

# New expenditure data in the PSID: comparisons with the CE

*New data in the Panel Study of Income Dynamics (PSID) align closely with corresponding measures from the Consumer Expenditure Survey (CE), for each broad category in the former; imputed total PSID expenditures are very close to total CE expenditures, and cross-sectional life-cycle estimates of household expenditures are similar across the two surveys, both for total expenditures and for the distinct categories*

Geng Li, Robert F. Schoeni, Sheldon Danziger, and Kerwin Kofi Charles

Consumption is a fundamental concept in economics, figuring prominently in the theoretical literature of both microeconomics and macroeconomics. However, data on consumption expenditures at the household level have been quite limited. The Consumer Expenditure Survey (CE), the modern version of which began regular data collection in 1980, is the most widely used data set for studying consumption in the United States.

Another national survey that has collected data on some consumption expenditures over a long period is the Panel Study of Income Dynamics (PSID).<sup>1</sup> Historically, this survey collected information only on food and housing expenditures. Beginning in 1999, however, the PSID added questions about other expenditures, including spending on transportation, health care, education, utilities, and childcare. With this expanded set of questions on consumption expenditures, the PSID covered more than 70 percent of the total outlays measured in the CE.

Several features of the PSID's design make the survey a unique resource for studying consumption expenditure issues that cannot be addressed with the cross-sectional CE data. Among these features are the PSID's longitudinal design, the inclusion of consumption expenditure data on the parents

and siblings of respondents, and many additional variables, including detailed information on health status, wealth, pensions, income, employment, and family structure.

This article describes the expanded expenditure data collected in the PSID, outlines the questions that have been included in each wave, and examines item nonresponse. Because most empirical studies of consumption expenditures have used CE data, and because the CE remains the gold-standard source for information on consumption expenditures in any given period, benchmarking exercises are conducted to establish the quality of the PSID expenditure data compared with the corresponding CE data. Specifically, estimates of total expenditures based on the PSID are compared with those based on the CE, as are cross-sectional estimates of life-cycle expenditure patterns derived from the two surveys. Overall, the comparisons show that the PSID expenditure data compare favorably with the CE data.

## The data sets

*The Panel Study of Income Dynamics.* The PSID began in 1968 with a sample of roughly 5,000 families, including a low-income oversample. The PSID has a unique genealogical design. All 1968 family members

Geng Li is an economist in the Household and Real Estate Finance Section, Division of Research and Statistics, Federal Reserve Board, Washington, DC; Robert F. Schoeni is a research professor, Institute for Social Research, University of Michigan, Ann Arbor, MI; Sheldon Danziger is H. J. Meyer Distinguished University Professor of Public Policy, Gerald R. Ford School of Public Policy, also at the University of Michigan; and Kerwin Kofi Charles is Edwin and Betty L. Bergman Distinguished Service Professor, Harris School of Public Policy Studies, University of Chicago, Chicago, IL. E-mail: Geng.Li@frb.gov

living in households are followed in future waves. When children left their parents' homes or when couples who were married in 1968 separated or divorced, both individuals were followed and continue to be interviewed. In addition, children born to sample members after 1968 are followed. Thus, since 1968, interviews have been completed with numerous members of the same extended families, including siblings, parents and adult children, and, in some cases, grandparents and grandchildren.

The sample grew to nearly 10,000 households by 1997. Then, budget constraints resulted in about two-thirds of the low-income oversample being dropped, reducing the sample to about 6,500 families. Because sample members are followed when they leave the PSID family and form a new one, 7,822 families completed interviews in 2003. Consistently high core response rates of 95 percent to 98 percent, together with the fact that the sample is replenished through births and marriages, enable the PSID, when weighted appropriately, to remain representative of the U.S. population.<sup>2</sup>

Families were interviewed annually from 1968 to 1997 and every other year since 1997. The interviews, which averaged 72 minutes in 2003, are completed by telephone for 97 percent of the families and face to face for the other 3 percent. Expenditures are reported for the family as a whole, with a PSID family defined as a group of people living together. Family members are generally related by blood, marriage, or adoption, but unrelated persons can be part of a PSID family if they permanently reside together and share both income and expenses.

Exhibit 1 reports the spending questions from the 2003 wave, along with an indication of whether the same or a similar question was asked in earlier waves. As mentioned, the PSID included a few expenditure questions from the start. Spending on food eaten at home has been collected in all but three waves, spending on food away from home in all but four waves. Housing-related expenditures have been included in many waves, with data on mortgage payments collected in all but 6 years since 1968. Rental payments for housing and property taxes have been included in most waves. Utility payments were collected from 1981 to 1983, dropped for 15 years, and added back in 1999. Childcare spending was asked in each wave since 1988 and in several earlier years.

In 1999, the expenditure questions were expanded. Four questions on out-of-pocket spending for health care were added: hospital and nursing home care, doctor's visits, prescription drugs, and insurance premiums.<sup>3</sup> Assessments of educational expenses include payments for tuition, books, supplies, and room and board. Transporta-

tion-related expenses (for up to three owned or leased vehicles) include outlays on vehicles, vehicle loan and lease payments, downpayments on vehicles, vehicle insurance payments, gasoline, repairs and maintenance, parking, bus fares, and taxicabs.

