Evaluating Wealth Data in the Redesigned 2014 Survey of Income and Program Participation*

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ABSTRACT: The U.S. Census Bureau redesigned the 2014 panel of the Survey of Income and Program Participation (SIPP). As part of the redesign, several changes were made to the wealth module of the survey to fill gaps in question content and improve clarity of existing questions. To evaluate the effects of these changes, we compare SIPP wealth data with Survey of Consumer Finances (SCF) wealth data to investigate how the match between SIPP and SCF changed after the questionnaire redesign. We find that the match between SIPP and SCF has improved for many wealth estimates, although numerous discrepancies remain. We offer potential explanations for why some estimates have changed and why the difference between SIPP and SCF is large for certain estimates.

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1. Introduction

Accurate measurement of household wealth is important for studying economic behavior and well-being. Wealth data allows researchers and policy makers to explore how household wealth varies across social and economic characteristics and how various groups within the U.S. might endure hardships when faced with unexpected expenses or drops in income. At the same time, wealth inequality has received increasing attention from some researchers and policymakers.[1]

The Survey of Income and Program Participation (SIPP) is one of the primary sources of wealth data for the U.S. population. SIPP has a large sample size, is a panel study, and includes a wide breadth of content on employment, health insurance coverage, and participation in government programs. Because of the decentralized nature of asset and debt holdings, household survey data provide the most comprehensive measure of wealth in the U.S. However, survey data are prone to measurement error, and questions on financial topics prove particularly challenging for many respondents.

The purpose of this paper is to support the careful use of SIPP data by researchers by examining how changes to the Survey of Income and Program Participation from the 2008 panel to the 2014 panel affected wealth data quality. In 2014, numerous changes were made to SIPP. The asset section underwent a major revision in which new assets were added and asset income and values were asked together rather than in separate sections. These changes may impact wealth data quality and estimates of wealth for various demographic groups.

To address this question, we compare estimates of wealth using SIPP to estimates using the Survey of Consumer Finances (SCF). The SCF is considered the "gold standard" for wealth data from surveys because of its dual-frame sample design that oversamples high-wealth families and the detailed questions aimed at capturing complex asset holdings held by these families.[2] We estimate differences between SIPP 2014 (wave 1) and SCF 2013 and compare them to differences between SIPP 2008 (wave 7) and SCF 2010, as reported in Eggleston and Klee (2015). The SIPP 2014 and SCF 2013 data refer to wealth from calendar year 2013, while the SIPP 2008 and SCF 2010 data refer to calendar year 2010.

This paper builds on previous research evaluating the quality of SIPP wealth data. These studies similarly focus on comparing estimates from SIPP to other surveys. Curtin, Juster, and Morgan (1989) and Wolff (1999) compared SIPP and SCF from the 1980s and early 1990s. They found the level and distribution of wealth to be comparable in general across these surveys upon excluding the wealthiest individuals. Czajka, Jacobson, and Cody (2003) find larger discrepancies in the 1996 Panel (calendar year 1998)—aggregate net worth estimated using SIPP is just under half of the magnitude estimated using the SCF, and median net worth estimate in SIPP data is approximately two-thirds of the analog in SCF data. Most of this discrepancy is due to lower estimates of the holdings of the wealthy.

Eggleston and Klee (2015) investigate how changes implemented based on recommendations from Czajka et al. (2003) affected the match between SIPP and SCF for the 2008 SIPP Panel (calendar year 2010). They find that the match between SCF and SIPP improved in some dimensions but not others. For example, the SIPP estimate of median net worth went from about 67 percent of the SCF estimate in Czajka et al. (2003) to about 84 percent in Eggleston and Klee (2015). However, the SIPP estimate of the 25th percentile of net worth went from about 42 percent of the net worth estimate to about 28 percent.

In this paper, we compare the first wave of the 2014 SIPP Panel (calendar year 2013) to the 2013 SCF. Our methodology largely resembles Czajka et al. (2003) and Eggleston and Klee (2015). We compare the net worth of U.S. families as well as the components of net worth. One difference in our methodology is that we break down net worth by major asset categories, such as financial assets held outside retirement accounts. Next, we analyze the relationship between components of net worth using correlation median statistics as described in (Falk 1998). We use this statistic rather than the standard Pearson's correlation coefficient in order to reduce the effect of outliers. Finally, we discuss survey quality as reflected by the incidence of imputed values.

We find that many of the differences between the 2014 SIPP and 2013 SCF estimates (calendar year 2013) are smaller than the differences between 2008 SIPP and 2010 SCF estimates (calendar year 2010). In other words,

[1] For example, Saez and Zucman's (2013) paper on wealth inequality looks at how much wealth is held by the wealthiest 0.1 percent of households. In addition, Munoz et al. (2015) examine how wealth varies across numerous racial and ethnic group in the Boston Metropolitan Statistical Area.

[2] National Research Council (2009) is one among many sources that have applied this label in reference to SCF.

there is less of a discrepancy between the SIPP and SCF in the 2014 Panel than there is in the 2008 Panel. At the same time, median net worth has *increased* in SIPP between 2010 and 2013 (Smith et al. 2017), but median net worth had *decreased* in SCF between 2010 and 2013 (Bricker et al. 2016). We conclude that (1.) the overall level of the SIPP variables could be more reliable in 2014 than in 2008, and (2.) the 2008 and 2014 estimates are not directly comparable over time. Because of these changes, measures of household wealth should not be directly compared with earlier panels, unless data users account for changes due to the redesign.

Nevertheless, there are still potential quality problems with some individual asset categories, with large differences between SIPP and SCF estimates. For example, the estimate of the median value for trusts is $100,000 in the 2014 SIPP (calendar year 2013), but is $253,216 in the 2013 SCF. However, for broader asset categories, such as assets in tax-preferred retirement accounts, the differences between SIPP and SCF are smaller. Moreover, for the broadest category, household net worth, there is no statistically significant difference in the SIPP and SCF estimates in 2013 for the median or 75th percentile. Taking SCF as a benchmark, the SIPP data appears to have improved in a variety of dimensions, although there are still some large discrepancies for some individual assets.

2. Data

Our primary dataset of interest is the Survey of Income and Program Participation (SIPP). The SIPP is a longitudinal survey from the U.S. Census Bureau which interviews between about 30,000-45,000 households over a four-to-five year period.[3] The survey collects information about the income, assets, labor market activity, and participation in government welfare programs of U.S. households. Information on a wide variety of assets and debts is collected and includes variables on savings accounts, checking accounts, retirement accounts, property values, and credit card debt. Wealth data have been collected in every panel since the survey began in 1984. However, in prior panels, there was a strong focus on income, so only questions about the ownership of income earning assets and income amounts were asked in every interview. Periodically, there was a topical module that asked questions about asset values and debt as well as questions on non-income earning assets, such as vehicles. SIPP also oversamples low-income areas to improve its estimation of program participation.

In 2014, the SIPP underwent numerous revisions that could affect wealth measurement. Respondents in the 2014 SIPP Panel are interviewed less frequently in order to reduce costs (U.S. Census Bureau 2016). In the 2014 Panel, respondents are interviewed once a year, but in earlier panels, respondents were interviewed every four months. However, in contrast with earlier panels, wealth data are now collected during every wave. There were also many other changes made to the wealth content. New questions about student loans, education savings accounts, businesses owned as an investment, annuities, trusts, and the face-value of life insurance were added to the survey (Smith et al. 2017). The question text for several other questions was simplified. In particular, the question text for non-interest earning (regular) checking accounts was simplified, and questions on interest-earning and non-interest earning accounts were asked together, rather than at different times during the survey (as was the case in SIPP 2008). Additional examples were provided in the questions asking about other real estate and other assets. Finally, we developed a new methodology for assigning vehicle trade-in values from the National Automobile Dealers Association (NADA) using reported year, make, and model.

In Appendix A, we provide additional details about changes made to wealth questions in 2014 SIPP.

The first wave of 2014 SIPP has a higher unit nonresponse rate than the first wave of the 2008 Panel (31.2 percent vs 19.4 percent), which is expected because unit nonresponse rates have been increasing for surveys in general over time (de Leeuw and de Heer 2002). In addition, the 2014 SIPP has a smaller sample size than the 2008 Panel for the first wave (29,685 vs 42,032), although the sample size in the 2008 Panel did drop to 33,827 by wave seven, which is the wave we use in this paper. Thus, because the 2014 SIPP has a smaller sample size and higher nonresponse rates, there exist the potential for the 2014 to have more unit nonresponse bias and higher sampling error, although higher unit nonresponse rates don't necessarily lead to higher unit nonresponse bias (Groves and Peytcheva 2008).

2.1 Survey of Consumer Finances

To evaluate the changes in 2014 SIPP, we compare the SIPP wealth data to wealth data from the Survey of Consumer Finances (SCF). SCF is a triennial interview survey sponsored by the Federal Reserve Board of

[3] The sample size varies across panels.

