

A Comparison of Consumer Expenditure Survey and Panel Study of Income Dynamics Expenditure Data: 1999–2009

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This report compares selected expenditures from the Consumer Expenditure Survey (CE) of the U.S. Bureau of Labor Statistics and the Panel Study of Income Dynamics (PSID) from the University of Michigan Institute for Social Research. The CE average annual expenditures data were compared with PSID data from 1999 and every odd-numbered year through 2009, the most recent year for which PSID data are available. The data were adjusted to make them comparable because of several differences between the surveys. In many instances the CE expenditure categories did not have a directly comparable PSID counterpart. This problem was especially prevalent before 2005, when PSID introduced new categories, including clothing, telephone and Internet, household furnishings and repairs, trips, and entertainment expenditures. Categories that did not exist in either the CE or the PSID were excluded from this analysis. Other adjustments include moving expenditure items between categories to better align these categories for comparison.

Findings

Aggregate expenditure levels from the CE and PSID were very similar across the years studied, with the PSID totals being just slightly higher.

Data description for CE. The CE is an ongoing survey that collects information from a sample of the nation's households¹ and families on their expenditures, income, and household characteristics. The data are collected by the U.S. Census Bureau for the U.S. Bureau of Labor Statistics. The survey consists of two components—a quarterly Interview Survey and a weekly Diary Survey—each with its own questionnaire and sample. In the Interview Survey, each consumer unit is interviewed every 3 months, for a total of five interviews. In the Diary Survey, respondents are asked to keep track of all of their purchases made each day for two consecutive 1-week periods. The Interview Survey yields approximately 28,000 usable interviews annually; the Diary Survey yields about 14,000.

For this report, data from the CE integrated publication tables were used. Integrated data from the Diary and Interview Surveys provide a complete accounting of consumer expenditures and income that neither survey is designed to do on its own.² For example, the Diary Survey does not collect data on expenditures for overnight travel or information on reimbursements, whereas the Interview Survey does. Examples of expenditures for which reimbursements are not collected in the Diary Survey are medical care; automobile repair; and construction, repairs, alterations, and maintenance of property. The Interview Survey does not collect detailed food expenditures or expenditures for housekeeping supplies, personal care products, and nonprescription drugs. These items are collected only in the Diary Survey.

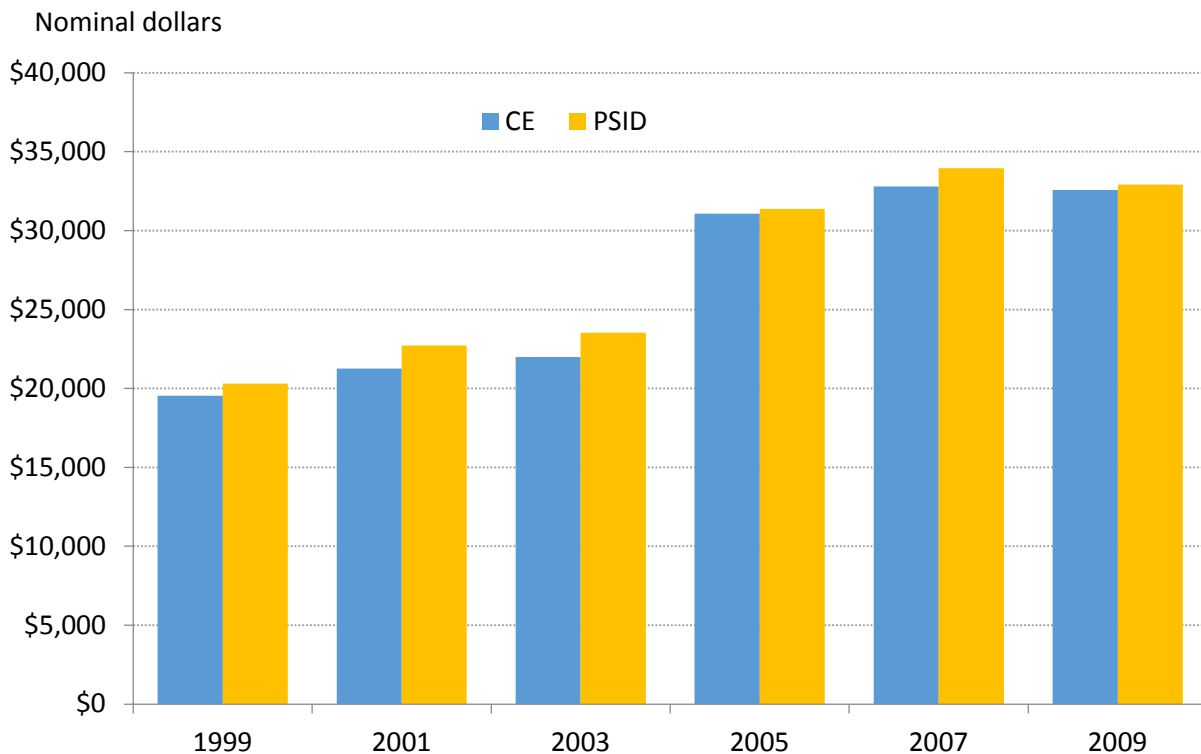
Data Description for PSID. The PSID is the world's longest-running national longitudinal household survey.³ The PSID began in 1968 and was conducted annually through 1997, after which it became a biennial survey. The PSID follows members of households in the original 1968 sample and their descendants as they grow up and form their own families. This feature allows analyses of economic

