietors' and rental income for each of the three data sources.

Table A8. Business Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI), 1988 - 2012

	Business ($Billions)			**Indexed (1994 = 100)**		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	447	338	286	0.79	0.66	0.73
1991	618	388	317	1.10	0.76	0.81
1994	563	514	392	1.00	1.00	1.00
1997	743	636	484	1.32	1.24	1.23
2000	856	784	595	1.52	1.53	1.52
2003	888	892	673	1.58	1.74	1.71
2006	1,350	1,085	941	2.40	2.11	2.40
2009	1,236	963	898	2.19	1.88	2.29
2012	1,404	1,291	1,126	2.49	2.51	2.87

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

A.2.2 Retirement Income

In this paper, retirement income includes pension account withdrawals, IRA distributions, social security benefits and other miscellaneous survivor income, disability insurance, railroad retirement benefits,[46] and

[46] Disability insurance (NIPA table 3.12.29) and railroad retirement (NIPA table 3.12.12) are included in the NIPA measure of other income (NIPA table 2.1.23).

veterans' benefits.[47] We are able to isolate social security income in each of the three data sources, as exhibited in table A9. It is likely the SCF maintains lower levels of both Social Security and other types of retirement income than the other two series due to not interviewing households in nursing homes or other institutions that are likely to have significant numbers of elderly or sick individuals receiving Social Security income; it also likely that these individuals live with family members, making them part of the NPEU. Additionally, SCF retirement income does not capture early pension withdrawals and cash settlements well, which are included in the NIPA value of benefit payments and withdrawals (NIPA table 7.20.21), as well as in taxable SOI retirement income. According to Argento, et al. (2015), net taxable distributions totaled about $95 billion in 2010, suggesting the portion of the gap in the series that is likely due to early withdrawals and cash settlements.

Table A9. Retirement Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI) 1988 - 2012[48]

	Social Security			Total Retirement		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	185	221	84	307	443	271
1991	235	272	108	235	272	368
1994	250	320	112	402	636	434
1997	265	365	140	463	785	578
2000	321	410	187	570	980	838
2003	392	472	214	838	1,050	868
2006	460	554	340	905	1,304	1,245
2009	547	675	457	1,086	1,494	1,415
2012	660	774	527	1,378	1,773	1,733

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

A.2.3 Transfer Income and Other Income

We classify government social benefits in the SCF and NIPA as transfer income and other. The NIPA components of government social benefits (NIPA table 3.12) that have counterparts in the SCF

[47] SCF IRA distributions includes other IRA distributions (X5725 = 11) and other miscellaneous survivor income (X5725 = 44), which are included in Other Income in the SCF (X5724).

[48] It is important to note that, beginning in 2006, the IRS had a change in reporting requirements, which likely resulted in the sharp increase in SOI Social Security income.

include federal and state and local workers' compensation, SNAP benefits, SSI benefits, family assistance, general assistance, energy assistance, other state and local public assistance (including expenditures for food under the supplemental program for women, infants, and children; foster care; adoption assistance; and payments to nonprofit welfare institutions), education, employment and training, other state and local benefits, Alaska Permanent Fund dividends, crime-victim payment, and refundable tax credits.

The sources of other income that do have comparable concepts in the NIPA and remain in the SCF total income measure include other IRA income, education scholarships and grants, income tax refunds and other tax credits, housing subsidies and agricultural support, rural housing subsidies, net sales of assets, Alaska Permanent Fund payments and other membership-based payments, miscellaneous nonwage benefits from work,[49] insurance dividends, earnings on education savings plans, and miscellaneous survivors income that is not otherwise included in Social Security income.

Because the SCF combines unemployment insurance and workers' compensation,[50] we include the NIPA values for both federal and state and local government workers' compensation (see table A10.), but can only include SOI data for unemployment compensation, as the IRS does not collect data on income received through workers' compensation.

[49] This is comparable to employment and training in the NIPA, and includes income such as the value of personal use of a car that is provided for business purposes.
[50] See SCF Codebook variable X5716 for specific question text.

A10. Unemployment and Workers' Compensation Income in the Survey of Consumer Finances (SCF), National Income and Product Accounts (NIPA), and Statistics of Income (SOI), 1988–2012

	Unemployment / Workers' Comp ($ Billions)			**Indexed (1994 = 100)**		
Year	SCF	NIPA	SOI	SCF	NIPA	SOI
1988	13	20	12	0.73	0.58	0.57
1991	25	36	23	1.43	1.05	1.15
1994	17	35	20	1.00	1.00	1.00
1997	14	31	17	0.79	0.89	0.85
2000	15	32	17	0.87	0.91	0.83
2003	32	68	44	1.83	1.95	2.17
2006	24	45	27	1.37	1.30	1.31
2009	91	146	84	5.22	4.21	4.12
2012	59	97	71	3.38	2.81	3.51

Sources: Federal Reserve Board, Bureau of Economic Analysis, and Internal Revenue Service

Table A11 displays the values of transfer and other income for the SCF and the NIPA; we exclude SOI from this income component because the majority of this income is subsidies and therefore not taxable or collected by the IRS.