Governors in collaboration with the U.S. Department of the Treasury. Because wealth is more of a focus for SCF than in SIPP, the SCF has more detailed wealth questions than SIPP, including scarcely held assets and liabilities. Data are collected by the National Opinion Research Center (NORC) at the University of Chicago. In total, 6,026 families were interviewed as part of the 2013 survey.

2.2 Sampling Frames

In both SIPP and SCF, the sample frame and questionnaire content are specifically designed to construct nationally representative estimates of wealth holdings. The SCF sample design consists of two parts; a standard geographically-based random sample, and a sample of primarily high-wealth families based on data from the Internal Revenue Service (IRS).[4]

This is in contrast to the SIPP, which oversamples low-income areas based on data from other Census surveys and the decennial Census. Using sample weights corrects for oversampling of various populations, so if the weights are designed correctly, the SIPP and SCF comparisons should not be impacted by differences in the sampling methodologies.[5] However, because SCF uses IRS tax return data to sample some respondents, they have more information on some non-respondents than SIPP does. Because of this, the SCF weights are potentially able to better-correct for nonresponse bias than SIPP weights. In addition, oversampling may affect the precision of various estimates. For example, because the SCF oversamples high-wealth households, the SCF data may have a more precise estimate of the wealth of high-wealth households for a given sample size.

2.3 Unit of Analysis

One major difference between SIPP and SCF is the unit of analysis. The SCF's unit of observation is a Primary Economic Unit (PEU), which includes a household's economically dominant individual or couple and their financial dependents. In SIPP, the main unit of observation is a household, which consists of everyone living together in a housing structure.[6] For many common household and family structures, such as a married couple with children, the Census household is the same as the PEU. However, if a married couple has a relative live with them who has her own job and maintains her own finances, then she would be in the Census household but not in the PEU.

We use demographic and family relationship variables collected in SIPP to generate PEUs.[7] This is necessary because SIPP does not collect data on economic dependence. We only include household members who are in the household head's family, are an unmarried partner of the household head, or are a child under 25 of an unmarried partner of the household head.[8] We exclude siblings and other relatives in the household head's family who are over 25. This procedure generates a comparable unit of analysis, although we likely exclude some household members who are economic dependents, such as a parent with a disability who lives with his or her child and relies on this person for financial support.

2.4 Group Quarters

Another difference between SIPP and SCF is the sampling of group quarters, such as student dorms and convents. SIPP includes noninstitutional group quarters in its sampling frame, while SCF does not. Because of this, we exclude SIPP respondents living in group quarters. With the group quarters and primary economic unit restriction, SIPP 2014 wave 1 median net worth is $77,949, which is larger than the estimate of $74,894 with group quarters included.[9] Our decision to exclude group quarters diverges from the methodology in Czajka et al. (2003)

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[4] To sample high-wealth households, the SCF imputes the wealth of potential respondents based on income reported in tax returns. For more details on this methodology, see Bricker et al. (2015).

[5] In addition, the weighing methodology did not change in the 2014 Panel, so changes in the difference between SCF and SIPP over time should not be impacted by changes in weighting.

[6] This is the standard unit of analysis for household surveys conducted by the U.S. Census Bureau.

[7] This procedure was first developed by Czajka et al. (2003) and used by Eggleston and Klee (2015).

[8] Czajka et al. (2003) and Eggleston and Klee (2015) have a condition which excludes subfamilies in which the subfamily head was over 25. Because 2014 SIPP no longer has subfamily indicators, we do not include this restriction. This difference should be minor, as our procedure still excludes many relatives in the household head's family who are over 25.

[9] P-value for the difference in medians is 0.07.

and Eggleston and Klee (2015), which included group quarters in their SIPP samples. In this paper, we remove group quarters for our estimates using SIPP 2008. As a result, the differences between SIPP 2008 and SCF 2010 reported in this paper are slightly smaller than the estimates reported in Eggleston and Klee (2015).

2.5 Reference and Recall Period

Finally, the 2014 SIPP and SCF also differ in the reference and recall period of the wealth data. In wave 1 of 2014 SIPP, interviews occurred between February and May of 2014, and respondents were asked to report asset and debt values as of the last day of 2013. The SCF, on the other hand, interviewed respondents throughout 2013, and respondents were supposed to report the value of assets as of the day of the interview. Because SIPP had a longer recall period for assets questions, it is possible that recall error may affect the comparisons between SIPP and SCF. In addition, the 2008 SIPP also asked respondents to report the value of assets as of the interview, so the comparisons between the 2008 and 2014 SIPP Panels may also be affected by changes in recall error as well.

3 Results

We start by benchmarking SIPP and SCF for net worth and broad categories of assets and debts, and across the distribution of their values. Our measure of net worth consists of (i.) financial assets inside tax-preferred retirement accounts; (ii.) financial assets outside tax-preferred retirement accounts; (iii.) miscellaneous financial assets; (iv.) unsecured debt; (v.) equity in real estate; and (vi.) equity in vehicles. Notably absent from our measures in both SIPP and SCF is the expected present value of defined benefit pensions, which might be an important source of wealth for older cohorts, but less important in recent years.

In order to provide more details about the changes in SIPP net worth estimates, we then compare ownership rates and the median value conditional on ownership for these broad asset and debt variables, as well as their sub-components. Next, we examine correlation between certain asset value and debt variables to provide details on how portfolio compositions compare between SIPP and SCF. Finally, we compare imputation rates across SIPP and SCF to help reconcile some of the large differences in correlation rates when we do not observe differences in the levels and ownership rates. Appendix B provides details on how we construct standard errors in order to compare SIPP estimates with SCF estimates.

Table 1: Overview of Net Worth Estimates

	2014 SIPP and 2013 SCF (Calendar Year 2013)						2008 SIPP and 2010 SCF (Calendar Year 2010)	
Statistic	SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	SIPP/SCF Ratio	Ratio Standard Error	SIPP/SCF Ratio	Ratio Standard Error
25th Percentile	3,706	8,743	5,037	469	***42.4	4.0	***28.3	2.3
Median	77,949	81,077	3,128	3,545	96.1	4.3	***84.5	3.4
75th Percentile	313,095	314,243	1,148	10,376	99.6	3.3	***86.9	4.0
Mean	372,011	525,963	153,952	25,245	***70.7	4.6	***75.8	6.1
Aggregate (Sum, in trillions)	46.25	64.45	18.19	3.13	***71.8	4.7	***76.1	6.1

Note: Table gives net worth estimates from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ratio is in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed though balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. The standard error for the ratio was calculated using the delta method. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

3.1 Benchmarking Net Worth in SIPP and SCF

Table 1 presents net worth estimates using SIPP 2014 and SCF 2013 (calendar year 2013), and compares them with estimates from 2008 SIPP and 2010 SCF (calendar year 2010). Overall, there are now smaller discrepancies between SIPP and SCF at the median, as well as the 25th and 75th percentiles. Median net worth for calendar year 2013 is $77,949 in SIPP and $81,077 in SCF, with a difference that is not statistically different from zero. The ratio of SIPP to SCF in 2013 is 96.1, which means the SIPP estimate is 96.1 percent of the SCF estimate. A ratio closer to 100 indicates a closer match, and the estimate of 96.1 is not statistically different from 100. This ratio for calendar year 2013 is higher than the ratio of 84.5 from calendar year 2010. For the 25th percentile, the SIPP estimate is 42.4 percent of the SCF estimate in 2013. This ratio from calendar year 2013 is higher than the 28.3 percent in calendar year 2010. For the 75th percentile, the SIPP estimate in calendar year 2013 is 99.6 percent of the SCF estimate, up from 86.9 percent in calendar year 2010. The mean is substantially lower in SIPP than in SCF, where the SIPP estimate is 70.7 percent of the SCF estimate. However, the ratio for 2010 was 75.8, which is not statistically different from the 2013 estimate. A similar pattern exists for aggregate wealth.

3.2 Benchmarking specific assets and debts

We present the ownership rates and median value conditional on ownership for all the subcomponents as well as for the overall category.

Table 2: Financial Assets in Tax-Preferred Retirement Accounts

	2014 SIPP and 2013 SCF (Calendar Year 2013)				2008 SIPP and 2010 SCF (Calendar Year 2010)	
Statistic	SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	Difference	Difference Standard Error
Ownership rates						
Total	49.66	49.23	-0.43	0.64	0.77	0.71
IRA/Keogh	27.02	28.10	*1.08	0.57	-0.01	0.64
Employer-Sponsored Plans	38.18	34.52	***-3.66	0.65	***-3.87	0.59
Median value conditional on ownership						
Total	60,000	58,228	-1,772	3,134	-563	2,986
IRA/Keogh	40,000	49,767	***9,767	3,102	***10,475	3,134
Employer-Sponsored Plans	50,000	37,027	***-12,973	2,408	1,260	2,469

Note: Table gives retirement account estimates from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ownership rates are in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

Retirement Accounts

Table 2 presents the results for retirement accounts. Measures of assets held in any tax-preferred retirement accounts are similar in SIPP and SCF in calendar year 2013, as they had been in calendar year 2010. According to the SIPP estimates from calendar year 2013, 49.7 percent of households have any tax-preferred retirement accounts, which is similar to the SCF estimate of 49.2 percent of households. The conditional median value of assets held in these accounts is $60,000 in SIPP and $58,228 in SCF in 2013. There is not a statistically significant difference between the ownership rates or the conditional medians in SIPP and SCF, and these differences in calendar year 2013 are comparable to those in calendar year 2010.