behavior across generations. The sample size has ranged from 4,800 families annually in 1968 to more than 9,000 in 2009.

The PSID expenditure data used in this article are from a series of global and general questions that were added to the survey in 1999 to collect information on health care, education, transportation and utilities spending.⁴ For this report, PSID unconditional means⁵ were compared with adjusted average annual CE expenditures. Additional expenditure questions were incorporated into the survey in 2005 to include spending on home repairs and maintenance, household furnishings, clothing, trips and vacations, and entertainment, which enabled the PSID to cover essentially all major household expenditure categories. (See Appendix 2 for examples of these questions.)

Data comparison. After adjustments for comparability, PSID consumption expenditures for most of the categories were consistently higher than the CE for each of the 6 years covered in this analysis. (See chart 1.)

Chart 1. CE and PSID average annual expenditures, 1999–2009



Source: U.S. Bureau of Labor Statistics, Consumer Expenditure Survey; University of Michigan, Panel Study of Income Dynamics.

CE-PSID expenditure totals were very similar, with historic ratios ranging from 0.934 to 0.990 for total comparable expenditures, which include food, housing, transportation, clothing (beginning in 2005), health care, and other expenditures. (See chart 2.) CE data were slightly lower for each year. Possible reasons include different question wording and survey methodology in the two surveys. Even after the data are adjusted for comparability, differences remain in some items included in categories of the two surveys. The PSID data generally have been more limited than the CE data, especially in the earlier years of the comparison. However, comparisons covering more categories can be made in later years (2005, 2007, and 2009), as the PSID added new categories.

Detailed Findings

Table 1 shows expenditures and ratios for major expenditure categories. Some CE categories are excluded from the comparison because they are not collected in the PSID. Overall, the total survey results were identical in 2009, when adjusted for comparability. The biggest positive ratio difference was in health care in 2009 (1.119), while transportation had the biggest negative ratio difference (0.884).