Table A11. Transfer and Other Income in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA), 1988 - 2012

	Transfer / Other ($Billions)		**Indexed (1994 = 100)**	
Year	SCF	NIPA	SCF	NIPA
1988	44	59	1.12	0.55
1991	46	82	1.16	0.76
1994	40	108	1.00	1.00
1997	29	114	0.72	1.06
2000	25	124	0.64	1.15
2003	34	155	0.86	1.44
2006	57	192	1.45	1.78
2009	82	257	2.07	2.39
2012	107	300	2.72	2.79

Sources: Federal Reserve Board and Bureau of Economic Analysis

A.2.4 Capital Gains

Although the NIPA does not include capital gains income, we can compare the SCF with SOI and Congressional Budget Office (CBO) data. The NIPA does not include capital gains in their income measure because it is not considered a measure of current production.[51] The SCF includes a question for net annual income from gains or losses from mutual funds and sale of stocks, bonds, and real estate.[52] We use the taxable net gain portion of sales of capital assets reported on Form 1040, Schedule D[2] from the SOI data. The CBO publication *The Budget and Economic Outlook: 2014 to 2024* contains capital gains tax receipts, which we also use in our comparison of this income component.[53] Table A10 indicates capital gains levels and growth trends for each of the three sources.

Table A10. Capital Gains Income in the Survey of Consumer Finances (SCF), Statistics of Income (SOI), and Congressional Budget Office (CBO) Data, 1997–2012

	Capital Gains ($Billions)			**Indexed (1994 = 100)**		
Year	SCF	SOI	CBO	SCF	SOI	CBO
1997	260	365	365	0.92	1.13	1.13
2000	415	628	628	1.46	1.95	1.94
2003	283	323	323	1.00	1.00	1.00
2006	652	790	790	2.30	2.45	2.45
2009	201	263	263	0.71	0.81	0.81
2012	528	645	645	1.86	2.00	2.00

Sources: Federal Reserve Board, Internal Revenue Service, and Congressional Budget Office

[51] See Chapter 2 of the *NIPA Handbook* for more detail on including certain types of income in the NIPA.
[52] See the SCF Codebook variables x5711 and X5712 for specific questions relating to capital gains at www.federalreserve.gov/econresdata/scf/files/codebk2013.txt
[53] For more information, see Table 6 in Congressional Budget Office (2014) at www.cbo.gov/publication/45065.

Appendix B: Reconciling Household Net Worth, Asset, and Liability Concepts

The Financial Accounts of the United States (FA) provide quarterly estimates of aggregate assets, liabilities and net worth held by the household sector. The FA concept of net worth reported in table B.101 (Balance Sheet of Households and Nonprofit Organizations) diverges conceptually from the SCF in several ways. In creating an equivalent version of household net worth, assets, and liabilities, we remove irreconcilable asset and liability categories from both the FA and the SCF in order to create two conceptually equivalent estimates of net worth. This appendix describes the procedure we implement to conduct that exercise.

B.1 Reconciling SCF and FA Net Worth

To construct a conceptually equivalent measure of net worth in the FA and the SCF we implement the following procedure, the effect of which is summarized in appendix table B1.

First, FA includes nonprofit institutions as part of the household sector, so we remove identifiable nonprofit assets and liabilities, which are not measured in the SCF because it is a household survey.[54] As indicated in table B1, nonprofit net worth appears in both financial and nonfinancial assets, thus reducing published FA household net worth by $2.4 trillion in 2013 Q3.

[54] Table B.101 lines 5, 6, 7, 16, 21, 35, 38, and 40.

Table B1: Reconciling Household Net Worth in the Survey of Consumer Finances (SCF) and Financial Accounts (FA) ($Billions)

Published Net Worth SCF	**65,507**	**Published Net Worth FA**	**76,628**
Published Nonfinancial Assets SCF	45,423	*Published Nonfinancial Assets FA*	27,160
(-) S - and C- Corporate Equity	4,473	(-) Identifiable Nonprofit Net Worth	
(-) Vehicles	2,391	Real Estate	2,608
(-) Other Nonfinancial Assets (incl. Consumer Durables)	644	(-) Equipment	305
(-) Vacant Land Debt	-30	(-) Intellectual Property	122
		(-) Consumer Durable Goods	4,924
		(+) Equity in Non-corporate Business	9,260
Conceptually Equivalent Nonfinancial Assets SCF	**37,945**	**Conceptually Equivalent Nonfinancial Assets FA**	**28,460**
Published Financial Assets SCF	31,256	*Published Financial Assets FA*	63,200
(-) Cash Life Insurance	829	(-) Identifiable Nonprofit Net Worth	
(-) Other Financial Assets	469	(-) Open Market Paper	18
(+) S - and C- Corporate Equity	4,473	(-) Consumer Credit (Student Loans)	60
		(-) Security Credit	792
		(-) Life Insurance Reserves	1,218
		(-) Misc. Assets	901
		(-) Other loans and Advances	25
		(-) Mortgages	79
		(-) Pension Entitlements	19,448
		(-) Equity in Non-corporate Business	9,260
		(+) Pension Entitlements	
		(+) DC Pensions	5,627
		(+) Annuities in IRAs at Life Ins Co.	2,757
Conceptually Equivalent Financial Assets SCF	**34,432**	**Conceptually Equivalent Financial Assets FA**	**39,784**
Published Liabilities SCF	11,171	*Published Liabilities FA*	13,732
(-) Other Debt	118	(-) Identifiable Nonprofit Net Worth	
(+) Vacant Land Debt	30	Municipal Securities	232
		(-) Commercial Loans and Advances	201
		(-) Trade Payables	255
		(-) Depository Institution loans n.e.c.	92
		(-) Other loans and Advances	141
		(-) Security Credit	314
		(-) Deferred and Unpaid Life Insurance Premiums	27
Conceptually Equivalent Liabilities SCF	**11,083**	**Conceptually Equivalent Liabilities FA**	**12,470**
Conceptually Equivalent Net Worth SCF	**61,294**	**Conceptually Equivalent Net Worth FA**	**55,774**