Tax-preferred retirement accounts include both employer-sponsored plans (e.g., 401(k), 403(b), or Thrift plans), as well as Individual Retirement Accounts (IRAs) and Keogh plans. While the ownership rates and value of assets held in any tax-preferred retirement accounts are similar in SIPP and SCF, there are differences between

estimates for the types of plans. For employer-sponsored plans, 2014 SIPP has three percentage points higher ownership rates. This is similar to estimates in calendar year 2010. The median value of IRA/Keogh accounts is now $49,767 in SCF and $40,000 in SIPP, for a difference in median values of $9,767. In calendar year 2010, this difference is $10,475, which is not statistically different from the estimate in calendar year 2013. For employer-sponsored plans, the difference in median values for calendar year 2013 is -$12,973, in which the SIPP estimate is higher than the SCF estimate. This is in contrast with the difference of +$1,260 in calendar year 2010, in which the SCF estimate is not statistically different from the SIPP estimate.

To summarize, while the SIPP and SCF estimates for all tax-advantaged retirement accounts are similar, there are differences in the estimates for the employer-sponsored plans compared with IRA/Keogh plans for calendar year 2013. For employer-sponsored plans, both the ownership rates and the median value conditional on ownership are higher in SIPP than in SCF. For IRA/Keogh, both estimates are lower in SIPP than in SCF. The re-designed SIPP survey instrument had only minor changes to the questions on tax-preferred retirement accounts. In light of this, we did not anticipate changes among these variables, and, indeed, these findings for calendar year 2013 are comparable to results from calendar year 2010. Nevertheless, the employer-sponsored plans median value conditional on ownership increased in SIPP relative to SCF. Because the question text for employer-sponsored plans changed very little in the 2014 Panel, this result is surprising. While the median value could be affected by overall changes made to the survey, such as changes due to context effects or data processing, it is unclear whether these effects would result in the large change in median values.

Financial Assets Outside of Retirement Accounts

Table 3 presents results for financial assets outside of retirement accounts, such as bank accounts, directly owned bonds, and shares of stocks held outside of retirement accounts. For savings accounts, SCF classifies education savings accounts, such as a 529 plan, as a type of savings account. Because of this, for the 2014 SIPP panel, we include data on 529 plans in our savings account variable. Questions on education savings accounts were added in the 2014 Panel, so the SIPP estimates from calendar year 2010 do not include any data on educational savings accounts.

Table 3: Financial Assets Outside Tax-Preferred Retirement Accounts

Statistic	2014 SIPP and 2013 SCF (Calendar Year 2013) SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	2008 SIPP and 2010 SCF (Calendar Year 2010) Difference	Difference Standard Error
Ownership rates						
Total	85.95	92.41	***6.46	0.39	***17.74	0.48
Bank Accounts	85.74	92.19	***6.46	0.40	***18.76	0.49
Checking Accounts	81.61	87.10	***5.49	0.48	***24.67	0.59
Savings Accounts	61.65	49.61	***-12.04	0.75		
Money market deposit accounts	12.36	14.21	***1.85	0.46		
Certificates of deposit (CDs)	7.62	7.75	0.13	0.39		
Bonds (Other Interest Earning Assets)	8.82	11.02	***2.20	0.43	***1.48	0.42
Stocks and Mutual Funds	19.20	18.42	-0.78	0.50	***2.18	0.52
Median value conditional on ownership						
Total	5,400	5,373	-27	299	***1,130	221
Bank Accounts	4,200	4,559	359	277	***1,492	175
Checking Accounts	1,500	1,991	***491	1		
Savings Accounts	2,500	3,952	***1,452	249		
Money market deposit accounts	15,358	29,860	***14,502	1,896		
Certificates of deposit (CDs)	24,000	16,125	**-7,875	3,185		
Bonds (Other Interest Earning Assets)	3,000	1,493	***-1,507	281	-265	183
Stocks and Mutual Funds	35,000	42,601	*7,601	4,411	**7,933	3,623

Note: Table gives estimates on bank accounts and other financial assets outside of retirement accounts from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ownership rates are in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

Ownership rates and median values of financial assets outside tax-preferred retirement accounts are typically smaller in SIPP than in SCF, although the differences between the estimates are smaller in calendar year 2013 than they are in calendar year 2010. According to the SIPP estimates from calendar year 2013, 86.0 percent of households have financial assets outside of tax-preferred retirement accounts, which is smaller than the SCF estimate of 92.4 percent of households. This difference of 6.5 percentage points in calendar year 2013 declined from a 17.7 percentage point difference in calendar year 2010. The conditional median value of assets held in these accounts is $5,400 in SIPP and $5,373 in SCF for calendar year 2013. This difference in the medians declined from $1,130 in calendar year 2010 to -$27 in calendar year 2013. The 2013 difference is not statistically different from zero.

In addition to these changes in aggregated ownership rates and the conditional median, there were also changes in the specific components of financial assets outside tax-preferred accounts. The current SIPP ownership for savings accounts is 61.7, compared with 49.6 percent of SCF households. This 12.0 percentage point difference is the largest among these components of financial assets outside tax-preferred retirement accounts.

One of the important changes is for bank accounts, specifically for checking accounts. In calendar year 2013, the SIPP ownership rate for bank accounts is 85.7, compared with 92.2 percent of SCF households. This difference of 6.5 percentage points in calendar year 2013 is in contrast with an 18.8 percentage point difference between SIPP and SCF in calendar year 2010. The changes in the ownership rate for checking accounts are even more striking. In calendar year 2013, the SIPP ownership rate is 5.5 percentage points lower than the SCF estimate, but in calendar year 2010, the difference was 24.7 percentage points. These large changes occurred following substantial changes to the checking account questions between the SIPP 2008 and 2014 panels, as described in Appendix A, suggesting that the redesigned SIPP survey led to improved estimation of checking account ownership.

Miscellaneous Financial Assets

Our measure of miscellaneous assets consists of data from less-commonly owned assets and data from a catch-all question which asks respondents to report about any remaining assets they have not yet reported to the interviewer. For SCF and both the 2008 and 2014 SIPP, miscellaneous assets includes business equity (positive) and other financial assets.[10] In 2014 SIPP, questions on annuities, trusts, were added to the survey. Annuities and trusts are included in the SCF. When an asset is not explicitly asked about in the survey, respondents are expected to include it in their response for "Other financial assets."

Finally, the 2008 SIPP, 2014 SIPP, and SCF all have questions on the cash value of life insurance plans. However, in the 2008 Panel, many respondents conflated life insurance face value and cash value (Gottschalck and Moore, 2007), so cash value was excluded from the net worth calculations. In the 2014 Panel, the question text was revised in an attempt to eliminate the confusion between face and cash value. Because of this change, cash value is now included in net worth for 2014 SIPP.

Table 4: Miscellaneous Financial Assets

	2014 SIPP and 2013 SCF (Calendar Year 2013)				2008 SIPP and 2010 SCF (Calendar Year 2010)	
Statistic	SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	Difference	Difference Standard Error
Ownership rates						
Total	31.06	37.65	***6.60	0.65	***28.02	0.63
Annuities	3.66	3.87	0.21	0.26		
Trusts	1.50	1.48	-0.02	0.17		
Cash Life Insurance	18.47	19.18	0.71	0.56		
Business Equity (Positive)	11.86	10.38	***-1.48	0.42	***2.99	0.43
Other financial assets	2.58	13.19	***10.62	0.41	***11.46	0.46
Median value conditional on ownership						
Total	18,600	15,841	-2,759	1,934	***-10,404	3,249
Annuities	48,750	72,461	**23,711	11,340		
Trusts	100,000	253,216	***153,216	49,924		
Cash Life Insurance	12,000	7,704	***-4,296	1,301		
Business Equity (Positive)	15,000	100,000	***85,000	6,341	***73,166	4,045
Other financial assets	30,000	9,953	***-20,047	5,841	***-33,756	4,211

Note: Table gives estimates of miscellaneous assets from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ownership rates are in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

Table 4 presents the results comparing miscellaneous assets between SIPP and SCF. Miscellaneous financial assets ownership rates are lower overall in SIPP than in SCF. In calendar year 2013, the SIPP ownership rate of miscellaneous assets is 31.1 percent of households, compared with 37.7 percent of SCF households. This difference in ownership rates of 6.6 percentage points in calendar year 2013 is in contrast with a 28.0 percentage point difference between SIPP and SCF in calendar year 2010. The median value conditional on ownership is larger in SIPP than in SCF. The conditional median is $18,600 in 2014 SIPP and $15,841 in 2013 SCF. This difference of -$2,759 in calendar year 2013 is closer to zero than the than the difference of -$10,404 in calendar year 2010. In other words, while the SIPP estimate is still higher than the SCF estimate in 2013, this disparity was even larger in 2010. This change is potentially driven by SIPP capturing more miscellaneous assets that have low values, such as cash life insurance, which drives down median values.