The period over which PSID expenditures are reported—weekly, monthly, or yearly—varies across spending categories. Even when a preferred period is specified in the questionnaire, respondents usually are allowed to report spending over alternative periods if doing so facilitates recall. Table 1 summarizes item nonresponse rates and the period of reported spending for the 1999, 2001, and 2003 waves. For food at home, respondents are asked to report the amount they currently spend in an average week, but they are allowed to report annual or monthly amounts. Because the question mentions “average week” in each of the 1999, 2001, and 2003 waves, 89 percent of respondents report a weekly amount. Questions about spending on food delivered and food away from home are asked right after the question about food at home, but the question does not specify that they be reported for an average week. As a result, 48 percent and 68 percent, respectively, of respondents report these expenditures as weekly amounts.

Education and child care spending are reported on an annual basis for the previous calendar year (that is, in the 2001 interview, respondents report spending for calendar year 2000), whereas health care spending is reported for the previous 2 calendar years combined. Most housing and transportation expenses refer to current spending and typically are reported for an average month. Respondents are asked to report annual spending for home and vehicle insurance and for property taxes because these payments are not typically made on a monthly basis.

Item nonresponse is low in the PSID. (See column 1 of table 1). In most spending categories, less than 2 percent of families failed to report a valid response. Nonresponse was highest for housing insurance and health insurance payments, at 8 percent and 11 percent, respectively. For food, the most extensively studied expenditure, 1.3 percent had invalid responses for food at home, while 0.9 percent had invalid responses for food eaten away from home.<sup>4</sup>

*The Consumer Expenditure Survey.* In addition to fulfilling its role as the official source for the Consumer Price Index, the CE is used to answer various important research questions about household consumption. For example, David Cutler and Lawrence Katz used CE data to describe the dispersion of total expenditures in the U.S. popula-

**Table 1. Item nonresponse and time period of reporting in the Panel Survey of Income Dynamics, average for 1999–2003<sup>1</sup>**

Expenditure category	Percent of families with valid response	Are unfolding brackets used?	Period of spending					
			Asked in the survey	Actually reported by respondent, percent				
				Weekly	Biweekly	Monthly	Annually	Other
<b>Food:</b>								
At home.....	98.7	No	weekly	89.4	2.1	7.9	0.5	0.0
Away from home.....	99.1	No	not defined	68.3	2.2	27.7	1.7	.0
Delivered.....	99.9	No	not defined	48.0	6.9	41.3	3.7	.0
<b>Housing:</b>								
Mortgage.....	99.3	No	monthly	.0	.0	100.0	.0	.0
Rent.....	99.0	No	monthly	.4	.1	99.3	.3	.0
Insurance.....	91.7	No	annual	.0	.0	.0	100.0	.0
Property tax.....	93.9	No	annual	.0	.0	.0	100.0	.0
Electricity.....	96.6	No	monthly	.0	.0	99.2	.7	.1
Heat.....	95.2	No	monthly	.0	.0	91.3	8.0	.8
Water.....	96.0	No	monthly	.0	.0	86.7	9.8	3.4
Other utility.....	99.8	No	monthly	.0	.0	97.2	2.2	.6
<b>Transportation:</b>								
Loan payment.....	99.1	No	monthly	.0	.0	96.2	.4	3.4
Downpayment.....	98.1	No	annual	.0	.0	.0	<sup>2</sup> 100.0	.0
Lease payment.....	99.9	No	monthly	.0	.0	98.8	.1	1.1
Insurance.....	92.9	No	annual	.0	.0	22.1	77.9	.0
Gasoline.....	97.8	No	monthly	.0	.0	100.0	.0	.0
Repairs.....	99.0	No	monthly	.0	.0	100.0	.0	.0
Other vehicle expenses.....	99.1	No	monthly	.0	.0	100.0	.0	.0
Parking.....	99.6	No	monthly	.0	.0	100.0	.0	.0
Bus and train.....	99.7	No	monthly	.0	.0	100.0	.0	.0
Taxicab.....	99.8	No	monthly	.0	.0	100.0	.0	.0
Other transportation.....	99.8	No	monthly	.0	.0	100.0	.0	.0
Education.....	99.2	No	annual	.0	.0	.0	100.0	.0
Child care.....	99.3	No	annual	.0	.0	.0	100.0	.0
<b>Health care:</b>								
Hospital and nursing home care.....	99.6	Yes	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Doctor's visits.....	99.3	Yes	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Prescription drugs in-home medical care, special facilities.....	99.3	Yes	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Insurance premiums.....	88.8	Yes	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>3</sup> )

<sup>1</sup> Weights are not used to calculate values in table.

<sup>2</sup> Survey asks about down payments in the previous two calendar years, but one can identify the date of each down payment to determine the amount in

the previous calendar year.

<sup>3</sup> Previous two calendar years combined.

tion across various years.<sup>5</sup> The CE consists of the quarterly Interview Survey and the Diary survey, which together provide data on the buying habits of consumers, including expenditures, income, and basic demographic characteristics.<sup>6</sup> The Diary Survey collects data on all spending during each day for two consecutive 1-week periods, focusing on frequently purchased items such as food, tobacco, and personal-care products. The Interview Survey, conducted in person, consists of five interviews 3 months apart, with key expenditure data collected in the last four interviews, covering a 12-month period. In both the surveys, expenditures are reported for the “consumer unit.”<sup>7</sup> The sample frame includes noninstitutionalized persons.

