The Consumer Expenditure Survey: a comparative analysis

The BLS Consumer Expenditure Survey compares well with data from other sources and provides confidence in its estimates

E. Raphael Branch

As part of postsurvey evaluations, the Bureau of Labor Statistics compares results from the Consumer Expenditure (CE) Survey with data from independent sources. The comparisons are used to monitor the consistency of results from the CE Survey and help identify areas in which the survey can be improved. The primary comparison is with Personal Consumption Expenditures (PCE), a component of the National Income and Product Accounts of the Bureau of Economic Analysis. When data cannot be compared for conceptual reasons, comparisons with other independent sources are made. In addition, comparisons are made with sources designed to collect data for a specific category of the CE Survey, such as food or energy.

Two earlier articles in the *Review* compared 1980–84 CE Survey estimates with data from independent sources. Raymond Gieseman compared estimates from the interview component of the CE Survey with PCE data.[1] He also compared detailed estimates of food expenditures from the diary component of the CE Survey with PCE and trade association data. E. Raphael Branch compared CE Survey estimates of out-of-pocket expenditures for health care with estimates of these same expenditures from the National Health Accounts of the Health Care Financing Administration.[2] The main difference between this article and the others is that it compares more recent, integrated CE Survey results with estimates from updated and revised sources. The article also compares CE Survey expenditure estimates with estimates from the Residential Energy Consumption Survey and the American Housing Survey. In addition, it includes comparisons of CE Survey estimates of income with income estimates from the Current Population Survey (CPS). Because the CE Survey is based on integrated results and revisions exist in all the data sources (particularly in PCE), ratios presented in this article should not be compared with those in the earlier articles.

E. Raphael Branch is an economist in the Office of Prices and Living Conditions, Bureau of Labor Statistics.

The CE Survey described

The CE Survey has collected data from households annually since 1980 and at approximately 10-year intervals before then. It consists of two components: a diary, or recordkeeping survey, and a quarterly interview survey. Both components query an independent sample of 5,000 households in areas representative of the total U.S. civilian noninstitutional population. This population excludes persons in the military living on post. The interview component, which covers about 95 percent of all expenditures, includes questions about large expenditures such as purchases of property and automobiles, as well as data on expenditures that occur on a regular basis, such as utility payments. The diary component is designed to obtain detailed data on small, frequently purchased items that are normally difficult for respondents to recall—for example, food, beverages, and housekeeping supplies (including laundry detergent, soap, and

paper products). Published data are integrated using both the interview and diary components to provide a complete picture of spending.[3]

CE Survey income estimates in this article are from the interview component and are used in the integrated CE Survey publications. Income data are collected in the second and fifth interviews, during which households are asked to report their income for the 12 months prior to the date of the interview.[4]

Methodology. The basic method of evaluating the CE Survey is to compute ratios of CE Survey estimates of aggregate expenditures to estimates from independent sources. Because the CE Survey and the independent data sources are constructed for different purposes, there are differences in definitions and estimation procedures that must be reconciled before making the comparisons. Where possible, adjustments are made to account for differences in content or concepts. Not all of the differences between the CE Survey and the independent data sources can be reconciled. Sampling errors account for some of the differences.[5] The remaining differences are most likely due to dissimilar concepts, different estimation methods, or irreconcilable content between categories.

Personal Consumption Expenditures

Estimates of PCE represent the market value of goods and services purchased by the entire personal sector of the U.S. economy and by parts of the institutional population. Included in PCE are purchases of goods and services by individuals; operating expenses of nonprofit institutions; and the value of food, fuel, clothing, rented dwellings, and financial services received in kind by individuals. The estimates are derived by complex methods that trace the flow of goods and services through the economy.

The primary sources of information for PCE are Census Bureau data, such as data from the Census of Manufactures, Census of Retail Trade, and Census of Service Industries. Many other data sources are used, including publications from other government administrative and regulatory agencies and private organizations (trade sources). Benchmark estimates of PCE are based on data collected approximately every 5 years in the Census of Manufactures and other quinquennial censuses. PCE data used for the comparison between the CE Survey and PCE in this article are annual estimates based on the 1982 benchmark revision[6] and include annual revisions through 1992.[7]

The CE survey and PCE are compared by matching detailed estimates from the two sources at the lowest level of published categories in the CE, wherever possible.[8] Once matched, the data are summed to higher levels of aggregation, and ratios for all levels are calculated. Broad categories are occasionally combined to achieve further comparability. For example, utilities and public services are combined with rent in order to improve the comparison. This is necessary because contract rent estimates in the CE Survey include utility expenditures paid as part of rent, and the CE Survey estimates of utility expenditures do not include such amounts. Adjustments are also made to selected detailed CE Survey categories to account for conceptual differences between the two sources. For instance, CE Survey estimates for new vehicle trade-in allowances are added to estimates of net payments for new vehicles to approximate the total value of new vehicles as measured in PCE. Another data adjustment is made to used vehicle estimates in the CE Survey: new car trade-in allowances and the values of sold, lost, or damaged vehicles are deducted from net used-vehicle estimates to approximate the net value of used vehicles in the PCE.