Table 1. CE and PSID average annual expenditures and CE-PSID ratios for major categories, 1999-2009

	Total			Food			Housing		
Year	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	19,548	20,315	0.962	5,031	5,412	0.930	4,912	5,106	0.962
2001	21,252	22,720	0.935	5,321	5,851	0.909	5,468	5,620	0.973
2003	21,986	23,536	0.934	5,340	5,945	0.898	5,666	5,853	0.968
2005	31,066	31,375	0.990	5,931	6,367	0.932	11,301	10,678	1.058
2007	32,790	33,943	0.966	6,133	6,665	0.920	12,220	12,133	1.007
2009	32,583	32,920	0.990	6,372	6,560	0.971	12,634	12,102	1.044
	Transportation			Health Care					
Year	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio			
1999	7,011	7,143	0.982	1,959	1,629	1.203			
2001	7,633	8,186	0.932	2,182	1,923	1.134			
2003	7,781	8,474	0.918	2,416	2,138	1.130			
2005	8,344	8,953	0.932	2,664	2,464	1.081			
2007	8,758	9,445	0.927	2,853	2,618	1.090			
2009	7,658	8,667	0.884	3,126	2,795	1.119			

Food. Table 2 shows that total food expenditures in the PSID were consistently higher than those in the CE, with PSID expenditures ranging from 3 to 10 percentage points higher than CE expenditures. This was due to the category Food at Home in the PSID being 19 to 24 percentage points higher than that category in the CE. This category makes up the majority of the total food expenditures in both surveys. However, CE expenditures were consistently higher in the Food Away from Home category, ranging from 18 to 33 percentage points higher. To make the two sets of data more comparable, the PSID category Food Delivered at Home was added to the PSID category Food Away from Home.

Table 2. CE and PSID average annual food expenditures and CE-PSID ratios, 1999-2009

Year	Food			Food at Home			Food Away from Home		
	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	\$5,031	\$5,412	0.930	\$2,915	\$3,803	0.766	\$2,116	\$1,609	1.315
2001	\$5,321	\$5,851	0.909	\$3,086	\$4,052	0.762	\$2,235	\$1,798	1.243
2003	\$5,340	\$5,945	0.898	\$3,129	\$4,079	0.767	\$2,211	\$1,866	1.185
2005	\$5,931	\$6,367	0.932	\$3,297	\$4,326	0.762	\$2,634	\$2,041	1.291
2007	\$6,133	\$6,665	0.920	\$3,465	\$4,535	0.764	\$2,668	\$2,129	1.253
2009	\$6,372	\$6,560	0.971	\$3,753	\$4,597	0.816	\$2,619	\$1,964	1.334

Housing. Expenditures on housing were higher in the PSID until 2005, when they were higher in the CE. (See table 3.) Several adjustments were required in this category to make the data comparable. For example, the PSID did not collect expenditures on telephone and Internet and household furnishings and repairs until 2005. Thus, these expenditures were excluded from the CE estimates of housing and utilities in comparisons for years prior to 2005. Also, the PSID mortgage calculation includes mortgage principal, interest, and mortgage insurance and does not separate them into components, whereas the CE collects data on mortgage interest and mortgage insurance separately. Because mortgage principal

cannot be separated out from the PSID total, mortgage expenditures were excluded from the housing calculation. Within the housing category, there were differences in six detailed categories shown in table 3: rent, utilities, property taxes, telephone/Internet services, home insurance and household furnishings and repairs. Expenditures on utilities and home insurance were much higher in the PSID than in the CE, while expenditures on property taxes were consistently higher in the CE. Rental expenditures were higher in the CE until 2007.

For comparability purposes, CE expenditures on telephone services and computer information services were combined into one category. Also, household furnishings and equipment were combined with household maintenance and maintenance commodities into one category for comparison with the PSID. Table 3 shows that PSID expenditures for these categories were higher than in the CE.

Table 3. CE and PSID average annual housing expenditures and CE-PSID ratios, 1999-2009