[10] Czajka et al. (2003) discusses that SCF asks respondents how much they would receive if they sold their share of a business. By construction, this SCF variable cannot be negative. Because of this, we only code a SIPP respondent as having a business if his or her business equity is positive.

For the subcomponents, ownership rates for annuities, trusts, and cash life insurance are not statistically different between the SIPP and SCF in calendar year 2013, and the SIPP ownership rate for business equity (positive) is only 1.48 percentage points higher than the SCF estimate. However, the ownership rate in calendar year 2013 for other financial assets captured from a catch-all question is 2.6 percent of households in SIPP compared with 13.2 percent of households in SCF. These differences between SIPP and SCF in calendar year 2013 are not statistically different from the differences in calendar year 2010, despite the fact that annuities and trusts are no longer included in the catch-all question for SIPP.[11] The question text about other financial assets was revised between SIPP 2008 and SIPP 2014 to include additional examples of other assets. However, even with this modification, the rates in SIPP are still much smaller than in SCF.

The conditional median values of specific assets are typically smaller in SIPP than in SCF. In particular, the median value of annuities is $48,750 in SIPP and $72,461 in SCF for calendar year 2013, and the median value of assets in trusts is $100,000 in SIPP and $253,216 in SCF. The median positive business equity in calendar year 2013 is $15,000 in SIPP and $100,000 in SCF. However, the median value of both the cash value of life insurance and other financial assets is higher in SIPP than in SCF in calendar year 2013. Thus, while the overall match between SIPP and SCF for other assets has improved in the 2014 Panel, there are large discrepancies for the individual subcomponents.

Unsecured Debt

Table 5 presents estimates for unsecured debt. For the overall category, 50.6 percent of households in SIPP hold unsecured debt in calendar year 2013, compared with 53.2 percent of SCF households. In calendar year 2013, the conditional median is $8,000 in SIPP and $6,274 in SCF. Comparing the estimates from calendar year 2013 to the estimates from calendar year 2010, the difference in SIPP and SCF ownership rates declined from 7.5 to 2.7 percentage points, and the difference in conditional median values increased in absolute value from -$314 to -$1,726.

Table 5: Unsecured Debt

	2014 SIPP and 2013 SCF (Calendar Year 2013)				2008 SIPP and 2010 SCF (Calendar Year 2010)	
Statistic	SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	Difference	Difference Standard Error
Ownership rates						
Total	50.55	53.22	***2.68	0.75	***7.52	0.79
Credit Cards	38.16	38.14	-0.01	0.69	0.54	0.72
Student Loans	17.29	19.92	***2.63	0.51		
Residual Debt	15.79	29.57	***13.77	0.61		
Median value conditional on ownership						
Total	8,000	6,274	***-1,726	359	-314	305
Credit Cards	3,500	2,289	***-1,211	240	***-1,474	184
Student Loans	19,000	16,642	*-2,358	1,349		
Residual Debt	3,950	255	***-3,695	516		

Note: Table gives unsecured debt estimates from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ownership rates are in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

Unsecured debt consists of revolving credit card debt, student loans, and any other residual debt. While the rate in calendar year 2013 of having credit card debt is not statistically different between the surveys at just over 38

[11] Because annuities and trust are not included in the catch-all question for 2014 SIPP, the estimates for other assets in SIPP between the 2008 and 2014 Panels are not comparable over time.

percent of households, the rate of having student loan debt is slightly lower in SIPP than in SCF—17.3 percent compared with 19.9 percent of households. Ownership of residual debt is 15.8 percent in SIPP compared with 29.6 percent in SCF in calendar year 2013. In 2014 SIPP, a direct question on student loans was added to the survey. A common assumption in the literature is that additional detailed questions produce more reliable measures of aggregate wealth (see Juster, Smith, and Stafford, 1999). Because of this, we think a likely reason that the rates of having debt increased in SIPP is because of the additional question explicitly asking about student loans. In addition, the median value of overall unsecured debt may have increased in SIPP if student loan balances have higher values than other types of unsecured debt. Given the addition of the student loan question, the specific components of unsecured debt are not directly comparable to the results from calendar year 2010. Nevertheless, for residual debt, the lower ownership rate and higher median value in SIPP relative to SCF suggests that SIPP is not capturing certain smaller debts.

Equity in Real Estate

Table 6 presents the results for real estate. In 2013, fewer households own real estate in SIPP than in SCF. In SIPP, 64.7 percent of households own real estate, compared with 67.2 percent of households in SCF. This difference of 2.5 percentage points in calendar year 2013 is not significantly different from the difference in calendar year 2010.

Table 6: Equity in Real Estate

	2014 SIPP and 2013 SCF (Calendar Year 2013)				2008 SIPP and 2010 SCF (Calendar Year 2010)	
Statistic	SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	Difference	Difference Standard Error
Ownership rates						
Total	64.73	67.20	***2.46	0.34	***2.45	0.27
Primary Residence	63.22	65.15	***1.93	0.29	***1.56	0.24
Primary Residence Debt	39.30	42.92	***3.62	0.55	***5.45	0.61
Rental Property and Other Real Estate	12.72	17.12	***4.40	0.48	***8.47	0.44
Rental Property and Other Real Estate Debt	6.22	5.28	***-0.95	0.33	***2.94	0.26
Median value conditional on ownership						
Total equity	90,000	89,183	-817	2,830	-4,948	4,680
Primary Residence	175,000	169,209	-5,791	4,159	-213	4,579
Primary Residence Debt	120,000	114,664	**-5,336	2,412	***-11,361	2,343
Rental Property and Other Real Estate	150,000	96,310	***-53,690	9,129	***-34,822	9,126
Rental Property and Other Real Estate Debt	110,000	89,581	**-20,419	9,574	***-29,447	9,923

Note: Table gives real estate estimates from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ownership rates are in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

The SIPP ownership rates for primary residences are close to the SCF estimates, although the SCF estimates are higher by about 1.9 percentage points in calendar year 2013. For rental property, 12.7 percent of households in the SIPP data own rental property or other real estate for calendar year 2013, compared with 17.1 percent of households in SCF. The ownership rate of rental property and other real estate increased in SIPP relative to SCF from calendar years 2010 to 2013. This difference of 4.4 percentage points in calendar year 2013 is smaller than the 8.5 percentage points in calendar year 2010. One explanation for the higher reported ownership of other real estate is the SIPP 2014 instrument included explicit examples of other real estate (such as timeshares) in the question text, while the question text in the SIPP 2008 instrument did not include any examples.

Equity in real estate equals the value of a primary residence and rental property and other real estate, minus debt secured by the primary residence as well as debt for rental property and other real estate. For overall equity in

real estate, there is no statistically significant difference in median values conditional on ownership. The median value for 2013 is $90,000 in SIPP and $89,183 in SCF. This difference of -$817 in calendar year 2013 is not statistically different from the -$4,948 difference in calendar year 2010. The estimates for primary residence values are similar in SIPP and SCF, and primary residence debt is slightly higher in SIPP. In contrast, rental property and other real estate values and debt are much larger in SIPP than in SCF. This pattern, along with lower ownership rates in SIPP, suggest that SIPP might be missing ownership of other real estate and rental property that are toward the lower end of resale values.

Equity in Vehicles

Table 7: Equity in Vehicles

	2014 SIPP and 2013 SCF (Calendar Year 2013)				2008 SIPP and 2010 SCF (Calendar Year 2010)	
Statistic	SIPP Estimate	SCF Estimate	Difference	Difference Standard Error	Difference	Difference Standard Error
Ownership rates						
Vehicles	83.99	86.29	***2.30	0.46	***3.65	0.44
Vehicle Debt	32.33	31.20	*-1.13	0.64	0.10	0.54
Median value conditional on ownership						
Total equity	6,861	11,050	***4,189	236	***5,836	248
Vehicles	11,831	15,886	***4,055	213	***5,799	313
Vehicle Debt	12,499	12,000	-499	624	***-667	147

Note: Table gives estimates on vehicles from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. The SIPP and SCF estimates for medians are given in 2013 dollars, and the ownership rates are in percentage terms. The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

Table 7 presents results for vehicles. Roughly 84 percent of SIPP households own vehicles in calendar year 2013, compared with 86.3 percent of SCF households. This difference of 2.3 percentage points in calendar year 2013 is slightly smaller than the 3.65 percentage point difference in calendar year 2010. Median equity conditional on owning vehicles is $6,861 in SIPP and $11,050 in SCF for calendar year 2013. This is mostly explained by the difference in vehicle values (difference in median of $4,055) rather than vehicle debt (difference in median of -$499, which is not significantly different from $0).

Both surveys use data from the National Automobile Dealers Association (NADA) to assign vehicle values based on reported year, make, and model. Given the two surveys have similar methodology for creating vehicle values, it is surprising that median vehicle values are different between SIPP and SCF. However, SIPP uses average trade-in value while SCF uses retail value. Retail value is typically larger than trade-in value. By construction, the same reported data in SIPP and SCF would generate smaller median vehicle values in SIPP than in SCF.