This article compares the PSID with the Interview Survey and shows that PSID expenditures provide a good approximation to reported Interview Survey expenditures. Since the first quarter of 1999, the Interview Survey has been given to 7,000 to 8,000 households each quarter, with respondents reporting spending during the previous 3 months. The survey measures 578 separate categories at the Universal Classification Code (ucc) level, covering about 95 percent of total spending; among excluded items are spending on nonprescription drugs, household supplies, and personal care.<sup>8</sup> The response (consumer unit cooperation) rate was 80 percent in 2000.<sup>9</sup> Because it is PSID and Interview Survey expenditures, and not consumption,

**Exhibit 1. Expenditures Data Collected in the PSID: 1968–2003**

Domain	Question in 2003	Waves Available
Food:		
At home	F17 and F18: In addition to what you buy with food stamps, [you and anyone else in your family/you] do spend any money on food that you use at home? How much do you spend on that food in an average week?	1968–2003, except '73, '88, '89
Delivered	F19 and F20: Do you have any food delivered to the door which isn't included in that? How much do you spend on that food?	1968, 1994–2003
Away from home	F21: About how much do [you and anyone else in your family/you] spend eating out?	1969–2003, except '73, '88, '89
Health care:		
Hospital and nursing home	H64: About how much did you pay out-of-pocket for nursing home and hospital bills in 2001 and 2002 combined?	1999–2003
Doctor	H70: About how much did you pay out-of-pocket for doctor, outpatient surgery, dental bills in 2001 and 2002 combined?	1999–2003
Prescription drugs	H76: About how much did you pay out-of-pocket for prescriptions, in-home medical care, special facilities, and other services in 2001 and 2002 combined?	1999–2003
Insurance	H63: Altogether, how much did [you/your family] pay for health insurance premiums, in 2001 and 2002 combined, for (all of) the health insurance or health care coverage(s) you just mentioned? Please include amounts you had automatically deducted from your pay, as well as amounts you paid directly.	1999–2003
Housing:		
Mortgage	A25: How much are your monthly mortgage payments? A30: Do your payments include insurance premiums?	1968–2003, except '73, '74, '75, '82, '88, '89
Rent	A29: Do your payments include property tax? A31: About how much rent do you pay a month?	1968–2003, except '88, '89
Insurance	A22: How much is your total yearly homeowner's insurance premium?	1991–2003
Property tax	A21: About how much are your total yearly property taxes, including city, county, and school taxes?	1968–2003, except '78, '88, '89
Electricity	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 on average?	1981–83, 1999–2003
Heat	A49: How much for gas or other types of heating fuel per month?	1981–83, 1999–2003
Water and sewer	A50: How much [do you/does your family] usually pay for water and sewer per month?	1981–83, 1999–2003
Other utilities	A51, A52, and A53: And do you have any other utility expenses? What were those other utilities expenses? On average, how much are these other utility expenses per month? [Cable, garbage, phone, sewer]	1981–83, 1999–2003
Transportation:		
Vehicle loan payment	V20: How much are your payments and how often are they made?	1968, 1999–2003
Down payment	V17: How much did you put down in cash? (Asked up to three times if the household has multiple vehicles?)	1999–2003
Vehicle lease payment	V24: How much was your initial outlay for that lease—including your down payment and any fees? V25: How much are your payments and how often are they made? (Asked up to three times if the household has multiple vehicles?)	1999–2003
Other vehicle expenditures	X3: (Other than the car payments you already told me about,) how much did you pay in car payments?	1999–2003
Insurance	X1: How much do [you/you and your family living there] pay for car insurance [per year/for all your vehicles per year]?	1968, 1999–2003
Gasoline	X4: In the last month how much did [you/you and your family living there] pay for each of these transportation related expenses?	1999–2003
Repairs and maintenance	X4:	1999–2003
Parking and carpool	X4:	1999–2003
Bus fares and train fares	X4:	1999–2003
Taxicabs	X4:	1999–2003
Other transportation	X4:	1999–2003
Education	X6 and X7: In 2002, did [you/you and your family living there] have any school-related expenses such as -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? How much in total were these expenses?	1999–2003

See footnotes at end of table.

Exhibit 1. Continued—Expenditures Data Collected in the PSID: 1968–2003		
Domain	Question in 2003	Waves Available
Child Care	X8, X9, and X10: In 2002, were there any other school-related expenses not already covered in the previous question? What other types of school-related expenses did you have? Altogether, how much were these other expenses?  F7: How much did [you/you and your family living there] pay for child care in 2002?	1970, '71, '72, '76, '77, '79, '85, 1988–2003
<p><sup>1</sup> Mortgage payment question, A25, was asked for up to two mortgages.</p> <p><sup>2</sup> Vehicle loan and lease payment questions, V17, V20, V24 and V25, were asked up to three times if the household has multiple vehicles. Other vehicle lease and loan related payment information was asked in question X3. X3 will be positive if, for example, the household has four or more vehicles.</p>		

that are being compared, expenditures on durables are not converted into flows of services received.<sup>10</sup>

### A comparison of PSID and CE expenditures

Consumption expenditures in both data sets were annualized. For the PSID, if an amount was reported for a period of less than 1 year, it was inflated by the reciprocal of the fraction of the year that the report covers. If the report was for more than 1 year, the amount was deflated, effectively assuming that spending was uniform over the period. For the CE, BLS procedures for calculating the weighted mean across interviews were followed.<sup>11</sup>

There are many reasonable approaches to imputing values for families with item nonresponse. However, given the PSID’s low rate of nonresponse, estimates of spending are relatively insensitive to the choice of imputation strategy. Table 2 reports average PSID spending for each category when the missing data are dropped (implicitly assuming that spending for families with item nonresponse is equal to the average among families that responded) and when the missing data are imputed with the use of a model that includes a third-order polynomial in age and an unrestricted spline for family size. The imputation models were fit separately for each expenditure category listed in table 2 using ordinary least squares.