Source: Federal Reserve Board

In addition to nonprofit assets in FA, we remove consumer durable goods, including vehicles, from nonfinancial assets in both the SCF and FA because the definitions are not comparable between the two data sources, with the FA definition of durables being broader in scope and including items such as furniture and appliances.[55] The SCF primarily captures the vehicles portion of the stock of durables, and it is not possible to separate vehicles from other durables in FA.[56] Removing consumer durables results in a reduction in net worth of about $4.9 trillion and $3.0 trillion for the FA and SCF, respectively; we also remove other nonfinancial assets from the SCF, reducing SCF net worth by about $73 billion.

Next, we remove FA asset and liability categories involving security credit (for a total reduction in net worth of $478 billion), which is not well-measured at the household level.[57] We also remove miscellaneous financial assets and liabilities from both FA and the SCF because there is potential misclassification between the FA and the SCF.[58] Moreover, miscellaneous assets and liabilities in the SCF includes money owed between households, which would net out in the FA aggregate household balance sheet. This adjustment reduces SCF aggregate net worth in 2013:Q3 by $350 billion and FA net worth by $516 billion.

We next remove life insurance assets and liabilities from both data sets. FA measures term life insurance reserves less deferred and unpaid life insurance. The SCF net worth includes the cash value of whole life insurance. Because the two measures are conceptually different, we remove all assets and liabilities related directly to life insurance plans.[59] This adjustment reduces 2013:Q3 SCF net worth by $829 billion and FA net worth by about $1.2 trillion.

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[55] See SCF Codebook variable X4020 for a list of classifications for durable goods other than vehicles; the FA estimates and definitions use BEA fixed assets table 1.1 (line 15) and Fixed Assets Table 8.1, respectively. See www.federalreserve.gov/apps/fof/SeriesAnalyzer.aspx?s=FL155111005&t=B.101&bc=B.101:FL155111005&suf=Q for more detail on the FA construction of consumer durable goods.

[56] FA includes all consumer durable goods according to the NIPA. Thus, we remove the variable VEHIC and OTHNFIN, which includes other consumer durables, from SCF net worth and B.101 line 8 from FA net worth.

[57] B.101 line 26 and 39.

[58] B.101 lines 30, 36, and 37 and SCF variables OTHFIN, OTHNFIN, and ODEBT, as defined in the SAS Macro at www.federalreserve.gov/econresdata/scf/files/bulletin.macro.txt.

[59] We remove the net of B.101 line 27 less B.101 line 41 from FA and the variable CASHLI from the SCF.

We also reconcile pension assets captured in both surveys. Since the SCF does not capture information on the value of defined benefit (DB) pensions, we must remove that from the FA measure of pension assets. We instead use the sum of defined contribution pension assets and annuities held in IRAs at life insurance companies as our measure of pension assets in the FA.[60] This adjustment reduces FA net worth by about $11.1 trillion.

Finally, we subtract the wealth of the Forbes 400 list from FA aggregate household net worth because the SCF is explicitly forbidden from sampling any household identifiable by its high wealth. Forbes publishes the net worth of the 400 wealthiest Americans annually, and we simply sum that series to arrive at our annual estimate of the aggregate wealth of the Forbes 400.[61]

As a result of these changes, we arrive at conceptually equivalent aggregate net worth figures of about $61.3 trillion in the SCF and about $55.8 trillion in FA for2013 Q3.

B.2 FA Asset and Liabilities

After reconciling total household net worth in the SCF and FA, we can classify the net worth components into three broad balance sheet categories: nonfinancial assets, financial assets, and liabilities. Table B2 details the macro and micro data comparisons for these broad categories and their subcomponents. As described in the text and Henriques and Hsu (2014), it is difficult to reconcile any further asset and liability sub-categories between the two data sets.