In the 2008 Panel, SIPP estimates for vehicle values were also lower than SCF estimates. However, the match between SIPP and SCF estimates is closer now than it was for calendar year 2010. The difference in median values conditional of ownership is now $4,055, but was $5,799 previously. This could be due to changes in the methodology used to assign vehicle values, as described in Appendix A. In particular, the NADA database used to

create vehicle values is now updated more frequently, which may result in more accurate assignment of vehicle values.

3.3 Median Correlation Coefficients

Another way to compare data in SIPP and SCF is to analyze the relationship between particular types of assets and debts. The intuition is that if people with greater assets in tax-preferred retirement accounts also have greater assets outside of these accounts, we should see the same pattern across datasets. However, one problem with correlation coefficients is that the estimates can be sensitive to outliers.[12] Because wealth data are highly skewed, observations at the upper end of the distribution may have a large effect on the estimated correlation coefficient. For example, Eggleston and Klee (2015) find that the correlation between asset and debt in the 2008 SIPP was only 0.020 using the entire sample, but the estimate rose to 0.234 when high-wealth households were excluded. This may cause the correlation coefficient to be more reflective of the behavior of a few outliers, rather than reflecting the behavior of the majority of the distribution. To mitigate the impact of outliers, we use the correlation median described in Falk (1998). For two variables x and y, the statistic is given by the expression

$$\frac{Med\left(\left(x - Med(x)\right)\left(y - Med(y)\right)\right)}{Med\left(abs\left(x - Med(x)\right)\right) Med\left(abs\left(y - Med(y)\right)\right)}$$

in which $Med(\cdot)$ is the median of a given variable. This equation is very similar to Pearson's correlation coefficient, except with the median function in place of the expectation function. This statistic is much less sensitive to outliers because it uses medians instead of means.

[12] Czajka et al. (2003) find that the correlation between asset and debt is much lower in SIPP than in SCF, and has gotten worse over time. However, as the correlation coefficient can be very sensitive to outliers, this deterioration may have been driven more by changes in outliers rather than in the overall distribution.

Table 8: Median Correlation Coefficients

		2014 SIPP and 2013 SCF (Calendar Year 2013)				2008 SIPP and 2010 SCF (Calendar Year 2010)	
Pairwise comparison		SIPP	SCF	Difference	Difference Standard Error	Difference	Difference Standard Error
Retire Assets	Non-Retire Assets	0.615	0.618	0.003	0.036	0.011	0.026
Retire Assets	Unsecured debt	0.000	-0.026	-0.026	0.028	-0.014	0.027
Retire Assets	Equity in real estate	0.368	0.553	***0.185	0.038	***0.185	0.032
Retire Assets	Equity in vehicles	0.360	0.303	-0.057	0.035	**0.071	0.029
Retire Assets	Stocks & MF	0.453	0.590	0.136	0.090	***0.348	0.099
Retire Assets	Cash Life Insurance	0.139	0.456	***0.317	0.094		
Retire Assets	Checking Accounts	0.362	0.378	0.015	0.038	**0.138	0.055
Non-Retire Assets	Unsecured debt	0.000	0.005	0.005	0.017	*0.044	0.023
Non-Retire Assets	Equity in real estate	0.549	0.584	0.035	0.030	***0.114	0.034
Non-Retire Assets	Equity in vehicles	0.500	0.451	*-0.049	0.025	***0.088	0.030
Equity in real estate	Equity in vehicles	0.279	0.210	**-0.070	0.032	-0.022	0.021
Equity in real estate	Stocks & MF	0.474	0.542	0.068	0.095	***0.431	0.077
Stocks & MF	Cash Life Insurance	0.197	0.245	0.048	0.110		
Stocks & MF	Checking Accounts	0.270	0.387	*0.116	0.066	***0.253	0.087
Primary Residence	Primary Resid. Debt	0.596	0.579	-0.018	0.038	-0.017	0.038
Vehicles	Vehicles Debt	0.461	0.468	0.007	0.054	0.041	0.036
Assets	Debt	0.750	0.716	-0.034	0.025	***-0.073	0.020

Note: Table gives the correlation median, introduced by Falk (1998) and discussed in the paper, from a sample of all SCF-like families in 2014 SIPP (Wave 1) and all primary economic units in 2013 SCF, which are for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. SCF-like families include the primary family in a household, any unmarried partners of the household reference person, and all of that partner's children younger than age 25. SCF-like families exclude siblings and other relatives of the household reference person who are age 25 or older. Retirement Assets is short for "Financial Assets in Tax-Preferred Retirement Accounts." Similarly, "Non-Retirement Assets" is short for "Financial Assets Outside Tax-Preferred Accounts." The standard error for the difference was calculated using replicate weights from both surveys and the five imputation implicates for SCF. The SIPP standard errors were constructed through balanced repeated replication with Fay's adjustment factor of 0.5, and the SCF standard errors were constructed via bootstrapping. Significance asterisks: *** p<.01, ** p<.05, * p<.1.

Table 8 compares the median correlation coefficients among variables in SIPP and then in SCF. Each row examines the median correlation coefficient between two variables. We report the estimate using SIPP 2014, the estimate using SCF 2013, the difference between these estimates, and the standard error of this difference. We also report the difference using data from SIPP 2008 wave 7 compared with SCF 2010, along with the standard error of the estimated difference.

For many pairwise comparisons in this table, the correlation is similar between SIPP and SCF. For example, the correlation with financial assets outside of tax-preferred retirement accounts ("Non-Retire Assets") is large in both 2014 SIPP (0.606) and 2013 SCF (0.618), and the difference between them (0.012) is not statistically significant. The difference between SIPP 2008 and SCF 2010 is also small (0.011) and not statistically significant. In general, the comparison between broader categories (such as retirement and non-retirement assets, as well as assets and debt) is similar between SIPP and SCF, with differences that are small and not statistically significant. For some other pairwise comparisons, the correlations in SIPP are smaller than in SCF. The correlation of retirement assets and equity in real estate is smaller in 2014 SIPP (0.368) than in 2013 SCF (0.553). The correlation between retirement assets and cash value of life insurance is 0.139 in 2014 SIPP, but 0.456 in 2013 SCF.

Finally, we look at how the difference in pairwise comparisons has changed after the SIPP redesign. Overall, the differences between SIPP and SCF are similar in both calendar year 2010 and 2013, with a few exceptions. For retirement assets and checking accounts, the SIPP correlations are closer to SCF in the 2014 Panel than in the 2008 Panel, potentially due to improvement in the regular checking account question. For other variables, the largest change using SIPP 2014 was for equity in real estate and stocks and mutual funds. The difference in the correlation between the two categories was 0.431 for calendar year 2010, but there is no statistically significant difference between the SIPP and SCF estimates for calendar year 2013.

In summary, the relationship between asset variables is similar between SIPP and SCF, at least for broad asset categories. For smaller asset grouping, the relationship is close between SIPP and SCF for many variables, although there are some notable exceptions, such as the correlation between cash life insurance and retirement accounts, and the correlation between real estate equity and retirement accounts. These results are in contrast to Czajka et al. (2003) and Eggleston and Klee (2015), which found that the Pearson's correlation coefficient was much lower in SIPP than in SCF. However, given the Pearson's correlation coefficient can be sensitive the outliers, these low correlations may be driven by the data of a few high-wealth individuals, rather than being reflective of most respondents' wealth data.

3.4 Imputation rates

The reported amounts in the preceding sections use data from all respondents, which includes both reported amounts and imputed data. In this section, we use the share of imputed data as an indicator of data quality, comparing imputation rates between the 2008 and 2014 SIPP Panels and benchmarking these to rates from SCF 2013. For both SIPP and SCF, we code responses into three categories: (1) reported values (or logically edited values); (2) values imputed from a range follow-up; and (3) values imputed without a range follow-up.

Given the large number of asset questions in both surveys, we combine the asset imputation rates into meaningful categories (e.g., bank account, vehicles) as well as a net worth category which combines all asset and debt variables. To combine imputation rates from individual questions, we construct a weighted average of the response rates in which the weight is the median value times the ownership rate.[13] This procedure gives more weight to variables that constitute a larger proportion of net worth, which reflects the frequency of ownership and the value conditional on ownership.[14] For example, in our net worth category, the imputation rate for primary residences is given a relatively high weight, given that home values constitute a large portion of many people's wealth portfolios and homeownership rates are also relatively high. Using the data reported in Table 6, for example, the weight for primary residences in SIPP (before the weights are normalized to sum to one) would be the ownership rate of 63.22 times the median value of $175,000, which equals 11,063,500. On the other hand, bonds are given a lower weight because very few households directly own bonds. Using the data reported in Table 3, for example, the weight for bonds in SIPP would be the ownership rate of 8.82 times the median value of $3,000, which equals 26,460. More details about this methodology along with other metrics for comparing item nonresponse rates across surveys can be found in Eggleston (forthcoming).