The CE measures far more spending categories than the PSID does. Accordingly, we mapped the UCC codes from the CE into the PSID categories. Details of this mapping are given in exhibit 2. The mapping was determined by having two coders independently map the UCC codes into the PSID categories. Differences were reconciled through close inspection of each UCC.

For each PSID category, average spending for the PSID and the CE in 2001 is shown in the first and third columns of table 3; subsequent columns report comparisons

for 1999 and 2003. Estimates for certain subcategories are significantly different in some cases, most likely because of respondent misallocation of spending into narrowly defined categories. These differences aside, total spending in each major category aligns fairly closely across the two surveys, especially considering the differences in survey design. For example, in 2001 total spending on food in the PSID is 8 percent higher than in the CE, total housing aligns exactly, and total transportation spending is 5 percent lower. These three categories account for 86 percent of spending measured in the PSID.

The gaps are larger for spending on health care, education, and childcare, with PSID respondents reporting higher amounts in each case. In mapping education expenditures between the two surveys, the CE UCCs of computers, computer systems, and related hardware for nonbusiness use, and those of computer software and accessories for nonbusiness use (but not limited to school-related use) were included, which would lead to a higher estimate for the CE than the PSID. Moreover, CE UCC 660900—supplies and equipment expenses for “other schools,” such as business, secretarial, technical, and trade schools—also was included, to match with the PSID category “other school-related expenditures.” However, this UCC also covers such expenses for daycare centers and nursery schools, which, alternatively, can be counted as childcare expenses. In this article, these expenditures are characterized as school related. However, even given this potential inconsistency, the PSID education expenditure estimate is still higher than that of the CE.

With all PSID categories combined, annual spending totals \$25,961, a figure that is 2 percent greater than CE spending. (See table 3.) Estimates for 1999 and 2003 are similar, with PSID total spending 4 percent lower than CE spending in 1999 and 1 percent higher in 2003.

Spending on categories included in the PSID totals

**Table 2. Average spending before and after imputation for item nonresponse, Panel Study of Income Dynamics, 2001 wave**

Imputation	Before imputation			After imputation		
	Number of families with valid responses	Percent of families with spending greater than 0	Unconditional mean	Number of families	Unconditional mean	Unconditional mean after trimming top 1 percent
Food, total.....	7,228	98.8	5,936	7,406	5,899	5,724
At home.....	7,276	97.1	3,990	7,406	3,969	3,881
Away from home.....	7,318	89.9	1,829	7,406	1,825	1,770
Delivered.....	7,397	13.1	105	7,406	105	81
Housing, total.....	5,841	100.0	10,783	7,406	1,0471	9,777
Mortgage.....	6,543	42.2	4,493	7,406	4,737	4,153
Rent.....	7,337	33.9	2,006	7,406	2,014	1,789
Insurance.....	6,822	54.5	363	7,406	376	344
Property tax.....	6,977	56.1	1,210	7,406	1,224	1,107
Utilities <sup>1</sup> .....	6,867	92.8	2,128	7,406	2,120	2,048
Transportation, total.....	6,496	84.0	5,892	7,406	5,921	5,471
Loan payment.....	7,246	27.7	1,188	7,406	1,192	1,072
Downpayment <sup>1</sup> .....	7,219	19.8	1,363	7,406	1,367	996
Lease payment <sup>1</sup> .....	7,365	5.4	393	7,406	392	256
Insurance.....	6,871	83.5	1,163	7,406	1,158	1,073
Gasoline.....	7,264	84.6	1,343	7,406	1,342	1,259
Repairs.....	7,332	40.5	110	7,406	110	90
Other vehicle expenses.....	7,338	24.1	97	7,406	97	84
Parking.....	7,374	6.2	46	7,406	46	24
Bus and train.....	7,383	4.7	42	7,406	42	18
Taxicab.....	7,383	2.4	15	7,406	15	4
Other transportation.....	7,387	3.1	160	7,406	160	46
Education.....	7,362	32.9	1,199	7,406	1,199	831
Child care.....	7,379	14.9	341	7,406	342	234
Health care, total.....	6,746	88.4	2,100	7,406	2,129	1,873
Hospital and nursing home.....	7,383	27.2	310	7,406	311	147
Doctor.....	7,366	68.7	427	7,406	426	351
Prescriptions, in-home medical care, special facilities.....	7,370	74.2	338	7,406	339	272
Insurance.....	6,770	63.6	1,056	7,406	1,052	974

<sup>1</sup> PSID family weights are used to calculate means and percents.

<sup>2</sup> For utilities, downpayments, and leases, the proportion with valid responses reported in table 1 multiplied by the sample size (7,406) does not equal the number of families with valid responses reported here. For utilities, if any individual component does not have a valid response, total utilities are counted

as not having a valid response. For vehicles, some households can have multiple cars. In table 1, if the family reports one valid downpayment for a car, it is counted as valid. Here, the sum of all car downpayments for cars is reported, and if any car downpayments is invalid, the sum is invalid. The same is true of lease payments.

