

Measuring annual change in household wealth with the Consumer Expenditure Survey

The Consumer Expenditure Survey (CE) effectively estimates change in net wealth at the household level, compared with the Flow of Funds Accounts; however, results show that the CE does not accurately measure wealth changes at the aggregate national level

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The Consumer Expenditure Survey (CE) tracks the value of assets and liabilities for a large rotating sample of American households. Unfortunately, researchers studying household wealth have largely neglected this resource, generally relying instead on aggregate statistics. While aggregate wealth statistics suggest individual household decisions, the CE potentially offers a more direct picture of how American households manage their finances.

To validate the survey's potential for measuring changes in household wealth, this article compares the CE with the well-established Flow of Funds Accounts (FFA) of the Federal Reserve Board (FRB). Results indicate that the CE effectively measures change in wealth at the household level.

Additionally, this article examines the extent of wealth gains and losses for the 2004–2009 period. The number of households with annual wealth losses during this period was considerably higher than the number of households with negative net worth. Furthermore, wealth gains varied substantially across households possessing varying types of assets. These demonstrative findings reveal the poten-

tial of the CE for examining how financial and demographic characteristics of households affect their annual change in net wealth.

The CE is known among researchers for its detailed coverage of households' expenditures. Less well known is that the survey also tracks changes in most categories of households' assets and liabilities. In fact, in terms of categorical coverage, the wealth categories that the CE tracks are similar to those in the well-regarded Survey of Consumer Finances (SCF).

Despite this broad coverage of wealth categories, researchers have only recently begun validating the CE wealth estimates against other well-established survey estimates. Most notable is the pioneering work of Johnson and Li,¹ comparing CE liability data against the SCF. Comparing estimates between the two surveys, the authors found that "household debt balances and payments are measured reasonably well in the CE" and that "CE data may be used to examine household debt and its relation to household economic decisions."² The work of Johnson and Li breaks new ground by confirming the capability of the CE to track liabilities at the household level.

Moving forward, it is of considerable interest to know how well the CE tracks households' overall net wealth (i.e., both assets and liabilities). To meet this goal, this article ex-

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amines the potential of the CE for measuring annual changes in household net wealth, by comparing it with the FRB's FFA. The FFA are the most widely used source of aggregate data on U.S. household balance sheets.³ Findings from the research indicate that the survey effectively estimates annual changes in household wealth.

Additionally, this article presents estimates for the number of U.S. households with annual wealth gains and losses during the 2004–2009 period. These estimates show the capability of the CE to explore financial changes at the household level. Furthermore, this article lays groundwork for future research examining the connection between expenditures of households and their annual change in wealth, using the CE comprehensive expenditure data.

Measuring changes in household wealth using the CE

The CE tracks respondents' reported expenditures over five 3-month periods. The BLS reports only the final four periods of transactions in the published data, because the first interview is dropped (the first interview is only used to contact respondents and to establish a baseline for future transactions). Respondents completing all five interviews of the survey report an entire year of their financial transactions.

Unlike many economic surveys, the CE does not track households, *per se*. Rather, it tracks the expenditures of consumer units (CUs). CUs are defined by

- all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements;
- a person who is living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel but is financially independent; or
- two or more persons living together who use their income to make joint expenditures.⁴

On the basis of these criteria, CUs align in many ways with the common conception of a household; however, a single household can include more than one CU, such as in the case of roommates sharing an apartment. Because *household* refers to a dwelling, the household in this case is the apartment, which comprises more than one CU. For simplicity, I will refer to CUs as "households" for the remainder of this article,

despite the limited number of cases in which this designation is technically incorrect.

In terms of categorical coverage, the survey has strikingly detailed information on expenditures. It covers everyday expenditures, such as gasoline purchases, as well as infrequent expenditures, such as clocks, decorative pillows, plastic dinnerware, fresh flowers, sewing patterns, and aircraft rental. As noted by Johnson and Li, the CE also has comprehensive coverage of liabilities, covering both the balance and change in balance for most types of debt.