Housing				Rent			Property Tax		
Year	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	\$4,912	\$5,106	0.962	\$2,027	\$1,946	1.042	\$1,123	\$940	1.195
2001	\$5,468	\$5,620	0.973	\$2,134	\$2,064	1.034	\$1,233	\$1,015	1.215
2003	\$5,666	\$5,853	0.968	\$2,179	\$2,137	1.020	\$1,344	\$1,099	1.223
2005	\$11,301	\$10,678	1.058	\$2,345	\$2,285	1.026	\$1,541	\$1,253	1.230
2007	\$12,220	\$12,133	1.007	\$2,602	\$2,695	0.965	\$1,709	\$1,357	1.259
2009	\$12,634	\$12,102	1.044	\$2,860	\$2,976	0.961	\$1,811	\$1,392	1.301
Utilities				Telephone / Internet			Utilities without Telephone/Internet		
Year	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	\$1,528	\$1,909	0.800	\$898	\$0	N/A	\$1,528	\$1,909	0.800
2001	\$1,852	\$2,204	0.840	\$1,004	\$0	N/A	\$1,852	\$2,204	0.840
2003	\$1,856	\$2,219	0.836	\$1,080	\$0	N/A	\$1,856	\$2,219	0.836
2005	\$3,341	\$3,886	0.860	\$1,206	\$1,707	0.707	\$1,977	\$2,179	0.907
2007	\$3,674	\$4,310	0.852	\$1,307	\$1,902	0.687	\$2,170	\$2,408	0.901
2009	\$3,901	\$4,654	0.838	\$1,418	\$2,046	0.693	\$2,483	\$2,608	0.952
Home Insurance				Household Furnishings/Repairs					
Year	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio			
1999	\$234	\$311	0.752	\$2,120	\$0	N/A			
2001	\$249	\$337	0.739	\$2,093	\$0	N/A			
2003	\$287	\$398	0.721	\$2,175	\$0	N/A			
2005	\$329	\$456	0.721	\$2,539	\$2,798	0.907			
2007	\$340	\$503	0.676	\$2,588	\$3,268	0.792			
2009	\$341	\$491	0.695	\$2,303	\$2,589	0.890			

Transportation. Table 4 shows CE and PSID expenditures and ratios for the transportation category. Like most of the other aggregated categories, PSID transportation expenditures were higher than CE transportation expenditures. These included much higher expenditures on vehicle insurance and vehicle maintenance and repairs. Gasoline expenditure ratios, however, were relatively close in the comparison.

Table 4. CE and PSID average annual transportation expenditures and CE-PSID ratios, 1999-2009

Year	Transportation			Gasoline			Vehicle Insurance			Vehicle Repair		
	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	\$7,011	\$7,143	0.982	\$1,055	\$990	1.066	\$756	\$1,084	0.697	\$664	\$1,196	0.555
2001	\$7,633	\$8,186	0.932	\$1,279	\$1,413	0.905	\$819	\$1,162	0.705	\$662	\$1,401	0.473
2003	\$7,781	\$8,474	0.918	\$1,333	\$1,358	0.982	\$905	\$1,486	0.609	\$619	\$1,316	0.470
2005	\$8,344	\$8,953	0.932	\$2,013	\$1,862	1.081	\$913	\$1,459	0.626	\$671	\$1,399	0.480
2007	\$8,758	\$9,445	0.927	\$2,384	\$2,303	1.035	\$1,071	\$1,300	0.824	\$738	\$1,398	0.528
2009	\$7,658	\$8,667	0.884	\$1,986	\$1,865	1.065	\$1,075	\$1,371	0.784	\$733	\$1,484	0.494

Health care. In the health care category, CE expenditures were consistently higher than in the PSID. This is largely explained by the CE's higher expenditures on both health insurance and prescription drugs. (See table 5.) However, expenditures on medical services were higher in the PSID. Two adjustments were made for comparability on health care spending: expenditures on doctors were combined with hospital and nursing home expenditures in the PSID to create a category comparable to medical services in the CE, and expenditures on medical supplies collected in the CE were excluded from total health care.