\$25,340, as measured by the CE in 2001. This figure accounts for 72 percent of total spending across all CE categories, including those not collected in the PSID (not shown in tables). This spending gap falls largely into five categories not measured in the 1999, 2001, or 2003 PSID waves: home repairs and maintenance (\$1,200 in the 2001 CE), household furnishing and equipment (\$1,400), clothing and apparel (\$1,300), trips and vacations (\$1,300), and recreation and entertainment (\$1,200). To capture spending on these items, questions were added to the 2005 and subsequent waves of the PSID.

*Life-cycle expenditure profiles.* Chart 1 displays weighted cross-sectional life-cycle expenditure profiles from both the PSID and the CE surveys.<sup>12</sup> The chart also shows the 95-percent confidence interval for the PSID expenditures. For each data source, two different measures of expenditures are plotted, by the age of the family head. The first measure is the total of the expenditure categories collected in the PSID. The second measures total expenditures—for the PSID, the imputed value of total expenditures; for the CE, the sum of all expenditure categories. The three-age-group moving average for each single year of age (for

**Table 3. Estimated expenditures in the Panel Survey of Income Dynamics (PSID) and the Consumer Expenditure Survey (CE), 2001, and means and ratios of means, 1999, 2001, and 2003<sup>1</sup>**

Expenditure category	2001					1999		2003	
	PSID		CE			Unconditional mean, PSID	Ratio of means, PSID/CE	Unconditional mean, PSID	Ratio of means, PSID/CE
	Unconditional mean	Percent of total expenditures	Unconditional mean	Percent of total expenditures	Ratio of means, PSID/CE				
Total.....	25,961	100.0	25,340	100.0	1.02	22,449	0.96	26,994	1.01
<b>Food</b>									
Total food.....	5,899	22.7	5,482	21.6	1.08	5,397	1.03	6,058	1.10
At home.....	3,969	15.3	3,817	15.1	1.04	3,735	1.04	4,070	1.06
Away from home.....	1,825	7.0	1,339	5.3	1.36	1,575	1.16	1,858	1.35
Delivered.....	105	.4	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	87	( <sup>2</sup> )	130	( <sup>2</sup> )
Alcohol.....	( <sup>2</sup> )	( <sup>2</sup> )	326	1.3	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
<b>Housing</b>									
Total housing.....	10,471	40.3	10,482	41.4	1.00	8,931	.94	10,764	.97
Mortgage.....	4,737	18.2	3,737	1.5	1.27	3,773	1.10	4,762	1.17
Rent.....	2,014	7.8	2,096	8.3	.96	1,918	.96	2,053	.96
Insurance.....	376	1.4	256	1.0	1.47	334	1.40	447	1.51
Property tax.....	1,224	4.7	1,291	5.1	.95	1,046	.87	1,331	.95
Utility.....	2,120	8.2	2,206	8.7	.96	1,860	1.02	2,171	.95
Telephone.....	( <sup>2</sup> )	( <sup>2</sup> )	896	3.5	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
<b>Transportation</b>									
Total transportation.....	5,921	2.3	6,251	24.7	.95	4,994	.86	6,148	.94
Loan payment.....	1,192	4.6	1,514	6.0	.79	1,071	.76	1,403	.80
Downpayment.....	1,367	5.3	1,214	4.8	1.13	1,186	.98	1,237	.96
Lease payment.....	392	1.5	340	1.3	1.15	291	.96	227	.96
Insurance.....	1,158	4.5	819	3.2	1.41	1,085	1.13	1,475	1.63
Gasoline.....	1,342	5.2	1,268	5.0	1.06	979	.94	1,315	1.00
Repairs.....	110	.42	631	2.5	.17	89	.14	100	.17
Other vehicle expenses.....	97	.37	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	95	( <sup>2</sup> )	103	( <sup>2</sup> )
Parking.....	46	.18	28	.10	1.64	34	1.36	43	1.54
Bus and train.....	42	.16	98	.40	0.43	35	.38	58	.70
Taxicab.....	15	.06	17	.10	0.88	11	.65	24	1.50
Other transportation.....	160	.62	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	118	( <sup>2</sup> )	163	( <sup>2</sup> )
Public transportation.....	( <sup>2</sup> )	( <sup>2</sup> )	322	1.3	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )	( <sup>2</sup> )
Education.....	1,199	4.6	914	3.6	1.31	1,030	1.16	1,217	1.13
Childcare.....	342	1.3	273	1.1	1.25	274	1.21	346	1.26
<b>Health care</b>									
Total health care.....	2,129	8.2	1,938	.40	1.10	1,823	1.04	2,461	1.14
Hospital and nursing home.....	311	1.2	109	1.8	2.85	315	3.08	354	3.03
Doctor.....	426	1.6	455		.94	368	.85	480	1.04
Prescriptions, in-home medical care, special facilities.....	339	1.3	364	1.4	.93	272	.83	412	.87
Insurance.....	1,052	4.1	952	3.8	1.11	868	.97	1,215	1.09