Unfortunately, the CE coverage of assets is slightly less comprehensive. It only tracks the balances of certain assets such as checking and savings accounts and the value of owned securities, U.S. bonds, and money owed to the household for personal loans. The survey does not track the balance of whole life insurance policies, annuities and trusts, quasi-liquid retirement accounts (e.g., pensions, individual retirement accounts/Keoghs), or business investments. The survey does track the current market value of real estate (e.g., primary residence, vacation properties, and investment properties); however, the current market value is self-reported, and respondents cannot be expected to consistently report the correct appraisal values of their properties. In addition, the survey does not cover the value of other nonliquid assets such as vehicles and collectibles (e.g., artwork, coins).

Despite having limited coverage of asset value, the CE has comprehensive coverage for changes in asset value over the period of a year. For instance, the survey does not record the total worth of business assets that a household owns; however, it does track annual contributions and withdrawals to business assets. Using these data, one can examine how much value a household contributes or withdraws over a year, even though one does not know the total worth of business assets at the start of the year. Thus, the CE gives researchers a broad perspective on households' annual change in asset and liability values, even when they have a more limited view of a household's total net worth.

Presently, scant literature exists concerning household-level wealth transactions, using population representative data. In the areas of economics and policy, past researchers have mainly examined aggregate national statistics when investigating Americans' saving and investing practices.⁵ While aggregate statistics suggest individual decisions, they overrepresent the actions of a limited number of households with large wealth ownership. Examining disaggregated transactions will more directly show how households manage their finances, across all levels of wealth ownership. Using the CE to examine annual change in wealth is a good first step toward exploring financial decisions at the individual household level. In fact, because the CE also tracks comprehensive demographic and

expenditure details, the survey can potentially illuminate how the spending and investing of a household are correlated with its annual change in net wealth.

To measure change in households' net wealth, this article assembles CE data from 2004 to 2009. I calculate change in net wealth by aggregating the changes in a household's individual wealth components, i.e., its various assets and liabilities (see appendix A). The CE reports many changes in asset value in a household's fourth quarter of transactions, to reflect changes occurring over a full year. However, because the CE is conducted on a rotating basis, a number of households do not finish the full survey. The present sample is restricted to only those households reporting four quarters of transactions in the survey. Despite this restriction, the sample of households completing the full survey is found to have demographic characteristics congruent with the full CE sample, which is itself weighted to represent the U.S. population (see "Technical notes" section and appendix B).

Comparing estimates

How well does the CE track changes in wealth? For validating the CE estimates, the most natural point of comparison is the FRB's FFA. The FFA are a project of the FRB to track the U.S. financial flows across various economic sectors. In the United States, the FFA are the only instruments that measure annual change in personal net wealth, other than the CE.⁶

Like the CE, researchers collect data for the FFA on a perpetual, rotating basis (as opposed to the SCF, which is only administered every 3 years). Unlike the CE, the FFA are measured at the aggregate national level. Data are collected from a variety of sources, including banks and businesses, and change in personal wealth is estimated with data reconciled on aggregate spending and investments.

To compare personal wealth estimates between the CE and FFA, one must examine year-to-year change in aggregate national wealth for nine 6-month periods, encompassing the period from 2004 to 2009. Using 6-month periods ensures an adequate sample size in the CE (2,385 households per period, on average). The time frame for each 6-month period spans either October to March or April to September.⁷ Households starting the survey in 2005 are excluded, because a change in the CE sample frame makes this time unusable.

In the CE, one calculates change in wealth by summing the annual change in wealth reported by households. Thus, to calculate the aggregate change in wealth between one period and the same period 1 year later, one sums a

1-year change in wealth for all households reporting in the latter period. To find the change in wealth occurring between the period starting in October 2007 and the period starting in October 2008, one sums the annual change in wealth reported by households in the October 2008 period. For example, suppose one unique household provides data in each of the 6 months (e.g., October to March) so that the sample size is six observations. If each household reports a net increase in wealth of \$5, the total increase in net wealth over the period would be \$30—\$5 for the October-to-October increase, \$5 for the November-to-November increase, and so forth.