The following expenditure categories are not compared because of conceptual differences that could not be reconciled: homeowner shelter, capital improvements, health care, insurance, and finance charges. Homeowner shelter expenditures are not compared because PCE measures owned dwellings using a rental equivalence approach, a concept that is not in the CE Survey.[9] Capital improvements and finance charges are excluded because they are not covered in PCE. Health care expenditures are not compared because PCE includes expenditures by consumers plus governments, commercial insurance companies, and other third parties. By comparison, the CE Survey covers only the out-of-pocket expenditures paid by consumers. These exclusions do not account for all the differences between the CE Survey and PCE. Adjustments are made for the remaining differences to the extent possible.

Results. Results of comparing selected components of the CE Survey and PCE for 1989 through 1992 are shown in table 1. The ratios indicate that CE estimates for almost all categories of consumption are lower than PCE estimates. PCE data are based mostly on administrative and establishment data, which we expect to be more complete, whereas the CE data are collected via a household survey, which is subject to underreporting. In addition, the lower CE Survey estimates may reflect broader population coverage in the PCE.

The relationship between the two series is fairly consistent over time for most comparable category estimates, and the level of several CE

Survey estimates compares well with PCE. For example, CE estimates are 93 percent or more of PCE for rent, utilities, and public services, as well as gasoline and motor oil. Also, CE estimates are at least 80 percent of PCE estimates for apparel and services, transportation, and household operations. This is consistent with the relatively high reporting rates for these expenditure categories and relatively low coefficients of variation, which suggest low sampling error.[10]

Table 1. **Comparison of the Consumer Expenditure Survey (CE) with Personal Consumption Expenditures (PCE), selected expenditure categories, 1989–92**

Expenditure category	CE Survey (in billions)				Ratio of CE Survey to PCE			
	1989	1990	1991	1992	1989	1990	1991	1992
Food	$390	$408	$410	$420	0.78	0.76	0.75	0.75
Food at home	229	240	259	264	.71	.70	.74	.74
Food away from home[1]	161	168	151	156	.89	.87	.76	.77
Alcoholic beverages	27	28	29	30	.40	.39	.38	.39
Rent, utilities, and public services[2]	285	297	305	328	.95	.95	.93	.96
Rented dwellings, total	163	171	171	192	1.05	1.04	1.00	1.08
Utilities, fuels, and public services	176	183	195	198	.89	.90	.91	.89
Telephone	54	57	61	62	1.05	1.07	1.08	1.06
Household operations[3]	22	21	22	24	.95	.85	.92	.89
Household furnishings and equipment	143	148	159	160	.68	.68	.71	.67
Household textiles	10	10	10	9	.49	.45	.45	.39
Furniture	30	30	29	32	.81	.82	.78	.79
Floor coverings	7	9	11	7	.59	.76	.99	.59
Major appliances	16	16	15	16	.63	.62	.57	.56
Small appliances and miscellaneous household equipment[4]	80	83	94	95	.69	.68	.74	.71
Apparel and services	155	160	171	172	.82	.81	.85	.80
Transportation	379	378	387	399	.85	.81	.87	.84
Vehicle purchases[5]	196	182	187	194	1.04	.99	1.11	1.04
Gasoline and motor oil	94	102	97	97	1.00	.95	.97	.96
Other vehicle expenses[6]	63	67	74	80	.52	.53	.58	.58
Public transportation	25	27	28	28	.60	.59	.63	.61
Entertainment	130	129	136	141	.67	.61	.62	.61
Fees and admissions	36	36	37	38	.86	.77	.76	.72
Televisions, radios, and sound equipment	41	44	46	49	.63	.63	.61	.62
Pets, toys, and playground equipment	24	27	26	27	.69	.70	.67	.68
Other entertainment supplies and equipment	57	44	54	53	.54	.40	.48	.44
Personal care products and services	35	35	39	39	.63	.59	.64	.61
Reading	19	19	20	21	.50	.46	.48	.45
Tobacco products and smoking supplies	25	27	27	27	.62	.61	.60	.54
Miscellaneous[7]	33	33	31	34	.34	.32	.29	.30

[1] Excludes school lunches and meals as pay.