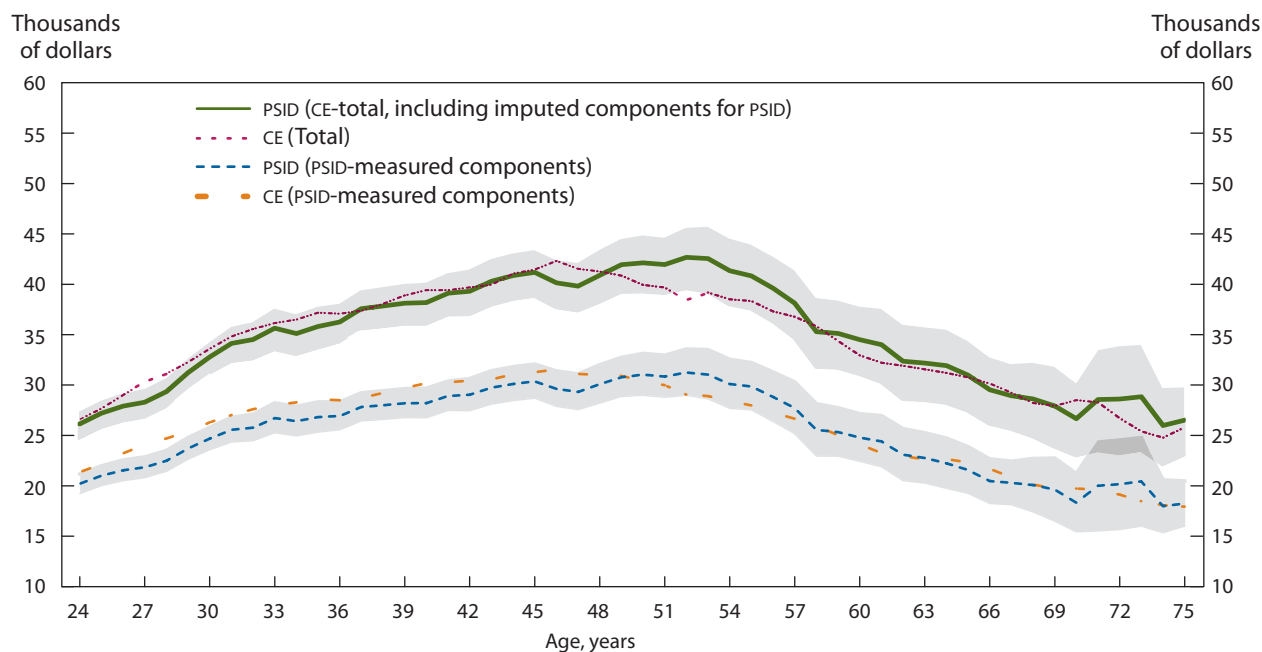
<sup>1</sup> Weights are used to calculate all estimates. <sup>2</sup> Not applicable.

example, 25 to 27 years, 26 to 28 years, 27 to 29 years and so forth.) is calculated for each year (1999, 2001, and 2003) and then averaged across the years. Chart 1 does not control for any household characteristics (for instance, gender of head of household and family size). The profiles represent how, at a given point in time, consumption expenditures differ for family heads at different points in

the life cycle and thus reflect changes in household size, composition, and other factors over the life cycle.

The chart shows that, for the categories measured in the PSID, the life-cycle expenditure profiles in the two data sets are similar. The lower profiles show that spending in the categories measured in the PSID rise through the late forties or early fifties and then fall almost monotonically

**Chart 1. Life-cycle expenditure profiles for PSID and CE, average for 1999, 2001, and 2003 combined**



NOTE: Shaded areas represent 95-percent confidence interval for PSID.

through the mid-seventies. The one period when the patterns for the two data sources diverge somewhat is in the early fifties, and this is due almost entirely to the gap in education expenditures at those ages. Notice that, despite this slight divergence, the CE series lies almost everywhere within the 95-percent confidence band of the PSID series.

The upper two profiles display total spending. For the CE, the data are total measured expenditures, including categories not measured in the PSID. For the PSID, total spending is imputed with a strategy developed by Jonathan Skinner.<sup>13</sup> The CE data are used to estimate a regression of total expenditures on the expenditure categories measured in the PSID. Then, the coefficients from that regression are used together with PSID data to predict total PSID expenditures. The value of R-squared from the imputation regression is 0.89; the estimated coefficients are reported in table 4.

Chart 1 shows that total CE expenditures and imputed total PSID expenditures are similar. The profiles imply spending of roughly \$30,000 per year in the late twenties, increasing to above \$40,000 in the late forties (CE) and early fifties (PSID). Spending falls thereafter, so that by the late sixties it is about the same as the level experienced by families headed by people in their midtwen-

ties. The two series are generally very close, with the CE series lying within the 95-percent confidence interval for the PSID throughout virtually the entire life cycle. The point estimate of the PSID series is often somewhat higher than that of the CE after middle age, but the difference is typically statistically insignificant. The slightly higher point estimate of the imputed expenditure in the PSID is consistent with what Jonathan Fisher and David Johnson found. Expanding the Skinner imputation strategy by including demographic characteristics, they also report a slightly higher imputed total consumption in the PSID than in the CE.<sup>14</sup> On balance, both their results and the ones presented here indicate that, measured against the benchmark of the CE, the PSID expenditure data provide a high-quality estimate of household expenditure behavior.