In the FFA, one calculates change in wealth by averaging aggregate personal net wealth within each of the 6-month periods. Then each period average is subtracted from its counterpart in the following year. For instance, from October 2003 to March 2004, the FFA estimate that Americans possessed an average of \$45.8 trillion. One year later, the FFA estimate that Americans possessed an average net worth of \$51.4 trillion. Thus, personal net wealth gained approximately \$5.6 trillion between the two periods.

Comparing estimates for change in aggregate net wealth (chart 1), one will find that movements in the FFA and the CE correlate at 0.94 ($p < .001$). This result suggests that movements in CE wealth estimates are strongly consistent with movements in the FFA. Note, however, that the scale of changes in the CE is not comparable with the FFA.⁸ This result is to be expected, given that CE population weights are not calibrated to represent the correct volume of personal net wealth at the aggregate national level.

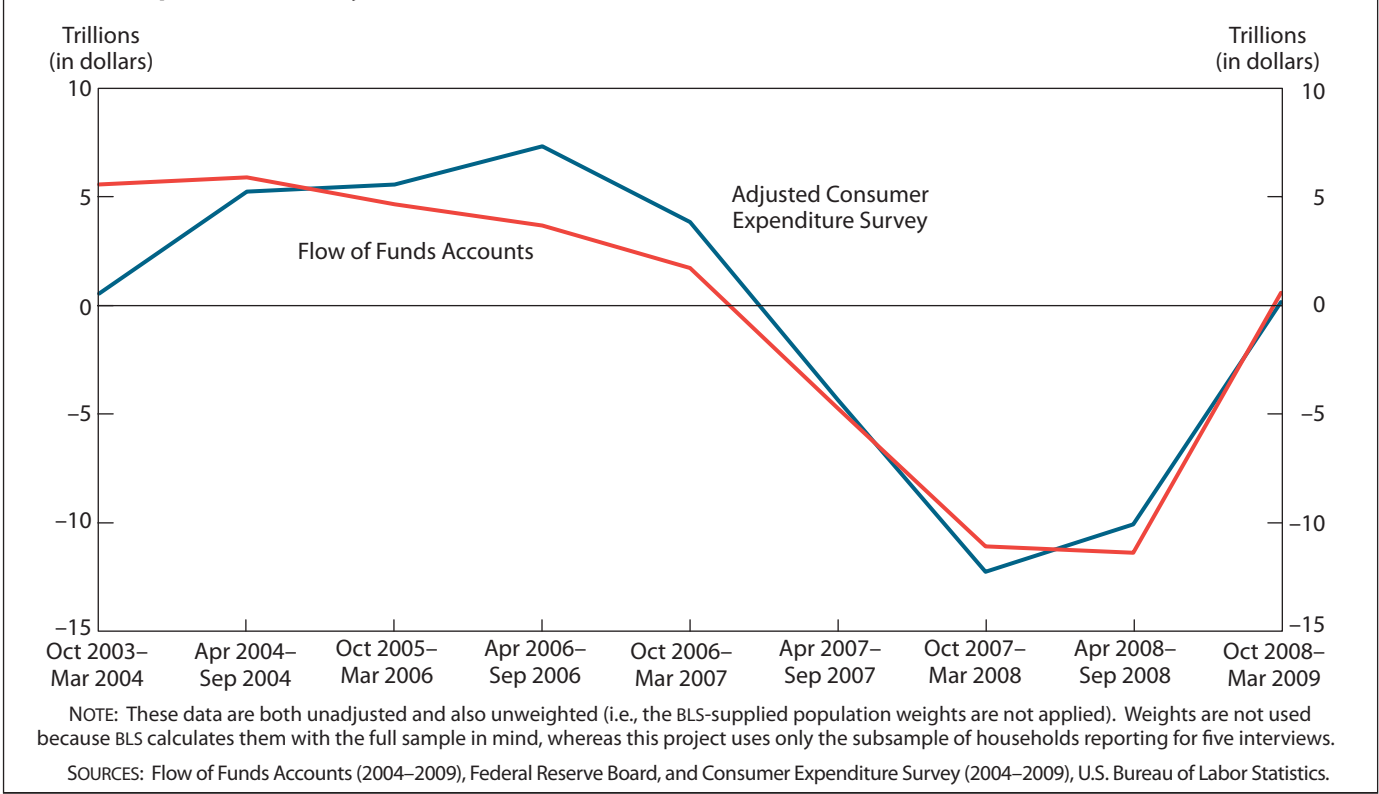
Nonetheless, the strong correlation between the CE and FFA suggests that CE data accurately represent changes in net wealth at the individual household level. Thus, the CE can apparently be used for investigating household changes in net wealth. The CE should not be used, however, for estimating the total volume of personal net wealth at the national level.