[2] Includes rent for tenant-occupied dwelling units and lodging away from home and at school. Rent in the CE Survey is contract rent, which includes utilities for some renters. The CE Survey covers direct costs of utilities and fuels by homeowners and renters. In PCE, data are for space rent, which excludes charges for utilities. PCE data cover total expenditures for utilities and fuels, even if paid by landlords.

[3] Excludes amounts for babysitting, day care centers, and care of invalids or the elderly.

[4] Various subcategories are combined to approximate equivalent content.

[5] The PCE estimates are derived using estimates of dealer margin on goods purchased by persons (a concept that cannot be matched with vehicle purchases as measured in the CE Survey) and the wholesale value of net transactions between persons and other sectors such as government and nondealer businesses. CE data on vehicle purchases and trade-ins were combined to approximate the total value of new vehicle purchases. CE data on used vehicle purchases, trade-ins, sales, and losses were combined to approximate the value of net transactions of used vehicles.

[6] Includes vehicle rentals, maintenance repairs, and other vehicle charges. Excludes aircraft rentals, vehicle licenses, vehicle inspection, and vehicle registration.

[7] CE estimates exclude expenditures for other properties.

NOTE: Sums may not equal totals due to rounding. Expenditure estimates for home ownership, insurance, capital improvements, health care, finance charges, education, and cash contributions are excluded from the comparisons.

SOURCES: For information on the CE Survey, see *Consumer Expenditure Survey, 1990–91*, Bulletin 2425 (Bureau of Labor Statistics, September 1993). PCE data that are used in the comparisons are from unpublished detailed tabulations of the Bureau of Economic Analysis as of September 1993. These data are based on 1982 benchmark estimates. For more information on PCE, see *National Income and Product Accounts of the United States: Volume 2, 1959–88* (Bureau of Economic Analysis, 1992) and *Survey of Current Business* (Bureau of Economic Analysis, August 1993.)

Ratios which show volatility and those which are very low may reflect some differences in content or methodology that could not be completely reconciled, or they may reflect underreporting in the CE Survey. For example, ratios for alcoholic beverages, household textiles, and major appliances show that CE estimates for these items are well below 50 percent of PCE estimates. Discrepancies between 1989 and 1990 ratios may partly reflect changes made in the 1992 revisions to PCE, which did not affect the data for 1989.

Other data sources on expenditures

Detailed food comparisons. Table 2 compares detailed estimates of food expenditures from the diary component of the CE survey with similar estimates in PCE and in two food trade association sources—*Supermarket Business*[11] and *Progressive Grocer.*[12] The estimates for total food at home are consistently lower than PCE estimates and consistently higher than the trade associations' estimates. This is also true of estimates for the detailed food category data, with a few exceptions. CE estimates for expenditures on fish and seafood are consistently more than 20 percent higher than PCE estimates and are also higher for expenditures on eggs and fresh milk and cream. CE estimates for expenditures on fresh fruits and vegetables are lower than comparable estimates of the trade associations.

In general, CE estimates are higher than trade association estimates because of differences in coverage among the surveys. *Supermarket Business* conducts a comprehensive annual survey of food manufacturers, packers, wholesalers, and retailers to construct a detailed picture of grocery store sales by product line. Total grocery store sales for the study are based on Census Bureau estimates and include sales by specialty food stores. Estimates are also available annually from the Progressive Grocer Company, which conducts a similar study that is published in *Progressive Grocer* magazine. These data cover stores with annual food sales of $2 million or more, accounting for 75 percent to 80 percent of grocery store food sales.

Residential Energy Consumption Survey. The Energy Information Administration conducts the Residential Energy Consumption Survey every 3 years. The survey consists of two components: the Energy Supplier Survey, from which data on energy consumption and expenditures are obtained, and the Household Survey, from which data on demographic characteristics of house-

Table 2. **Comparison of aggregate expenditures for food, diary component of Consumer Expenditure (CE) Survey, Personal Consumption Expenditures (PCE), *Supermarket Business,* and *Progressive Grocer,* 1989–92**