THIS ARTICLE HAS DEMONSTRATED that PSID and CE estimates of expenditures in most broad categories align closely despite substantial differences in their instruments and design features. Also, cross-sectional lifecycle consumption expenditure profiles are similar in the two surveys. Because the PSID expanded the set of questions on consumption expenditures 1999, it now gives a very good approximation of the consumption expenditures provided



**Exhibit 2. Mapping of Universal Classification Codes from Consumer Expenditure Survey into Panel Survey of Income Dynamics Categories**

Panel Survey of Income Dynamics Consumption Category	Consumer Expenditure Survey Universal Classification Codes
Food <sup>1</sup> .	
At home	190904, 790220, 790230
Delivered	
Away from home	190901, 190902, 190903, 790410, 790430, 800700
Health care	
Hospital and nursing home	570110, 570210, 570220, 570230
Doctor	560110, 560210, 560310, 560330, 560400
Prescription drugs	340906, 540000, 550110, 550320, 550330, 550340, 570901, 570903, 570240
Insurance.	580111, 580112, 580113, 580114, 580311, 580312, 580901, 580903, 580904, 580905, 580906
Housing	
Mortgage	220311, 220312, 220321, 220322, 830201, 830202
Rent	210110, 800710
Insurance	220121, 220122
Property tax	220211, 220212
Utilities <sup>2</sup>	250111, 250112, 250113, 250114, 250211, 250212, 250213, 250214, 250221, 250222, 250223, 250224, 250901, 250902, 250903, 250904, 260111, 260112, 260113, 260114, 260211, 260212, 260213, 260214, 270211, 270212, 270213, 270214, 270310, 270411, 270412, 270413, 270414, 270901, 270902, 270903, 270904
Transportation.	
Vehicle loan payment	870103, 870104, 870203, 870204
Downpayment	870101, 870102, 870201, 870202
Vehicle lease payment	450310, 450313, 450314, 450410, 450413, 450414
Insurance	450311, 450411, 500110
Gasoline	470111, 470112, 470113
Repairs	470220, 470211, 470212, 480110, 480213, 480214, 490110, 490211, 490212, 490221, 490231, 490232, 490311, 490312, 490313, 490314, 490318, 490319, 490411, 490412, 490413, 490501, 490502, 490900, 520410
Other vehicle payments	
Parking	520531, 520532
Bus	530311, 530312, 530501, 530902, 530210
Taxicab	530411, 530412
Other transportation	520511, 520512, 520521, 520522, 520542, 520902, 520903, 520904, 520905, 520906, 520907, 530110, 530901
Education	
Schooling	190901, 210310, 370903, 390901, 660110, 660210, 660310, 660900, 670110, 670210, 670901, 670902, 800802, 800804
Other school-related expenditures	690111, 690112
Childcare	340211, 340212, 670310

<sup>1</sup> The Universal Classification Codes of alcoholic beverages consumed at home, in restaurants, and on trips—200900, 790310, 790320, and 790420—are also included to match with the PSID total food expenditure, although these UCCs are not assigned to food at home or food away from home.

<sup>2</sup> The Universal Classification Codes of telephone services—270101 and 270102—are included in order to match the PSID total housing expenditures.

<sup>3</sup> The Consumer Expenditure Survey has Universal Classification Codes for expenditures on motorcycles, mopeds, scooters, and private airplanes. The Panel Survey of Income Dynamics explicitly asked households not to include these payments when they report vehicle expenditures.

<sup>4</sup> Universal Classification Codes 450311 and 450411 encompass other charges on leased vehicles, such as maintenance charges.

by the CE.

Most likely, the CE will remain the primary data set for cross-sectional analyses. The survey collects detailed expenditure data on a continuous quarterly basis, so CE data permit highly accurate assessments of year-to-year

changes in expenditures across the population. Also, because the CE has collected comprehensive expenditure data for more than two decades, long-term trends can only be analyzed with that survey.

Still, given the PSID's longitudinal nature, its genealogical

**Table 4. Ordinary least square model of total Consumer Expenditure survey expenditures used to impute total expenditures in the Panel Study of Income Dynamics**

Imputation	Coefficient	p-value
Spending on:		
Constant.....	-2546	<0.0001
Food at home.....	1.19	<0.0001
Food away.....	2.35	<0.0001
Mortgage.....	1.01	<0.0001
Rent.....	1.16	<0.0001
Home insurance.....	2.10	<0.0001
Property tax.....	2.62	<0.0001
Utilities.....	2.00	<0.0001
Transportation.....	1.26	<0.0001
Education.....	1.18	<0.0001
Child care.....	1.59	<0.0001
Health care.....	1.42	<0.0001

design, and the wealth of information it provides on labor market and demographic variables, several new areas of research can be advanced with the use of PSID consumption expenditure data. For example, previous research using cross-sectional data has documented that income-poor families consume substantially more than their annual income.<sup>15</sup> Does this result hold when both income and consumption expenditures are measured over multiple years? Similarly, a large literature documents a strong intergenerational relationship between wealth and income.<sup>16</sup> Is there a similar intergenerational pattern for consumption expenditure? Using the PSID to answer these and other questions will greatly enrich our understanding of consumption behavior and provide a useful complement to research that analyzes the CE. □

## Notes

ACKNOWLEDGMENTS: This research was supported in part by a grant to the National Poverty Center at the University of Michigan from the Assistant Secretary for Planning and Evaluation, U. S. Department of Health and Human Services. We thank Laurie Pounder and Jonathan Fisher for assisting with the validation of the mapping of Universal Classification Codes from the CE into the PSID. We also thank Richard Bavier, Rebecca Blank, Jonathan Fisher, Gary Solon, James Sullivan, the editor and an anonymous referee of the *Monthly Labor Review*, and seminar participants at the Bureau of Labor Statistics and the NBER Summer Institute for comments on a previous draft. Address correspondence to Geng Li, Mail Stop #93, Federal Reserve Board, Washington, DC 20551, Geng.Li@frb.gov. Any views expressed in this article are those of the authors and not necessarily those of the Federal Reserve Board or any sponsoring agency or organization.