A test case using CE wealth data: household wealth gains

This section examines descriptive findings drawn from the CE. These basic findings demonstrate the kind of questions CE wealth data can answer—starting with one of the most basic: On average, how many households gain wealth during a given year?

Analyzing annual estimates from the 2004–2009 CE data, one will find an average of 55 percent of American households to have lost or maintained their wealth dur-

Chart 1. Estimated change in aggregate net wealth between Flow of Funds Accounts and adjusted Consumer Expenditure Survey



ing a given year, while 45 percent of households gained wealth. This estimate of wealth gain may seem low when compared with previously published estimates from the SCF. For instance, the FRB estimates that in 2004, approximately 91 percent of U.S. households fell into the category of having positive net wealth (table 1).⁹

Although SCF and CE estimates appear quite divergent (i.e., wealth gain rates of 45 percent vs. 91 percent), one should note that the SCF and CE are measuring net wealth in two different forms. While considered the gold standard for personal wealth measurement, the SCF is limited to measuring a household’s current net worth at the time of the survey interview. Unlike the estimates found in the CE, wealth estimates from the SCF give no perspective on recent wealth changes.

Clearly then, the CE and SCF diverge in their estimates of wealth gains, because they are measuring 1-year change in wealth vs. life-to-date net worth, respectively. However, this raises the question: How can 55 percent of households lose or maintain their wealth per year, while only 9 percent of households have zero to negative net worth? The difference between 1-year wealth loss and negative net worth is explained by several factors.

One reason why annual rates of wealth loss are apparently high is the result of including zero-change households along with wealth-losing households. If households with zero annual change in wealth have gained wealth in the past or will gain surplus wealth in the future (as most households will strive to do), then they ultimately will have positive net worth across multiple years. When examining CE data, one will find that 14 percent of U.S. households reported zero change in net wealth during an average sample year. Thus, the percentage of households actually losing wealth per year is just 41 percent.

Another reason why annual rates of wealth loss are apparently high is connected to the economic life cycle of households. Specifically, a substantial portion of wealth-losing households are in the extremes of youth and older age and thus are spending against wealth they have accumulated (or plan to accumulate) during middle age.

To show this effect, table 1 displays the subsample of households whose household heads are mid-aged (i.e., 25 < age of household head < 50). Notably, in the mid-aged sample, the percentage of households with zero or negative annual change in wealth is 20 percent lower than the percentage for the population as a whole. This finding re-

Table 1. Percentage of U.S. households gaining, maintaining, or losing wealth

Wealth change status	Net worth (2004 Survey of Consumer Finances)	Annual change in wealth (2004–2009 Consumer Expenditure Survey)	
		Total	Mid-aged
Positive	91.1	44.7	54.8
Zero or negative	8.9	55.3	45.2

SOURCES: Survey of Consumer Finances (2004) and Consumer Expenditure Survey (2004–2009), U.S. Bureau of Labor Statistics.

flects the substantial effect that older and younger generations exert on annual estimates of wealth loss. To examine this influence further, one should consider the percentage of wealth-losing households within older age brackets.