Table 5. CE and PSID average annual health care expenditures and CE-PSID ratios, 1999-2009

Year	Health Care			Health Insurance			Prescriptions			Medical Services		
	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	\$1,850	\$1,629	1.136	\$923	\$801	1.152	\$370	\$228	1.623	\$558	\$600	0.930
2001	\$2,082	\$1,923	1.082	\$1,061	\$944	1.124	\$449	\$299	1.502	\$573	\$680	0.843
2003	\$2,309	\$2,138	1.080	\$1,252	\$1,081	1.158	\$467	\$339	1.378	\$591	\$718	0.823
2005	\$2,559	\$2,464	1.039	\$1,361	\$1,261	1.079	\$521	\$401	1.299	\$677	\$802	0.844
2007	\$2,735	\$2,618	1.045	\$1,545	\$1,374	1.124	\$481	\$376	1.279	\$709	\$870	0.815
2009	\$3,007	\$2,795	1.076	\$1,785	\$1,453	1.228	\$486	\$354	1.373	\$736	\$988	0.745

Clothing and education. Table 6 shows that expenditures on clothing (or apparel and services in the CE) were higher in the CE beginning in 2005, the first year the PSID collected clothing expenditure data. CE expenditures ranged from 13 to 15 percentage points higher than PSID expenditures for this category. PSID expenditure data on education have been consistently higher than CE data since 1999, but the difference has narrowed over time.

Table 6. CE and PSID average annual clothing and education expenditures and CE-PSID ratios, 1999-2009

Year	Clothing			Education		
	CE	PSID	CE-PSID Ratio	CE	PSID	CE-PSID Ratio
1999	\$1,743	N/A	N/A	\$635	\$1,025	0.620
2001	\$1,743	N/A	N/A	\$648	\$1,140	0.568
2003	\$1,640	N/A	N/A	\$783	\$1,126	0.695
2005	\$1,886	\$1,646	1.146	\$940	\$1,268	0.741
2007	\$1,881	\$1,661	1.133	\$945	\$1,422	0.665
2009	\$1,725	\$1,498	1.151	\$1,068	\$1,298	0.823

Appendix 1. Components of Expenditure Categories Described in Text:

CE	Years in Survey	PSID	Years In Survey
Food	1999-2009	Food	1999-2009
Food at Home	1999-2009	Food at Home	1999-2009
Food Away from Home	1999-2009	Food Away from Home	1999-2009
		Food Delivered	1999-2009
Housing	1999-2009	Housing	1999-2009
Rented Dwellings	1999-2009	Rent	1999-2009
Property Tax	1999-2009	Property Tax	1999-2009
Home Insurance	1999-2009	Home Insurance	1999-2009
Utilities	1999-2009	Utilities	1999-2009
Telephone Services	1999-2009	Telephone/Internet	2005-2009
Computer Information Services	1999-2009	Home repairs and Maintenance	2005-2009
Maintenance repairs	1999-2009	Household Furnishings and Equipment	2005-2009
Household furnishings and equipment	1999-2009		
Transportation	1999-2009	Transportation	1999-2009
Vehicle Purchases	1999-2009	Vehicle Loan Payment	1999-2009
Gasoline and Motor Oil	1999-2009	Vehicle Down Payment	1999-2009
Vehicle Finance Charges	1999-2009	Vehicle Lease Payment	1999-2009
Maintenance and Repairs	1999-2009	Insurance	1999-2009
Vehicle Insurance	1999-2009	Repairs and Maintenance	1999-2009
Vehicle rental, leases, licenses, and other charges	1999-2009	Gasoline	1999-2009
Public Transportation	1999-2009	Parking and carpool	1999-2009
		Bus fares and train fares	1999-2009
		Taxicabs	1999-2009
		Other transportation	1999-2009
Health Care	1999-2009	Health Care	1999-2009
Health Insurance	1999-2009	Doctor	1999-2009
Medical Services	1999-2009	Prescription Drugs	1999-2009
Drugs	1999-2009	Insurance	1999-2009
		Hospital/Nursing Home	1999-2009
Apparel and Services	1999-2009	Clothing	2005-2009
Education	1999-2009	Education	1999-2009