[13] In this section, we use the terms imputation rates and item nonresponse rates synonymously. However, some missing value are the results of a respondent exiting the interview before the asset section, rather than saying "Don't Know" or "Refuse" to a question.

[14] The weights are normalized to sum to one.

Table 9: Imputation Rates for SIPP 2008 and 2014

	SIPP 2014 (Calendar Year 2013)			SIPP 2008 (Calendar Year 2010)			
Category	Reported	Imputed without range	Imputed within range	Reported	Imputed without range	Imputed within range	P-value Difference
Bank accounts	60.2	22.0	17.8	52.7	33.4	13.9	<.001
	(0.63)	(0.60)	(0.46)	(0.49)	(0.43)	(0.34)	
Bonds	47.5	28.1	24.3	57.5	21.6	20.9	0.014
	(2.59)	(1.81)	(1.84)	(2.26)	(2.38)	(1.67)	
Stocks	47.5	27.7	24.8	37.7	39.6	22.6	<.001
	(0.93)	(0.83)	(0.69)	(0.78)	(0.84)	(0.73)	
Financial Assets	53.4	25.1	21.5	44.0	36.0	20.0	<.001
	(0.72)	(0.62)	(0.51)	(0.71)	(0.72)	(0.55)	
Business	54.7	22.2	23.1	23.8	76.2		<.001
	(1.48)	(1.36)	(1.18)	(1.01)	(1.01)		
Other Assets	52.3	31.0	16.7	30.2	65.2	4.6	<.001
	(0.99)	(1.10)	(0.79)	(1.31)	(1.80)	(0.80)	
Retirement Assets	57.2	19.4	23.4	42.1	31.9	26.0	<.001
	(0.53)	(0.35)	(0.37)	(0.52)	(0.51)	(0.47)	
Real Estate	83.8	15.1	1.1	68.5	30.7	0.8	<.001
	(0.29)	(0.29)	(0.07)	(0.42)	(0.42)	(0.06)	
Vehicles	79.3	20.7		66.1	33.9		<.001
	(0.28)	(0.28)		(0.47)	(0.47)		
Unsecured Debt	75.1	24.9		71.9	28.1		<.001
	(0.45)	(0.45)		(0.56)	(0.56)		
Net Worth	77.3	17.3	5.3	64.4	31.8	3.8	<.001
	(0.30)	(0.26)	(0.12)	(0.39)	(0.40)	(0.08)	

Note: 2008 SIPP Panel (Wave 7), for calendar year 2010, and 2014 SIPP Panel (Wave 1), for calendar year 2013. These estimates are compared to comparable estimates from a sample of all SCF-like families in 2008 SIPP (Wave 7) and all primary economic units in 2010 SCF, both of which are measured for calendar year 2010. Table present allocation rates across aggregated wealth categories. The allocation rates are a weighted average of the allocation rates from the underlying variables, where the weights are the ownership rate times the median value conditional on ownership. Replicate weights used to construct standard errors. For the statistical test comparing the allocation rates between the 2008 and 2014 Panels, a Z-test was used for categories without a range follow-up option in either panel, and a Chi-squared test was used for all the other categories.

Table 9 presents the results comparing 2008 and 2014 SIPP. When looking at any asset or debt variable, the weighted response rate is 64.4 percent in the 2008 Panel but 77.3 percent the 2014 Panel. These numbers mean than on average, SIPP asset value and debt questions had a weighted average response rate of 64.4 percent in the 2008 panel, but such questions had a response rate of 77.3 percent the 2014 Panel, on average. Allocation rates vary across assets, with the weighted average rates being low for real estate (16.2 percent in the 2014 Panel), but higher for stocks (52.5 percent in the 2014 Panel). When comparing across panels, the 2014 Panel has lower imputation rates for every asset except for bonds.

Table 10: Imputation Rates for SIPP 2014 and SCF 2013 (Calendar Year 2013)

	SIPP 2014			SCF 2013			
Category	Reported	Imputed without range	Imputed within range	Reported	Imputed without range	Imputed within range	P-value Difference
Bank accounts	60.2	22.0	17.8	80.8	4.0	15.2	<.001
	(0.63)	(0.60)	(0.46)	(1.34)	(0.63)	(1.26)	
Bonds	47.5	28.1	24.3	71.7	17.1	11.2	0.032
	(2.59)	(1.81)	(1.84)	(7.82)	(6.87)	(4.41)	
Stocks	47.5	27.7	24.8	73.6	7.5	18.8	<.001
	(0.93)	(0.83)	(0.69)	(2.48)	(1.57)	(2.17)	
Financial Assets	53.4	25.1	21.5	75.6	7.2	17.2	<.001
	(0.72)	(0.62)	(0.51)	(1.70)	(1.18)	(1.59)	
Business	54.7	22.2	23.1	72.5	6.3	21.2	<.001
	(1.48)	(1.36)	(1.18)	(3.35)	(1.40)	(3.32)	
Other Assets	52.3	31.0	16.7	73.7	8.9	17.4	<.001
	(0.99)	(1.10)	(0.79)	(3.89)	(2.35)	(3.39)	
Retirement Assets	57.2	19.4	23.4	73.6	7.9	18.5	<.001
	(0.53)	(0.35)	(0.37)	(1.72)	(0.80)	(1.41)	
Real Estate	83.8	15.1	1.1	88.8	1.4	9.7	<.001
	(0.29)	(0.29)	(0.07)	(0.67)	(0.23)	(0.72)	
Vehicles	79.3	20.7		90.8	1.3	7.9	<.001
	(0.28)	(0.28)		(0.73)	(0.19)	(0.74)	
Unsecured Debt	75.1	24.9		85.5	3.3	11.2	0.129
	(0.45)	(0.45)		(1.48)	(0.58)	(1.49)	
Net Worth	77.3	17.3	5.3	85.0	3.4	11.7	<.001
	(0.30)	(0.26)	(0.12)	(0.72)	(0.23)	(0.73)	

Note: 2014 SIPP Panel (Wave 1) and 2013 SCF, which are for calendar year 2013. Table present allocation rates across aggregated wealth categories. The allocation rates are a weighted average of the allocation rates from the underlying variables, where the weights are the ownership rate times the median value conditional on ownership. Replicate weights used to construct standard errors in both survey, and imputation implicates used to construct the standard error for SCF. For the statistical test comparing the allocation rates between the 2008 and 2014 Panels, a Z-test was used for categories without a range follow-up option in either panel, and a Chi-squared test was used for all the other categories.

Table 10 compares imputation rates in the SIPP 2014 Panel and 2013 SCF. This table shows that item nonresponse rates are lower in the SCF than in SIPP for all wealth categories. For bank accounts, SCF has a weighted response rate of 80.8 percent, but only 60.2 percent for SIPP. These numbers mean than on average, SIPP questions on bank account balances have a weighted average response rate of 60.2 percent, but similar questions in the SCF have a response rate of 80.8 percent, on average. In addition, SCF also has fewer individuals whose values are imputed without a range follow-up. The rate of imputed without a range follow-up for SCF is only 4 percent,

but the rate is 22 percent in SIPP. This trend holds when looking at all asset and debt variables, in which the response rate for SCF is 85 percent but is 77.3 percent in SIPP 2014

In summary, imputation rates are lower in SIPP 2014 than in 2008, but the 2014 imputation rates are still higher than in SCF. These differences in imputation rates are unlikely to be solely attributed to differences in the instrument or question text. For example, the allocation rates for real estate is different in the 2008 SIPP, 2014 SIPP, and 2013 SCF, even though the question text for the value of primary residences is almost identical between all these surveys.

For the 2008 and 2014 SIPP comparisons, one difference in the wealth data between the panels is that wealth data for calendar year 2010 is from the 7th wave of the 2008 Panel, but wealth data for calendar year 2013 is collected in the 1st wave of the 2014 Panel. Because of this, attrition or repeated interviewing may have some impact on the responses rates in the 2008 Panel. For example, respondents who skip items in the initial interview might be more likely to attrit from the SIPP panel, which would decrease imputation rates in later waves. On the other hand, respondents may learn the interview is quicker when they report not knowing answers (rather than spending time to find the answer), which would increase imputation rates in later waves.

For the SIPP and SCF comparisons, one overall difference between the surveys is that wealth questions are asked near the end of the SIPP interview, while SCF has more wealth questions earlier on in the survey. Because of this, some respondents may drop out of the SIPP interview by the time they reach the section, or they may be fatigued by the time they get to the wealth questions. Both of these factors would increase imputation rates in SIPP relative to SCF.

4. Conclusion

In 2014, SIPP underwent numerous revisions that affected wealth measurement. In addition to the changes to the wealth content, respondents in the redesigned SIPP 2014 panel are interviewed less frequently, wealth questions are included in every wave rather than only in occasional Topical Modules, and the reference period is always the last day of the calendar year. Some improvements in SCF and SIPP differences by asset category, such as for checking accounts and student loans, are consistent with changes to the wealth content. However, there are other changes in the SCF and SIPP differences--such as for estimates of financial assets in tax-preferred retirement accounts, and the lower imputation rates across all wealth questions--that cannot be directly attributed to changes to the survey content.