Households with heads 55 years of age and older account for 50.4 percent of wealth-losing households, and households with heads 65 years of age and older account for 31.5 percent of wealth-losing households. These statistics suggest that older individuals represent a significant portion of wealth-losing households during any given year. While some of these individuals may have persistent annual wealth losses (e.g., retirees), they will also have positive net worth, because of the wealth they have accumulated over their lifetime.

Finally, another reason for the apparently high wealth loss rate is its connection to the nature of personal finance. In particular, the present research does not smooth debt across loan payment terms; therefore, many recorded annual losses misrepresent a household's long-term finances.

For example, consider a family taking a loan to remodel its home during a survey year. Such a loan will register as a large negative change in the household's net wealth. However, for many years after the survey, this household is likely to record positive changes in wealth as the family repays its loan. Furthermore, when the family eventually sells its remodeled home, it will likely realize an increased selling price resulting from the modifications.

In many cases then, the large up-front loss from a loan misrepresents the long-term wealth accumulation of a household, because the short-term loss will be balanced by persistent gains over the long term. In addition, if the loan is for a capital improvement, an increase in asset value will likely go unrecorded during a survey year.¹⁰

Given the factors just addressed, one would expect a significant proportion of annual wealth losers to ultimately end up with positive net worth. Thus, many annual losses likely misrepresent a household's current (and future) net worth.

The extent of wealth losses

Looking at how many Americans lose wealth is instructive, but it offers no sense of the extremes to which households are gaining or losing wealth. Table 2 details the quartile values for households' annual change in net wealth among the mid-aged subsample. Only the mid-aged subsample is examined, for controlling life-cycle-related wealth changes (e.g., the effect of retirees, students).

Two primary results are evident from table 2. First, many mid-aged households have moderate annual wealth gains. In fact, among wealth-gaining households, one-quarter gained less than \$2,900 per year.

Second, stark differences exist in wealth gains between households with varying levels of asset ownership. Among households lacking any significant assets, over half did not gain any wealth. On the other side of the spectrum, however, households with more than \$10,000 in securities had a median gain over 11 times larger than the population median. In the middle were households with homeownership and who possessed between \$0 and \$10,000 in securities. These households experienced moderate gains, with a median gain around twice the population median.

COMPARING THE CE and the FFA reveals that the CE does effectively estimate change in net wealth at the household level. However, results show that the CE does not accurately measure wealth changes at the aggregate national level. The latter result is to be expected, given that CE population weights are not calibrated to reflect the aggregate personal wealth of the United States.

To demonstrate the potential of the CE, this article examines the extent of household wealth gains and losses for the 2004–2009 period. The number of households with annual wealth losses was found to be considerably higher than the number of households with lifetime wealth losses. Additionally, households in various asset ownership groups were found to have wealth gains that also varied considerably.

Such descriptive results merely scratch the surface of the CE demographic and financial variables. Nonetheless, they demonstrate the survey's capability to cross-reference households' demographic characteristics with their annual change in net wealth. This capability holds great promise for examining how economic transactions of households affect their annual wealth gains and losses.

Future work using the CE may take many forms. Certainly, the survey lends itself to studying questions about households' financial management. For instance, using the CE detailed expenditure data, one can examine how

Table 2. Annual change in net wealth of various households in mid-aged subsample

Quartile points	Total sample	Within wealth Δ status		Within owner status		
		Lost or maintained	Gained	Nonowners	Homeowners	Securities owners
25	-\$2,678	-\$16,030	\$2,834	-\$500	-\$4,158	-\$5,991
50	956	-3,983	7,222	0	2,287	11,329
75	8,500	0	19,881	2,048	10,726	36,035

SOURCE: Consumer Expenditure Survey (2004–2009), U.S. Bureau of Labor Statistics.

spending on various items is correlated with gains or losses in wealth. Taking another approach, one might examine how income shocks affect annual changes in wealth or how effectively insurance protects wealth in the face of such shocks. In addition, one might examine the comparative annual returns from different types of household investments. Obviously, the CE has many potential applications for researchers interested in policy, consumption behavior, and economic theory.