Appendix 2. Consumption Data Collected in the PSID: 1968-2011

<u>Domain</u>	<u>Question Text</u>	<u>Waves Available</u>
<u>Food</u>		
At home	F17 & F18 F22: In addition to what you buy with food stamps, do [you and anyone else in your family/you] spend any money on food that you use at home? How much do you spend on that food in an average week?	1968-2011, except '73, '88, '89
Delivered	F19F23 & F20F24: Do you have any food delivered to the door which isn't included in that? How much do you spend on that food?	1968, 1994 - 2011
Away from home	F21F25: About how much do [you and everyone else in your family/you] spend eating out?	1969 - 2011, except '73, '88, '89
<u>Home repairs & maintenance</u>		
	F87: How much did you spend altogether in 2008 on home repairs and maintenance, including materials plus any costs for hiring a professional?	2005-2011
<u>Household furnishings & equipment</u>		
	F88: How much did you spend altogether in 2008 on household furnishings and equipment, including household textiles, furniture, floor coverings, major appliances, small appliances and miscellaneous housewares?	2005-2011
<u>Clothing & apparel</u>		
	F89: How much did you spend altogether in 2008 on clothing and apparel, including footwear, outerwear, and products such as watches or jewelry?	2005-2011
<u>Trips & vacations</u>		
	F90: How much did you spend altogether in 2008 on trips and vacations, including transportation, accommodations, and recreational expenses on trips?	2005-2011

<u>Recreation & entertainment</u>	F91: How much did you spend altogether in 2008 on recreation and entertainment, including tickets to movies, sporting events, and performing arts and hobbies including exercise, bicycles, trailers, camping, photography, and reading materials?	2005-2011
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<u>Health care</u>		
Hospital & nursing home	H64: About how much did you pay out-of-pocket for nursing home and hospital bills in 2007 and 2008 combined? UNFOLDING BRACKETS	1999-2011
Doctor	H70: About how much did you pay out-of-pocket for doctor, outpatient surgery, dental bills in 2007 and 2008 combined? UNFOLDING BRACKETS	1999-2011
Prescription drugs	H76: About how much did you pay out-of-pocket for prescriptions, in-home medical care, special facilities, and other services in 2007 and 2008 combined? UNFOLDING BRACKETS	1999-2011
Insurance	H63: Altogether, how much did [you/your family] pay for health insurance premiums, in 2007 and 2008 combined, for (all of) the health insurance or health care coverage(s) you just mentioned? Please include amounts that you had automatically deducted from your pay, as well as amounts you paid directly.	1999-2011
Total medical care	H82: Could you give me your best estimate of the total cost of all medical care for you in 2007 and 2008 combined? That is, the total of your out-of-pocket costs you gave me, plus the costs covered by Medicare, Medicaid, or other health insurance? UNFOLDING BRACKETS	1999-2011
Medical Bills	W39B2: If you added up all medical bills (for all of (your/the) family living there), about how much would they amount to right now?	2011
-	-	-
<u>Housing</u>		
Mortgage	A25: How much are your monthly mortgage payments? A30: Do your payments include insurance premiums? A29: Do your payments include property tax?	1968 - 2011, except '73, '74, '75, '82, '88, '89

Rent	A31: About how much rent do you pay a month? A31b. Is heat included in your monthly rent?	1968 - 2011, except '88, '89
	A31a. Does (the rent/this amount) include water and sewer?	2011
Insurance	A22: How much is your total yearly homeowner's insurance premium?	1991 - 2011
Property tax	A21: About how much are your total yearly property taxes, including city, county, and school taxes?	1968-2011, except '78, '88, '89
Electricity	A42 (A48): The next few questions are about amounts paid for utilities, such as electricity and water. How much [do you/does your family] usually pay for electricity per month?	1981 - 1983, 1999-2011
Heat	A41 (A49): How much [do you/does your family] usually pay) for gas or other types of heating fuel per month on average?	1981 - 1983, 1999-2011
Electricity and gas combined	A42a: How much do you [and your family living there] usually pay for gas and electricity combined? IF COMBINED	2007-2011
Water and sewer	A43 (A50): How much [do you/does your family] usually pay) for water and sewer per month?	1981 - 1983, 1999-2011
Other utilities	A45 (A51): And do you have any other utility expenses? A45a (A52): What were those other utilities expenses? A45b (A53): On average, how much are these other utility expenses per month?	1981 - 1983, 1999-2011
Telecommunication	A44. How much do you usually pay for telephone, including cell phone, cable or satellite TV, Internet service per month?	2005-2011
<u>Transportation</u>		
Vehicle loan payment	F67 (V20): How much are your payments and how often are they made?	1968, 1999-2011
Down payment	F64 (V17): How much did you put down in cash?	1999-2011
Vehicle lease payment	F71 (V24): How much was your initial outlay for that lease -- including your down payment and any fees? F72 (V25): How much are your payments and how often are they made?	1999-2011
Insurance	F77 (X1): How much do [you/you and your family living there] pay for car insurance [per year/for all your vehicles per year]?	1968, 1999-2011