Nevertheless, our results suggest the redesigned SIPP 2014 survey led to improved measures of household wealth. Differences between wealth estimates in SIPP 2014 wave 1 and SCF 2013 are smaller than differences in these estimates from SIPP 2008 wave 7 and SCF 2010. The results show increases in wealth in SIPP relative to SCF. At the same time, there were large differences between SIPP 2008 and SCF 2010 in the covariance structure of particular assets and debts, but the estimates for SIPP 2014 and SCF 2013 were more comparable. Finally, imputation rates for asset and debt questions were lower in SIPP 2014 than in SIPP 2008, although they are still higher in SIPP than in SCF. Because of the changes in the SIPP survey, measures of household wealth should not be directly compared with earlier panels, unless data users account for changes due to the redesign.

While the quality of SIPP appears to have improved in a variety of dimensions, there are still concerns about data quality for individual asset categories. For example, there is evidence that the types of life insurance may still confuse respondents in 2014 SIPP. Many interviewers have left notes that respondents are realizing at the cash value question that they do not have whole life insurance, but instead have term insurance. It appears that many of these respondents are entering zero for the cash value in these situations, so it seems that they are at least not putting in the face value.[15] Moreover, 2014 SIPP has an imputation rate of 58.6 percent for cash value life insurance. Finally, the median correlation coefficient of this and other asset measures is quite a bit lower in SIPP than it is in SCF, again suggesting there might be issues with the cash life insurance data. Despite attempts to simplify the life

[15] In the final SIPP data, these respondents are recoded to have term life insurance.

insurance question, the reported confusion and high imputation rates suggest there are still problems with the quality of these data.[16]

While there are still discrepancies between SIPP and SCF for some individual assets, such as trusts and cash value of life insurance, SIPP and SCF estimates are similar for other assets, such as primary residences. Moreover, for broader asset categories, such as assets in tax-preferred retirement accounts, the differences between SIPP and SCF are smaller. For the broadest category, household net worth, there is no statistically significant difference in the SIPP and SCF estimates for the median or 75th percentile. Taking SCF as a benchmark, the SIPP data appears to have improved in a variety of dimensions, although there are still some large discrepancies for some individual assets.

[16] In the 2018 SIPP Panel, the life insurance question is being revised in order to address these potential issues with data quality.

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Appendix A: Detailed descriptions of changes to SIPP 2014

As mentioned in Section 2, numerous changes were made to the SIPP wealth section in the 2014 Panel. New asset questions were added, and question text was modified for numerous assets. Besides question-specific changes, some overall changes to the wealth section include:

1. Rearranging questions in order to ask about the value and income of an asset consecutively,
2. Modifying the imputation procedure to change the variables on the hot deck, and to impute asset value and income variables jointly as well as asset value and debt variables jointly (For example, the balance of a savings account is now used to impute the interest income someone receives from a savings account),[17]
3. Adding range follow-up questions for regular checking accounts, savings bonds, and business value and debt,
4. Adding soft checks which ask the interviewer to confirm the value of an asset if the reported amount is unusually high, and
5. Removing a screening procedure described in Moore and Griffiths (2003) which took respondents off-path for less common assets, such as rental properties, if they did not own more common types of assets, such as savings accounts.

[17] A description of Census's hot deck methodology can be found in U.S. Census Bureau (2016)

Table 11: Overview of Changes in Wealth Questions and Data

Variable	Question Substationally Revised	Details	Potential Impact on Wealth Statistics
Financial Assets in Tax-Preferred Retirement Accounts			
IRA/Keogh			
401(k)/Thrift			
Financial Assets Outside Tax-Preferred Retirement Accounts			
Checking Accounts	X	Question text simplified; order of questions improved	Increase in ownership rates; Increase in net worth
Savings Accounts	X	Separate reporting of account balance from other interest-earning accounts	Unclear impact on net worth
Education Savings Accounts	X	New question	Increase in net worth
Money market deposit accounts	X	Separate reporting of account balance from other interest-earning accounts	Unclear impact on net worth
Certificates of deposit (CDs)	X	Separate reporting of account balance from other interest-earning accounts	Unclear impact on net worth
Bonds (Other Interest Earning Assets)	X	Separate reporting of account balance from other interest-earning accounts	Unclear impact on net worth
Stocks and Mutual Funds	X	Separate reporting of value of stocks and mutual funds	Unclear impact on net worth
Miscellaneous financial assets			
Annuities	X	New question	Increase in net worth
Trusts	X	New question	Increase in net worth
Cash Life Insurance	X	Question on face value of life insurance added; cash value now included in net worth	Improved data on cash value; increase in net worth
Business Equity (Actively Managed Businesses)			
Business Equity (Businesses as an Investment)	X	New question	Increase in net worth
Mortgages Owned as an Asset	X	Question removed	Minor impact on net worth
Royalties	X	Question removed	Minor impact on net worth
Other financial assets	X	Question text changed; examples now given	Increase in ownership rates; Increase in net worth
Unsecured debt			
Credit Cards			
Student Loans	X	Question added	Decrease in net worth
Residual Debt	X	Questions combined and simplified	Unclear impact on net worth
Equity in real estate			
Primary Residence			
Primary Residence Debt			
Rental Property and Other Real Estate	X	Example of other real estate now given	Increase in ownership rates; Increase in net worth
Rental Property and Other Real Estate Debt	X	Example of other real estate now given	Increase in ownership rates; Increase in net worth
Equity in vehicles			
Vehicles	X	Data editing procedure revised	Unclear impact on net worth
Vehicle Debt			

Note: This table gives an overview of wealth questionnaire changes between SIPP 2008 Topical Modules and SIPP 2014 core questionnaires. For each variable we describe whether or not the text underwent a substantial revision, whether it was altogether added or removed, and whether this is expected to impact ownership rates and net worth.

To summarize the question-specific changes in the 2014 Panel, Table 11 gives an overview of all the changes made to SIPP asset and debt questions. For each variable, we describe whether the question text underwent a substantial revision and whether the question was added to or removed from the 2014 Panel. This table shows that question text was changed for most wealth questions, although the question text for IRAs, 401(k)s, primary residences, and credit cards changed very little between the 2008 and 2014 Panels.[18] In the rest of this section, we discuss the changes for each asset in more detail.

- **Checking Accounts**: SIPP asks separately whether a respondent owns an interest-earning checking account, and whether they own a non-interest earning checking account. In the 2008 and prior panels, questions about interest-earning and non-interest checking accounts were asked in separate sections of the interview. For respondents who had a checking account but were unsure whether it earned interest, this gap between the two checking account questions could have cause some respondents to forget that they have not said "yes" to any of the checking account ownership question, resulting in errors. In the 2014 Panel, on the other hand, the question about whether the respondent owns a non-interest earning checking accounts is asked right after the question on interest-earning checking.

  In addition, the question text for non-interest earning checking accounts was changed in the 2014 Panel. In the 2008 and prior panels, the text read "Did you own any checking accounts in your OWN name which did NOT earn interest? (Do not include any interest-earning checking accounts reported earlier.)" Respondents might have been confused by the qualifier "which did NOT earn interest". In this case, they might not respond affirmatively, even if they do have a checking account that pays no interest. To mitigate any confusion, In 2014, the text was changed to ask whether the respondent has "a non-interest (regular) checking account?" in order to simply the question text.
- **Other Bank Accounts (Savings, Money Market, CDs)**: For other types of bank accounts, there were not as many revisions as there were for checking accounts. The biggest change in 2014 was allowing respondents to report the balance of their interest-earning checking, savings, CDs, and money market accounts separately. In the 2008 and prior panels, respondents had to add up all these value in one single question. For respondents with multiple types of accounts, this question would require respondents to sum values in order to construct their answers, which may result in errors. In addition, the ownership question for money market accounts was changed to ask whether the respondent had "a money market deposit account or fund?" In prior panels, the question only asked about money market deposit accounts.
- **Bonds**: SIPP asks about three types of bonds 1) U.S. Savings bonds 2) U.S. Government securities, and 3) municipal and corporate bonds. In the 2008 and prior panels, the value of U.S. Government securities and municipal and corporate bonds were combined into one question. In the 2014 Panel, the value of U.S. Government securities was instead combined with U.S. savings bonds into one single question. In addition, the 2014 Panel has one ownership question for U.S. Government savings bonds and U.S. Government securities, while in previous panels, the ownership question was separated for these two types of bonds.
- **Stocks and Mutual Funds**: In the 2008 and prior panels, the respondent had to combine the value of stocks and mutual funds in one single question. For respondents with both stocks and mutual funds, this question would require respondents to sum values in order to construct their answers, which may result in errors. In the 2014 Panel, the respondent could report the values of stocks and mutual funds separately.
- **Cash Value of Life Insurance**: In the 2004 and 2008 Panels, SIPP asked about the cash value of life insurance. However, there is evidence that many respondents were confused about the difference between cash value and face value, and reported the face value of their life insurance instead (Gottschalck and Moore 2007). Because of this confusion, data on the cash value of life insurance was not included in the calculation of net worth. In the 2014 Panel, SIPP asks about both the cash value and face value of life insurance, and the question text explains the difference between them.
- **Business Equity**: In the 2014 Panel, there were numerous changes made to the business value and debt questions. The most notable change in 2014 is that SIPP now asks about business owned as an

[18] In the 2008 Panel, there was a separate question on Keogh retirement accounts. In the 2014 Panel, the question for Keogh accounts was combined with the IRA question. Because so few households own Keogh account (about 1.7% of households in wave 4 of the 2008 Panel), we do not classify this change as a substantial revision.

investment but not actively managed. These questions ask about percent owned, value of the business and debt against business for up to three businesses.