Technical notes

To have a sufficient number of points for comparison, this article used information from households participating in the CE from 2004 through 2009. During this period, two events occurred that affected the CE collection: (1) the survey frame was adjusted in 2005 and (2) the sample size was reduced in 2006.

The survey frame adjustment is a routine change to the CE, which occurs every 10 years. During these adjustment years, the survey frame is reconstructed with new demographic information from the preceding decennial census. Fewer households exist during these years, because no households enter the survey in January of the redesign year and some households cease to be interviewed if their primary sampling unit was cut from the frame. As such, the CE microdata documentation recommends that users do not link household records longitudinally across 2005. Consequently, this project dropped households whose

time in the survey crossed into 2005. This action can be noted in chart 1 by the gap on the *x*-axis between September 2004 and October 2005.

The second notable change to the CE collection occurred after the first quarter of 2006. At that time, a sample reduction was implemented to lessen the costs of survey collection. As such, a number of households during this period were not able to complete their survey, and thus their attrition was nonvoluntary.

In this article, I noted the similarity between the four-interview and full survey samples. Appendix B shows the differences in distribution for important demographic variables in the four-interview and full samples, using data from the second quarter of 2006 to the fourth quarter of 2009. These differences result from attrition, because households that complete four interviews have demographics that diverge from the full sample. The first quarter of 2006 is excluded from these analyses because of the sample reduction previously mentioned.

The following gives a sense of the attrition rate: an average of 79 percent of households completed four interviews during the second quarter 2006 to the fourth quarter 2009. In general, the differences between the samples appear to be reasonably small. The only difference of some note is the larger percentage of homeowners in the restricted sample. Households owning homes appear slightly more likely to complete the full survey than households who are renting. The reader should bear this in mind, because it may affect results to a limited extent. □

NOTES

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¹ Kathleen W. Johnson and Geng Li, “Household liability data in the Consumer Expenditure Survey,” *Monthly Labor Review*, December

2009, pp. 18–27, <http://www.bls.gov/opub/mlr/2009/12/home.htm>.

² *Ibid.*, p. 18.

³ Rochelle L. Antoniewicz, *A Comparison of the Household Sector from the Flow of Funds Accounts and the Survey of Consumer Finances* (Federal Reserve Board of Governors, October 2000).

⁴ 2005 *Consumer Expenditure Interview Survey Public Use Micro-*

data Documentation (U.S. Bureau of Labor Statistics, 2007).

⁵ Milt Marquis, “What’s Behind the Low U.S. Personal Saving Rate?” *FRBSF Economic Letter* (San Francisco, CA: Federal Reserve Bank of San Francisco, 2002); Marshall B. Reinsdorf 2007, “Alternative Measures of Personal Saving,” *Survey of Current Business* (Bureau of Economic Analysis, 2007), pp. 7–13.

⁶ The FFA are the only public instrument measuring personal wealth changes; private sources of data may be available separately. In addition, the *National Income and Product Accounts* (NIPAs) measure personal household savings (i.e., gross personal income minus gross personal consumption); however, the NIPAs do not measure change in wealth due to investments, capital gains and losses, etc.

⁷ These particular periods are chosen to correspond with the CE survey design. In the CE, respondents report transactions from the 3 months predating the time of their interview. For instance, CUs entering during the first half of 2004 (i.e., January 2004 to June 2004) are reporting expenditures from October 2003 to March 2004. CE data

are released by the calendar year in which respondents entered the survey, not according to the time frame of respondents’ expenditures. Therefore, to use the latest available data, one must use time periods offset 3 months back from the usual calendar year.

⁸ In chart 1, CE wealth changes are adjusted upward to more easily compare movements between the surveys. This adjustment is a simple linear transformation: each unadjusted CE value is multiplied by 560,000. This adjustment may seem quite large; however, the CE estimates are unweighted, and thus to match the FFA, they need to be adjusted by a large degree.