<sup>1</sup> The 2001 and 2003 Consumption and Activities Mail Surveys, supplements to the Health and Retirement Study, gathered comprehensive assessments of expenditures of people 50 years and older, allowing longitudinal analyses of consumption in this panel study.

<sup>2</sup> John Fitzgerald, Peter Gottschalk, and Robert Moffitt, "An Analysis of Sample Attrition in Panel Data," *Journal of Human Resources*, spring 1998, pp. 251–99; and Sean Beckett, William Gould, Lee Lillard, and Finis Welch, "The Panel Study of Income Dynamics after Fourteen Years: An Evaluation," *Journal of Labor Economics*, October 1988, pp. 472–92.

<sup>3</sup> The use of so-called unfolding brackets in the PSID questions on wealth has been found to reduce item nonresponse substantially. (See Thomas Juster and James P. Smith, "Improving Quality of Economic Data: Lessons from the HRS and AHEAD," *Journal of the American Statistical Association*, March, 1997, pp. 1268–78.) The health care expenditure questions added in 1999 also offer respondents unfolding brackets. For example, if the respondent says "don't know" when asked the amount spent on prescription drugs, in-home medical care, special facilities, and other services combined, the respondent is asked, "Would it amount to \$5,000 or more?" If the respondent says "yes," then he or she is asked in subsequent questions whether it is more than \$10,000 and then more than \$20,000. If the respondent says "no," then he or she is asked in subsequent questions whether it was more than \$1,000. If the respondent says "no" again, he or she is then asked if the

amount was more than \$500. If the respondent continues to respond "don't know," the series of questions is terminated.

<sup>4</sup> Over the 1999, 2001, and 2003 waves analyzed in this article, 15 respondents had expenditures in one category that were several orders of magnitude larger than the average spending across all families for that category. In these cases, the value was assumed to be invalid and was imputed using the same approach used for item nonresponse (described below).

<sup>5</sup> David Cutler and Lawrence Katz, "Rising Inequality? Changes in the Distribution of Income and Consumption in the 1980s," *American Economic Review*, May 1992, pp. 546–51.

<sup>6</sup> *Consumer Expenditure Survey Anthology, 2003*, Report 967 (Bureau of Labor Statistics, 2003), on the Internet at [www.bls.gov/cex/csxanthol03.pdf](http://www.bls.gov/cex/csxanthol03.pdf) (visited March 3, 2010).

<sup>7</sup> A consumer unit is defined as (1) all members of a household who are related by blood, marriage, adoption, or some other legal arrangement; (2) a person living alone or sharing a household with others, living as a roomer in a private home or lodging house, or living permanently in a hotel or motel, but who is financially independent; or (3) two or more persons living together who combine their incomes and make joint expenditure decisions. Financial independence is determined by three expense categories: housing, food, and other living expenses. To be considered financially independent, the respondent must provide expenditures, either entirely or in part, in at least two of the three categories.

<sup>8</sup> *Consumer Expenditure Survey, 2000: Interview Survey and Detailed Expenditure Files* (Bureau of Labor Statistics, 2002), distributed by Inter-university Consortium for Political and Social Research, Ann Arbor, MI, 2002.

<sup>9</sup> *Ibid.*, p. 247.

<sup>10</sup> Note that the conventional method for imputing consumption expenditure is to apply a linear transformation to the stock of durable goods. If expenditure outlays on durables are similar across the two surveys, it is likely that the stock of durables and the flows of services would be similar across the surveys as well.

<sup>11</sup> Because of the evolving structure of the CE sample design, the weight assigned to each consumer unit changes over quarters. Therefore, the annual weighted mean is computed by adding four quarterly weighted

## Consumer Expenditures

means together. (For details, see *Consumer Expenditure Survey, 2000*.)

<sup>12</sup> Comparisons of life-cycle profiles for detailed expenditure categories are reported in Kerwin Kofi Charles, Sheldon Danziger, Geng Li, and Robert Schoeni, *Studying Consumption with the Panel Study of Income Dynamics: Comparisons with the Consumer Expenditure Survey and an Application to the Intergenerational Transmission of Well-being*, Finance and Economics Discussion Series (Washington, DC, Federal Reserve Board, 2007).

<sup>13</sup> Jonathan Skinner, "A Superior Measure of Consumption from the Panel Study of Income Dynamics," *Economics Letters*, February 1987 pp. 213–16.

<sup>14</sup> Jonathan D. Fisher and David S. Johnson, "Consumption Mobility in the United States: Evidence from Two Panel Data Sets," *Topics in*

*Economic Analysis and Policy*, vol. 6, no. 1, 2006, Article 16, on the Internet at [www.bepress.com/bejeap/topics/vol6/iss1/art16](http://www.bepress.com/bejeap/topics/vol6/iss1/art16) (visited March 4, 2010). Another distinction between Fisher and Johnson's imputation and the one presented here is that they focus on consumption, instead of expenditure, by replacing durable goods and housing expenditures with estimated service flows.

<sup>15</sup> Bruce Meyer and James Sullivan, "Changes in the Consumption, Income, and Well-Being of Single Mother Headed Families," *American Economic Review*, December 2008, pp. 2221–41.

<sup>16</sup> See Gary Solon, "Intergenerational Income Mobility in the United States," *American Economic Review*, June 1992, pp. 393–408; and Kerwin Kofi Charles and Erik Hurst, "The Correlation of Wealth Across Generations," *Journal of Political Economy*, December 2003, pp. 1155–82.