[60] To remove defined benefit pensions and account only for the pension assets captured in the SCF, we substitute B.101 line 28 (total pension entitlements) with the sum of defined contribution pension assets (Table L.117 line 26) and annuities held in IRAs at life insurance companies (Table L.226 line 2).
[61] The Forbes 400 list can be found at www.forbes.com/forbes-400/list/.

Table B2: Components of Net Worth in Survey of Consumer Finances (SCF) and Financial Accounts (FA), 2013 (Billions)

Category	FA	SCF
Net Worth	**55,775**	**61,294**
Nonfinancial Assets	*28,460*	*37,945*
Real Estate	19,200	24,462
Non-Corp Business	9,260	13,304
Financial Assets	*39,785*	*34,432*
Retirement	14,394	12,141
Directly-Held	25,391	22,290
Liabilities	*12,471*	*11,083*
Home Mortgages	9,434	9,276
Consumer Credit	3,037	1,807

Source: Federal Reserve Board

As indicated in table B2, nonfinancial assets include owner-occupied housing and non-corporate business assets. In the SCF, owner-occupied housing includes the value of all primary residences, plus the value of secondary residences for which the household does not receive rental income; the SCF includes a net value of vacant land, so we remove the debt portion of this, increasing nonfinancial assets by $30 billion. FA has a similar concept of owner-occupied real estate, which includes vacant land and mobile homes at market value.[62] The SCF calculates non-corporate business equity as the sum of values of nonresidential properties, rental properties, and equity in non-corporate business and S-corporations; similarly, the FA includes proprietors' equity in non-corporate businesses in this category; because the SCF includes non-corporate equity in nonfinancial assets, we move this category from financial assets to nonfinancial assets in the FA.[63]

We separate financial assets into retirement and directly-held assets. In the SCF and FA retirement assets include 401(k)-type accounts and IRAs, but not defined benefit pensions. Directly-held financial assets include transaction accounts and certificates of deposit, all assets in bonds and corporate

[62] In FA, owner-occupied real estate is given by line 4 of table B.101.
[63] The FA value for non-corporate business is on line 29 of table B.101.

equities, mutual funds and other managed assets, outside of those in retirement accounts. As noted above, we also reduce financial assets by the wealth of the Forbes 400, for which we assume negligible housing wealth and liabilities exist.[64]

Liabilities in the SCF and FA include debt secured by primary and other residences (including home equity loans) and consumer credit, which includes education loans, credit cards, vehicle loans, and miscellaneous consumer credit and installment loans.

B.3 Liabilities in the SCF and FRBNY CCP/Equifax

In addition to the FA comparison, we also compare household liabilities in the SCF with the Federal Reserve Bank of New York Consumer Credit Panel/Equifax (CCP/Equifax). The panel contains household-level microdata on a variety of loan account types and balances pulled from a 5 percent random sample of credit reports created by Equifax. The quarterly aggregates are broken down into six sub-categories (mortgage, home equity revolving, auto loan, credit card, student loan, and other) along with a measure of total liabilities. Though the panel has data going back to 1999, the student loan category was only added in 2003.

The CCP/Equifax reports two types of housing debt accounts: mortgage accounts and home equity revolving accounts, which together include all types of closed-end and revolving loan types associated with property. Since credit reports do not distinguish if a loan is tied to a primary residence or other residential real estate, our measure of SCF housing-related debt sums all loans associated with both the primary residence and other residential real estate. We additionally plot only SCF debt secured by the primary residence in figure B1.

[64] Financial assets can be further divided into retirement (interest-bearing and equities) and non-retirement (interest-bearing, and closely held and publicly traded corporate equity) assets for the SCF and the FA.

Figure B1. Measures of Housing Debt in the Survey of Consumer Finances (SCF) and Consumer Credit Panel (CCP) / Equifax