- **Added and Removed Asset Questions:** New questions about annuities, trust, and education savings accounts were added to the 2014 Panel. In prior panels, these should have been included in a catch-all question for any remaining assets owned. Question of mortgages owned as an asset and royalties were removed in the 2014 Panel because of low ownership rates. Instead, these assets are now included in the examples of "other assets" for the catch-all question.
- **Other Financial Assets:** The catch-all question for any remaining assets was substantially revised in the 2014 Panel. In prior panels, the question text asked whether the respondent owned "any other financial investments." In the 2014 Panel, the question asked whether the respondent owned "any other financial investments? Examples include coins, jewelry, artwork, mortgages paid to you, other loans owed to you, or royalties." Thus, more examples were given to help the respondent think of additional assets, including physical assets the respondent may have not considered to be "financial investments." Tourangeau et al. (2014) discuss how changing the examples provided in survey questions can have a large effect on how respondents interpret a question.
- **Student Loans and Other Debt:** In the 2014 Panel, a new direct question was added on whether the respondent had any "educational loans or education-related expenses." In prior panels, education loans were included in a catch-all question on other debt. In these prior panels, the question text for other debt gave student loans as an example of a type of other debt. However, given there were other types of debt listed as examples, respondents may have overheard the student loan example, potentially causing them to answer no even if they had student loans. Also in the 2014 Panel, a question on whether the respondent had any other loans from a credit union or bank was removed and combined with the other debt catch-all question.
- **Rental Property and Other Real Estate:** SIPP has separate questions on rental property and other real estate. The 2014 Panel gives examples of other types of real estate when asking whether the respondent owns other real estate. These examples are "such as a vacation home, a deeded timeshare, or an undeveloped lot." Given some respondents may be unsure about the definition of other real estate, the addition of examples to the survey question may help respondents answer yes to the question if, for example, they have a timeshare but don't consider it to be a type of other real estate.
- **Vehicle Values:** In SIPP, respondents are asked to report the year, make, and model of their vehicles. Using this information, values are assigned from a dataset created by the National Automobile Dealers Association (NADA), which is one of the major providers of vehicle price data. In 2014 SIPP, some adjustments were made in the vehicle value assignment methodology.

  Starting in 2014, SIPP assigns values using an electronic copy of the National Automobile Dealers Association(NADA) data that are updated for the reference month (December). In contrast, in SIPP 2008 the NADA trade-in values were purchased at the beginning of the panel. In this older methodology, a constant rate of depreciation was applied to adjust vehicle values across waves. This change in methodology likely has the biggest effect on vehicle values, as almost every vehicle is affected by this change. For example, if the rate of depreciation was too high for the majority of cars, then this would cause vehicle values to be lower in the 2008 Panel than they would have been if up-to-date NADA data had been used.

  The methodology to assign values to new model year vehicles was also heavily revised between SIPP 2008 and SIPP 2014. These vehicles often do not have average trade-in values in the NADA data for December of the reference year. However, these vehicles often have data in the next year, when the data are collected and revised.[19] 2014 SIPP uses this information to identify a trend in the prices, and then extrapolates from this trend to generate a value for December of the reference year. In previous panels, the procedure was different. As an example, consider wave 7 of the 2008 Panel. In this wave, interviews occurred near the end of 2010, and car manufacturers had begun to sell vehicles with a model year of 2011. If data were available for the 2010 model year but not the 2011 model year, then this value for the 2010 year was used instead. If data for the 2010 model year were also unavailable, the data cleaning program calculated the ratio of manufacturer's suggested retail price (MSRP) divided by average trade-in values ratio of all vehicles with both the same make as the new

[19] For example, cars that are new in 2013 typically do not yet have NADA trade-in values by December 2013, but have them by December 2014.

vehicle and a model year of 2009. The within-make average of this ratio was used to estimate the average trade in value from the MSRP of the new 2011 model year vehicle.

Appendix B: Statistical Comparisons

To construct our point estimates and standard errors for SIPP and SCF estimates, we must account for the imputation of missing data in SCF and the complex sample design of both SCF and SIPP. In both SIPP and SCF, many asset and debt values are imputed. To account for uncertainty due to imputation, SCF uses multiple imputation as described by Rubin (1987), in which observations with missing data are imputed five different values, allowing a researcher to see how the point estimates change with different sets of missing values. For SCF, we utilize all 5 implicates of missing data when computing wealth estimates to account for uncertainty due to item non-response. We denote an estimate using implicate i and the main sample weight in SCF by $\hat{\beta}_{0,i}^{SCF}$. We average these estimates across all implicates to construct point estimates. We denote these point estimates by

$$\hat{\mu}^{SCF} = \frac{1}{5}\sum_{i=1}^{5} \hat{\beta}_{0,i}^{SCF}.$$

We compare this point estimate to the corresponding point estimate in SIPP when applying sample weights, denoted by $\hat{\mu}^{SIPP}$.

In addition, both the SCF and SIPP use a complex sampling design in which observation are selected with differing probabilities. Because this feature violates the simple random sample assumption underlying the standard formulas for variance estimates, we utilize replicate weights to account for the complex sample designs of SCF and SIPP. We estimate standard errors via balanced repeated replication with replicate weights in SIPP data[20] and 999 replicate weights constructed for the first implicate in SCF data. The 2008 SIPP Panel has 160 replicate weights, and the 2014 SIPP Panel has 240 replicate weights. We denote the estimate of the wealth statistic based on replicate weight r in SIPP data by $\hat{\beta}_r^{SIPP}$ and the estimate of the wealth statistic based on replicate weight r by $\hat{\beta}_{r,1}^{SCF}$.[21] In SIPP, $\hat{\beta}_0^{SIPP} = \hat{\mu}^{SIPP}$ since replicate weight 0 is the main sample weight. Based on Fay and Train (1995), the formula for the standard error of a SIPP estimate is

$$\hat{\sigma}_E^{SIPP} = \sqrt{\frac{4}{R^{SIPP}}\sum_{r=1}^{R^{SIPP}} \left(\hat{\beta}_r^{SIPP} - \hat{\beta}_0^{SIPP}\right)^2},$$

In which R^{SIPP} equals 160 or 240 depending on the Panel. Based on Rubin (1987) and Board of Governors of the Federal Reserve System (2013), the formula for the standard error of an SCF estimate is

$$\hat{\sigma}_E^{SCF} = \sqrt{\left(1+\frac{1}{5}\right)\left(\frac{1}{4}\right)\sum_{i=1}^{5}\left(\hat{\beta}_{0,i}^{SCF} - \frac{1}{5}\sum_{i=1}^{5}\hat{\beta}_{0,i}^{SCF}\right)^2 + \frac{1}{998}\sum_{r=1}^{999}\left(\hat{\beta}_{r,1}^{SCF} - \frac{1}{999}\sum_{j=1}^{999}\hat{\beta}_{j,1}^{SCF}\right)^2}.$$

For ease of exposition, we often refer to the difference in point estimates between the surveys, $\hat{\mu}^{SCF} - \hat{\mu}^{SIPP}$. Since SCF and SIPP are independent samples, the standard error of this difference is

$$\sqrt{(\hat{\sigma}_E^{SIPP})^2 + (\hat{\sigma}_E^{SCF})^2}.$$

We occasionally find it useful to cite the ratio of a SIPP estimate to an SCF estimate, $\hat{\mu}^{SIPP}/\hat{\mu}^{SCF}$. We use the multivariate delta method to construct the standard errors, given by

$$\sqrt{\left(\frac{1}{\hat{\mu}^{SCF}}\right)^2 (\hat{\sigma}_E^{SIPP})^2 + \left(\frac{-\hat{\mu}^{SIPP}}{\hat{\mu}^{SCF^2}}\right)^2 (\hat{\sigma}_E^{SCF})^2}.$$

Appendix C: Statistical Disclaimers

[20] When estimating standard errors for SIPP data, we apply Fay's method with a perturbation factor of $k = 0.5$, as the replicate weight were created with this parameter value (U.S. Census Bureau 2016)

[21] SCF only constructs replicate weights for the first implicate of imputed data.

Statistics from surveys are subject to sampling and nonsampling error. For further information on the source of the data and accuracy of the estimates, including standard errors and confidence intervals, see < http://www.census.gov/programs-surveys/sipp/tech-documentation/source-accuracy-statements.html >. All comparative statements in this report have undergone statistical testing, and, unless otherwise noted, all comparisons are statistically significant at the 10 percent significance level.