⁹ Edward N. Wolff, “Recent Trends in Household Wealth in the United States: Rising Debt and the Middle-Class Squeeze” (working paper, Levy Economics Institute Annandale-on-Hudson, NY, 2007).

¹⁰ The increase in unrealized value will only be accounted for if the home is sold during the same year in which the capital improvement loan is taken.

APPENDIX A: Consumer Expenditure Survey assets and liabilities

Table A-1. Consumer Expenditure Survey coverage for change in assets and liabilities

Consumer Expenditure Survey coverage of assets	Consumer Expenditure Survey variables
Total Δ in checking, money market, and call accounts	COMPCKGX
Total Δ in certificates of deposit and savings accounts	COMPSAVX
Total Δ in directly held pooled investment funds (all types, except money market funds), directly held stocks, and directly held bonds (all types, except bond funds or savings bonds)	COMPSECX
Total Δ in U.S. savings bonds	COMPBNDX
Negative Δ in household’s cash value of whole life insurance and/or annuities	SETLINSX
Positive Δ in household’s cash value of whole life insurance	POLICYBY
Negative Δ in household’s government retirement fund, account-type pensions on current job, and individual retirement accounts/Keoghs	FINDRETX
Positive Δ in household’s government retirement fund	FGOVRETM
Positive Δ in account-type pensions on current job	FPRIPENM
Positive Δ in individual retirement accounts/Keoghs	FINDRETX
Total Δ in other miscellaneous financial assets	COMPOWDX
Positive Δ in business assets	BSINVSTX
Negative Δ in business assets	WDBSASTX
Disposed of vehicles	EXPN – OVC: DISPX
Disposed of homes	EXPN – OPD: SALEX
Acquired vehicles	EXPN – OVB: NETPURX
Acquired homes	EXPN – OPB: OWN_PURX
Consumer Expenditure Survey coverage of liabilities	Consumer Expenditure Survey variables
Primary residence mortgages	EXPN – MOR: QBLNCM1X, QBLNCM2X, QBLNCM3X
Home equity loans secured by primary residence	EXPN – HEL: QBLNCM1G, QBLNCM2G, QBLNCM3G
Lines of credit secured by primary residence	EXPN – OPH: JLCPRINX, JINTPDX
Vehicle loans	EXPN – OVB: QVPRIM1X, QVPRIM2X, QVPRIM3X
Credit (credit cards, student loans, etc.)	EXPN – FNA: CREDITR5=100, ...

APPENDIX B: Consumer Expenditure Survey: four-interview and full survey comparison

Table B-1. A comparison of the four-interview sample to the full survey sample, second quarter 2006 to fourth quarter 2009, of the Consumer Expenditure Survey

Demographic variables	Survey sample		Difference
	Four-interview	Full	
Mean age	52.40	49.42	2.98
Mean number of autos	.93	.90	.03
Mean family size	2.56	2.53	.03
Mean income (dollars) ¹	67,185	63,969	3,216
Poverty rate (percent)	10.7	12.6	-1.9
Household tenure composition (percent)			
Owned with mortgage	46.9	43.2	3.7
Owned without mortgage	27.4	24.1	3.3
Rented	24.6	31.5	-6.9
Occupied without rent	1.1	1.2	-.1
Occupied student housing	.01	.7	-.7
Racial composition (percent)			
White	83.5	82.1	1.4
Black	10.8	11.7	-.9
Asian	4.0	4.3	-.3
Marital status (percent)			
Married	57.0	53.3	3.7
Widowed	10.6	9.4	1.2
Divorced	13.9	14.1	-.2
Separated	2.6	2.8	-.2
Never married	15.9	20.4	-4.5
Family type (percent)			
Husband and wife only	24.0	21.7	2.3
Husband and wife with one or more children	26.6	25.5	1.1
Other husband and wife	4.4	4.3	.1
Single parent	5.2	5.9	-.7
Single person	26.4	28.6	-2.2
All others	13.4	14.0	-.6

¹ Unadjusted for inflation.
 SOURCE: Consumer Expenditure Survey (2006–2009), U.S. Bureau of Labor Statistics.