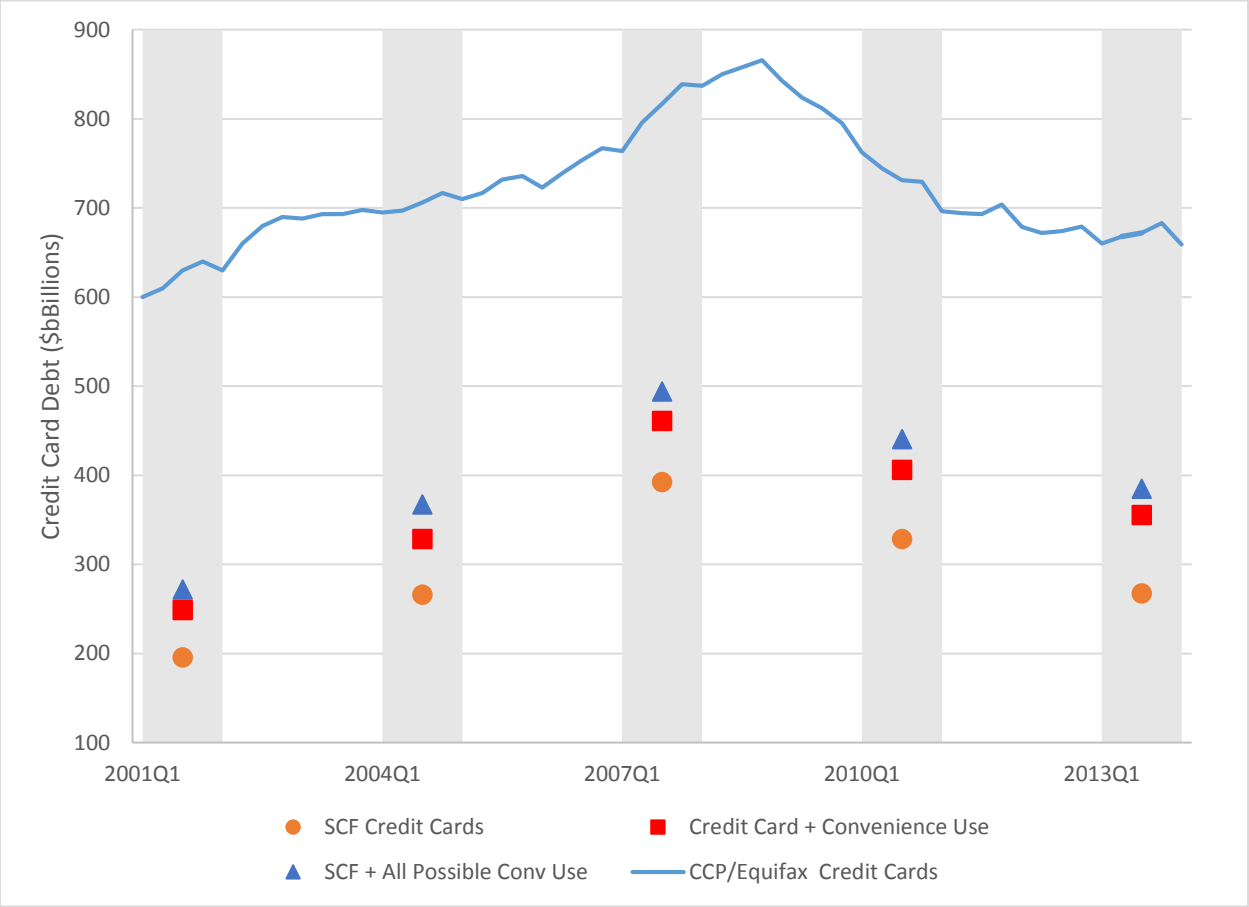
Source: Federal Reserve Board, Federal Reserve Bank of New York CCP/Equifax.

Auto loans in the CCP/Equifax contain all loans taken out to purchase a vehicle, both from banking institutions and automobile financing companies. These loans include all vehicles purchased new or used, and include vehicle leases that made up approximately 12.1 percent of financed vehicles in 2008Q1 (Brown et al., 2015). Loans on leased vehicles are not captured in the SCF, but previous comparisons between the SCF and the CCP/Equifax have used the Bluebook value of the leased vehicle at the time of the survey as an approximation (albeit an upper bound) of the loan amount (Brown et al., 2015).

Education debt in the CCP/Equifax covers loans to finance education from both financial institutions and state and local governments. This definition lines up conceptually with the bulletin extract variable on education debt, which sums all education-related loan balances for members of the primary economic unit as of the interview date. Education loans held by financially independent household members (the non-primary economic unit or NPEU)—which often includes roommates and adult children—are not captured in the survey or this measure. The SCF also does not sample institutional housing, such as dormitories.

While both the SCF and CCP/Equifax capture credit cards, the SCF captures credit card debt and the CCP/Equifax captures all credit card usage. Thus, individuals who pay off their balance in full each month and use credit cards for convenience are included in the measure of total credit card debt in the CCP/Equifax but not in the SCF. Figure B2 provides an estimate of credit card debt in the SCF if we convenience credit card usage is added, as well as all new charges among revolvers and non-revolvers of credit card debt. SCF respondents are also instructed not to include personal credit cards used for small business transactions, while the CCP/Equifax would be unable to distinguish a personal card used for business from a personal card used for personal expenses.

Figure B2: Credit Card Debt in the of Consumer Finances (SCF) and Consumer Credit Panel (CCP) / Equifax, 2001 - 2014



Source: Federal Reserve Board and Federal Reserve Bank of New York CCP/Equifax

It is difficult to reconcile the other debt category in the CCP/Equifax with the various "other" debt types reported in the SCF. The CCP/Equifax other debt category includes consumer finance (sales financing, personal loans) and retail (clothing, grocery, department stores, home furnishings, gas etc.) loans. The SCF collects information on a wide variety of other loans, lines of credit, and installment loans, including things like personal loans that would not be included in a credit report. We plot both categories but recognize they are unlikely to include the same forms of debt.

Appendix C: Reconciling Spending in the SCF and NIPA

C.1 Car Spending

The Survey of Consumer Finances (SCF) contains micro-level data relating to the characteristics of households' vehicle purchases, which can be aggregated to obtain an estimate of the household sector's total vehicle expenditures in a given year. Similarly, the Bureau of Economic Analysis (BEA) provides macro-level data series for motor vehicle spending on the product side of the National Income and Product Accounts (NIPA).