Repairs and maintenance	F80a (X4a): Altogether in the last month, how much did [you/you and your family living there] pay for each of these transportation related expenses...	1999-2011
Gasoline	F80b (X4b).	1999-2011
Parking and carpool	F80c (X4c).	1999-2011
Bus fares and train fares	F81a (X4d).	1999-2011
Taxicabs	F81b (X4e).	1999-2011
Other transportation	F81c (X4f).	1999-2011
Other vehicle expenditures	F79 (X3): (Other than the car payments you already told me about,) how much did you pay in car payments?	1999-2011
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<u>Education</u>	F82 (X6): In 2008, did [you/you and your family living there] have any school-related expenses such as: <ul style="list-style-type: none"> - Purchase or rental of books, supplies, uniforms, or equipment including computers and software; - Tuition or tutoring not including any amounts for day care or nursery school. I will ask you about those later; - Room and board for a family member who is away at school? -Any other expenses? F83 (X7): How much in total were these expenses?	1999-2011
	F84 (X8): In 2008, were there any other school-related expenses not already covered in the previous question? F85 (X9): What other types of school-related expenses did you have? F86 (X10): Altogether, how much were these other expenses?	1999-2011
	W39B1. If you added up all student loans (for all of (your/the) family living there), about how much would they amount to right now?	2011
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<u>Child Care</u>	F6d (F7): How much did [you and your family living there/you] pay for child care in 2008? for which months?	1970, '71, '72, '76, '77, '79, '85, 1988-2011

Notes

¹ The terms *consumer unit*, *family*, and *household* are often used interchangeably for convenience. However, the technical term for purposes of the Consumer Expenditure Survey is *consumer unit*. A consumer unit consists of any of the following: (1) All members of a particular household who are related by blood, marriage, adoption, or some other legal arrangement; (2) a person 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 who is financially independent; (3) two or more persons living together who use their incomes to make joint expenditure decisions. Financial independence is determined by spending behavior with regard to the three major expense categories: housing, food, and other living expenses. To be considered financially independent, the respondent must provide at least two of the three major expenditure categories, either entirely or in part.

² For more information on source selection details, see Brett Creech and Barry Steinberg, "[CE Source Selection for Publication Tables](#)," in *Consumer Expenditure Survey Anthology, 2011*, Report 1030 (U.S. Bureau of Labor Statistics, July 2011).

³ See [Panel Study of Income Dynamics, Consumer Expenditure Data](#), which is produced and distributed by the Survey Research Center, Institute for Social Research, University of Michigan, Ann Arbor.

⁴ Patricia Andreski, Geng Li, Zahid Samancioglu, and Robert F. Schoeni, "Estimates of Annual Consumption Expenditures and Its Major Subcomponents in the PSID in Comparison to the CE," *American Economic Review*, Papers and Proceedings, 2014, forthcoming.

⁵ For a random variable y_t , the *unconditional mean* is simply the expected value. In contrast, the *conditional mean* of y_t is the expected value of y_t given a conditioning set of variables. Ω_t . For more information, see "Conditional Mean Models, Documentation Center, MathWorks.com, <http://www.mathworks.com/help/econ/what-is-a-conditional-mean-model.html>.