C.1.1 Common Definition of Vehicle Transactions in NIPA and SCF

The first step in reconciling vehicle purchases and spending in the SCF and the NIPA is finding a common definition of vehicle transactions in the two datasets. The SCF collects data on make, model, and year of up to four owned vehicles and two leased vehicles for each household surveyed. For each vehicle (car, truck, or SUV) reported, the SCF includes information on how it was financed (loan, no loan, or lease), if it was new or used at the time of purchase, and, for vehicles purchased with a loan, the month and year of loan origination. As of the 2013 SCF, respondents were not asked to report the month or year of transaction for new or leased vehicles, so we infer purchase year from loan origination year or model year, if purchased outright. We are also able to distinguish between households' personally-owned and business-owned vehicles; we exclude business-owned vehicles from our analysis.

The Bureau of Economic Analysis' (BEA) National Income and Product Accounts provide estimates of motor vehicle units sold, spending, and output. The NIPA estimates total spending and units sold using transactions and vehicle registrations data, respectively, defining a new car as one that has had no

previous registration.[65] In order to remain consistent with the SCF definition of personal-use vehicles, we only include NIPA values for autos and light trucks (which include SUVs and pickup trucks.) in our comparison. Because leased vehicles are not part of the consumer sector in the NIPA,[66] we exclude them from this comparative analysis. Unlike in the SCF, new and used car expenditures are estimated using different valuation methods in the NIPA. Aggregate measures for units of used cars sold are included in the NIPA, but expenditures on used cars are based on the margin, or markup, on used cars, and not the total price paid by the consumer. Because the SCF differentiates leased and used vehicle purchases from loan and cash purchases, we remove these units from our measure of vehicle transactions and spending to remain consistent with the NIPA definitions.

After we align the definitions of SCF and NIPA vehicle transactions, we must ensure we are comparing the two datasets over the same time period. The NIPA estimates contain monthly and annual data dating back to 1967, while the SCF is a triennial household survey that has been conducted in its current form since 1989. Because SCF field interviews are conducted over a 10-month period from April to the following February, we compare NIPA and SCF aggregate vehicle purchases in the calendar year prior to the survey. Using the year prior to the survey ensures that all new vehicles purchased by households will be captured in both the SCF and the NIPA.[67] Using the year of the survey is problematic because the median interview is completed in July of the survey year, so comparing vehicle spending between the SCF and NIPA in the calendar year in which the survey was conducted would necessarily leave SCF values well below NIPA values, as the SCF would not capture any vehicles purchased between the interview completion date and the end of the year (about six months based on the median interview date). As such, we use 1991, 1994, 1997, 2000, 2003, 2006, 2009, and 2012 as our benchmark years.[68]

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[65] See "Chapter 5: Personal Consumption Expenditures" of the *NIPA Handbook: Concepts and Methods of U.S. National Income and Product Accounts* for details on the NIPA methodology for motor vehicle estimates at bea.gov/national/pdf/chapter5.pdf

[66] The NIPA includes leased vehicles with new units sold in business unit sales, which correspond to private fixed investment expenditures.

[67] While the SCF will capture the vast majority of vehicle purchases in the benchmark year, potential for measurement error still remains due to any vehicles that were resold or traded in before the field interview for the SCF.

[68] Due to minor changes in survey questions and measure, we do not include data from the 1989 SCF in our analysis.

Because the SCF does not question respondents on their date of purchase for new vehicles, we use information about loan origination and vehicle model year to determine whether a vehicle was purchased in a benchmark year. For allocating loan-financed vehicles to a purchase year, we assume the loan origination date is the same as the purchase date. Typically, between 60 and 70 percent of new cars in the SCF are purchased with a loan. Because model year and purchase year are often different, we rely on the observed relationship between model year and loan origination year of loan-financed cars to estimate the purchase year of cars bought without a loan. The SCF data indicate that between 25 and 35 percent of loan-financed vehicles were purchased in a year different than the model year.[69] To allocate non-loan-financed vehicles to a purchase year, we calculate a series of model year-to-purchase year ratios for loan-financed vehicles in each survey wave. Table C1 illustrates how we estimate the number of new vehicles purchased in 2012. Looking at model year 2011, 2012, and 2013 vehicles, we add the number of loan-financed vehicles in 2012, and the estimated number of non-loan-financed vehicles purchased in 2012 to obtain an estimate of total vehicles purchases for 2012. We assume that the model year and purchase year relationship does not depend on whether or not the vehicle was loan financed. In other words, if 30 percent of 2011 models purchased with a loan were loan-financed in 2012, we assume that 30 percent of 2011 models bought outright were also purchased in 2012.

Table C1. Car Purchases in Benchmark Year 2012

Model Year	Purchased With Loan In:	Purchased Without Loan
2011	2012	Percent of 2011 Models loan-financed in 2012* Number of 2011 Non-Loan Financed Models
2012	2012	Percent of 2012 Models loan-financed in 2012* Number of 2012 Non-Loan Financed Models
2013	2012	Percent of 2013 Models loan-financed in 2012* Number of 2013 Non-Loan Financed Models

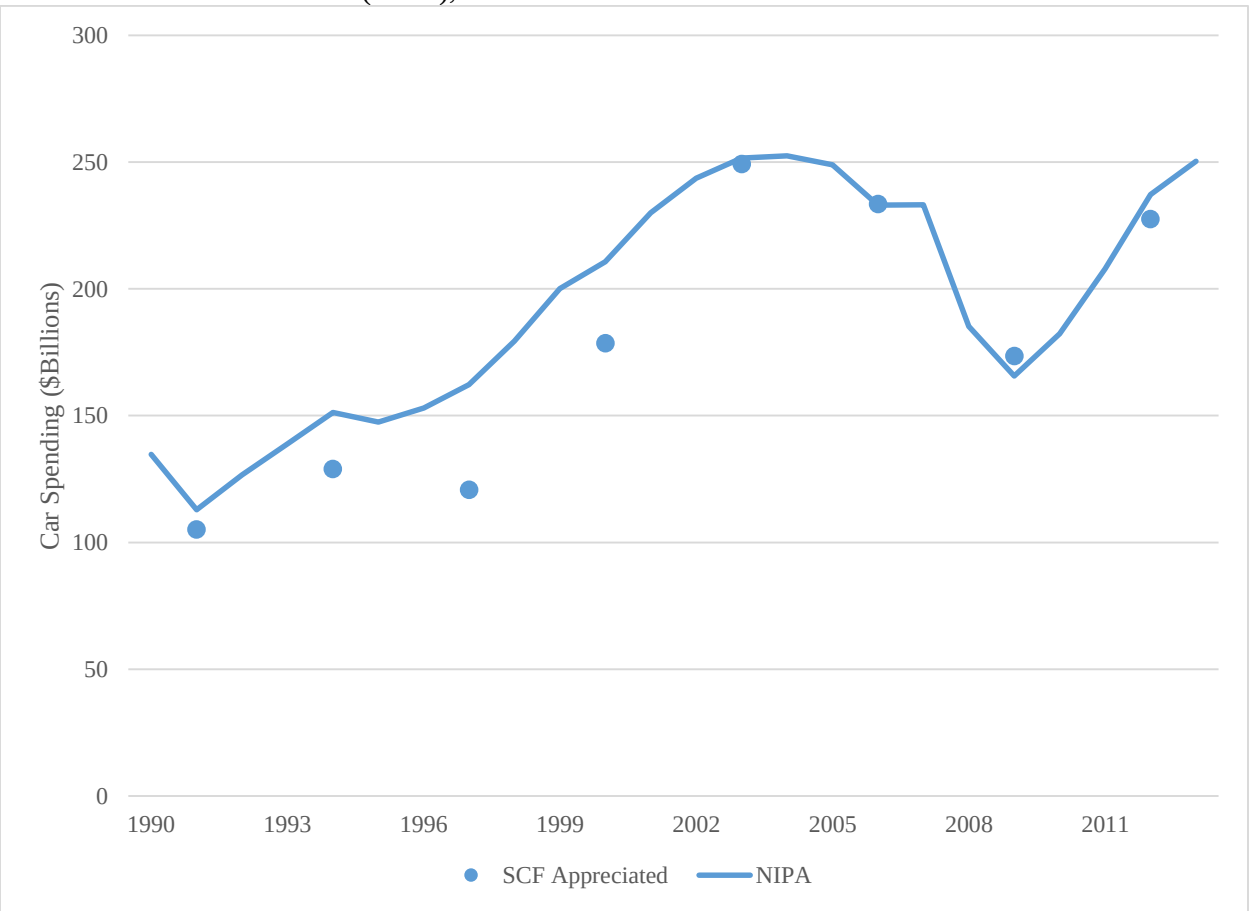
[69] Typically, new car models are released for purchase in the fall of the previous year, so a 'year t' car will first be available for purchase in the fall of t-1. New models continue to be sold into the following calendar year (t+1), suggesting any vehicle could conceivably be purchased new in any one of three calendar years.

C.1.2 Reconciling Motor Vehicle Units Sold in NIPA and SCF

To measure the number of vehicles sold in a given year in the SCF, we simply count the number of new vehicles a household acquired in a given year based on the procedure described above. NIPA table 7.2.5S[70] provides monthly estimates of auto and truck unit sales by sector, allowing us to use only the vehicles sold to the consumer sector (line 10), which most closely aligns with the SCF definition of a household.[71] Prior to 2002, the number of units of light trucks sold to the consumer sector is not published in the NIPA. To estimate this value for 1991 to 2001, we use the Motor Vehicle Unit Retail Sales table of the NIPA Motor Vehicle gap_hist file[72] to calculate the percent of total light units (autos and light trucks) composed of light trucks.[73] We then apply the auto and light truck shares of total retail sales to the number of new auto sales to the consumer sector (table 7.2.5S, line 10) to determine the total number of new autos and light trucks. In 2000, for example, light trucks composed 49 percent of total retail sales to all sectors (as given by the gap_hist file), and the consumer share of auto units totaled 4.64 million cars. Assuming a similar breakdown between autos and light trucks across sectors, we estimate about 4.53 million light trucks were purchased in 2000, for a total of 9.17 million new personal-use vehicles.[74] Figure C1 displays trends in new vehicle units purchased in the NIPA and SCF.

[70] Table 7.2.5S is found in the "Underlying Detail Tables" section of the BEA website at bea.gov/iTable/iTable.cfm?ReqID=12&step=1#reqid=12&step=1&isuri=1.
[71] The NIPA provides estimates of vehicles sold to the consumer, government, and business sectors, where the consumer sector encompasses personal-use vehicles.
[72] The gap_hist file is found under Supplemental Estimates: Motor Vehicles on the BEA website at bea.gov/national/index.htm#gdp; Table 6: Motor Vehicle Unit Retail Sales provides monthly estimates of auto and light truck unit retail sales.
[73] BEA changed its definition of light trucks to include SUVs, pickup trucks, and minivans as a result of the 2003 Comprehensive Revision. Following this reclassification, data for light truck units sold became available by sector.
[74] There is no noticeable trend break from 2001 to 2002, when our series changes from a share approach to a direct estimate of light truck unit retail sales for the consumer sector.

Figure C1: New Vehicle Units Purchased in the Survey of Consumer Finances (SCF) and National Income and Product Accounts (NIPA), 1989 - 2013



Sources: Federal Reserve Board and Bureau of Economic Analysis.

C.1.3 Reconciling Vehicle Spending in NIPA and SCF

The SCF uses make, model, and model year information on up to four cars per household to impute a present market value, according to National Automobile Dealers Association (NADA) data.[75] The NADA values provide a baseline estimate for the original purchase price of each vehicle , whichwe aggregate across households to estimate total vehicle spending. Because the purchase year is not available in the SCF, we allocate the value of vehicles purchased without loans to a purchase year proportionally based on the distribution of values for loan-financed purchases based on the procedure described earlier.

Because the NADA value is a measure of the current value of the vehicle, and not the price a household actually paid, vehicles purchased in a year other than their model year need to be adjusted in order to obtain an estimate of household spending. If a household purchased a vehicle outside of the survey year, we appreciate or depreciate the present value accordingly. The survey year (t=0) has an adjustment factor of 1, based on the assumption that the present value of the vehicle (model year = survey year) is equal to the purchase price of the vehicle in that year. The total value of vehicles with model years from two years before the survey year, one year before the survey year, and one year after the survey year are each divided by the value of vehicles in the survey year to obtain an adjustment factor; adjustment factors are calculated separately for loan and cash purchases. Table C2 below describes the unappreciated (SCF) and appreciated (SCF Appreciated) data. In the body of the text, we use the appreciated values as the SCF values.

[75] The "Vehicles" section of the SCF Codebook contains the specific questions asked of households regarding personal-use vehicles they have purchased and is available at www.federalreserve.gov/econresdata/scf/files/codebk2013.txt

Table C2: Comparison of Survey of Consumer Finances (SCF) Unappreciated and Appreciated Vehicle Spending ($ Millions), 1991 – 2012

Year	Unappreciated	Appreciated
1991	88	105
1994	117	129
1997	103	121
2000	171	179
2003	237	249
2006	220	233
2009	153	173
2012	198	227

Source: Federal Reserve Board

The NIPA includes motor vehicle spending from the consumer sector in estimates of personal consumption expenditures (NIPA table 2.4.5, line 5). BEA calculates expenditures on autos and light trucks by multiplying the number of units sold times the average expenditure per transaction; consumer shares derived from data detailing registrations by persons.[76] As with units sold, the NIPA does not include expenditures on leased vehicles in PCE for new motor vehicles, but in private fixed investment.[77]

C.2 Food Spending

The SCF added questions asking how much a household spends on food "you use at home," on food "delivered to the door," and on "eating out" in 2004.[78] The respondent provides a dollar value and a frequency with which they spend that amount, which we convert into an annual total for this analysis. We

[76] BEA uses *Wards' Automotive Reports* and J.D. Power and Associates for its unit sales and average expenditure per transactions values, respectively; R.L. Polk & Co. provides data on new registrations by persons.
[77] It is also important to note that "mixed-use autos" are not included in PCE estimates of motor vehicle expenditures, but are included with the business sector.
[78] See the SCF codebook for exact wording of the food spending questions at www.federalreserve.gov/econresdata/scf/files/codebk2013.txt

then combine the totals for delivery and eating out to create a total value for food purchased away from home.

The most similar NIPA measures of food spending are 2.4.5 line 27 (Food and nonalcoholic beverages purchased for off-premises consumption) and 2.4.5 line 83 (Purchased meals and beverages). The former lines up well conceptually with our measure of food spending for the home as it is composed mainly of grocery store purchases. The latter includes food at restaurants, alcohol at restaurants, food purchased at bars, school lunches, and food for delivery.