Food category	Aggregate consumer expenditures, diary component, CE Survey (in billions)				Ratio of CE Survey to PCE				Ratio of CE Survey to trade associations							
									Supermarket Business				*Progressive Grocer*			
	1989	1990	1991	1992	1989	1990	1991	1992	1989	1990	1991	1992	1989	1990	1991	1992
Total	$225.5	$235.8	$253.8	$259.3	0.71	0.70	0.74	0.74	1.05	1.06	1.09	1.10	1.19	1.16	1.22	1.20
Cereals and cereal products	12.5	12.4	14.1	14.1	.63	.62	.65	.64	1.07	.99	1.06	1.02	1.38	1.30	1.43	1.16
Bakery products	21.9	23.1	25.3	27.0	.62	.61	.64	.68	1.00	1.01	1.06	1.08	1.06	1.05	1.12	1.23
Beef, pork, other meat, and poultry	48.7	53.7	58.3	58.4	.79	.78	.82	.81	.94	1.01	1.07	1.08	1.01	1.02	1.07	1.11
Fish and seafood	7.8	7.9	7.9	7.7	1.25	1.23	1.29	1.23	1.01	1.22	1.19	1.20	2.25	2.63	2.68	2.80
Eggs	3.2	2.9	3.0	2.8	1.15	1.13	1.19	1.08	1.94	1.82	2.04	2.07	1.53	1.36	1.44	1.50
Fresh milk and cream	14.1	13.5	12.6	13.4	1.12	1.10	1.15	1.21	2.08	1.81	1.74	1.80	2.27	1.93	1.86	1.49
Other dairy products	15.0	15.0	16.1	16.8	.73	.72	.76	.78	1.37	1.29	1.38	1.40	1.34	1.25	1.32	1.20
Fresh fruits and vegetables	24.2	23.7	25.4	25.4	.88	.87	.92	.90	.85	.74	.73	.70	.99	.88	.92	.89
Processed fruits and vegetables	13.5	14.9	15.7	16.5	.58	.57	.60	.62	.97	1.07	1.06	1.11	1.26	1.30	1.37	1.43
Sugar and other sweets	8.2	9.1	9.9	10.2	.35	.34	.36	.37	1.18	1.25	1.32	1.35	2.23	2.38	2.48	2.18
Fats and oils	5.6	6.6	7.0	7.2	.74	.72	.76	.78	.88	1.02	1.09	1.13	1.46	1.67	1.74	1.36
Nonalcoholic beverages	20.7	20.6	21.9	21.3	.52	.51	.53	.51	1.06	1.03	1.02	.98	1.21	1.15	1.20	1.14
Miscellaneous prepared foods	30.1	32.4	36.6	38.5	.78	.76	.80	.83	1.15	1.17	1.28	1.30	1.05	1.07	1.16	1.16

SOURCE: Consumer Expenditure Survey, annual data. PCE estimates are published in "National Income and Product Accounts," *Survey of Current Business* (Bureau of Economic Analysis, July 1990–92 and August 1993). Detailed PCE estimates are from unpublished annual PCE data. Other estimates are from "Consumer Expenditure Study," *Supermarket Business*, FM Business Publications, Inc., September, 1990–93; and "The [year] Supermarket Sales Manual," *Progressive Grocer*, Maclean Hunter Media, Inc., July 1989–92.

holds are obtained.[13] The Residential Energy Consumption Survey collects data on various types of energy sources, including the major sources of home-heating energy: electricity, natural gas, and fuel oil. To compare this survey with the CE Survey, BLS matches time periods and types of fuel to the extent possible. An adjustment is made to the CE data to exclude expenditures for vacation properties because such housing units are not included in the Residential Energy Consumption Survey. Estimates from the latter are for households that pay all their utilities, a population that more closely matches the population covered in CE estimates for energy expenditures.[14]

Table 3 shows estimates of aggregate expenditures from the CE Survey and ratios of CE Survey to Residential Energy Consumption Survey estimates for 1984, 1987, and 1990 (the most recent years for which the latter data are available). Some differences between the two surveys are to be expected because the Residential Energy Consumption Survey covers persons in the military who live on post, a population not included in the CE Survey. CE Survey estimates for the combined major energy sources (natural gas, electricity, and fuel oil) are close to those in the Residential Energy Consumption Survey. Also, although CE Survey estimates for the individual energy sources differ from those of the Residential Energy Consumption Survey and are sometimes higher, most of the estimates are relatively close.

National Health Accounts. The Health Care Financing Administration of the Department of Health and Human Services publishes estimates of total aggregate health costs of the United States in the National Health Accounts. Total health care costs include payments for health care goods and services that are made by all sources, public and private. To derive the estimates for the National Health Accounts, which are constructed to be consistent in concept with the gross domestic product, the Health Care Financing Administration uses a variety of administrative and establishment data sources. These sources include the Census Bureau's Census of Service Industries and Services Annual Survey, the American Hospital Association's Annual Survey of Hospitals, and the monthly National Hospital Panel Survey. The National Health Accounts measures health expenditures for the U.S. population covered by Social Security, which includes inhabitants of U.S. territories, military personnel, and U.S. citizens living outside the United States.[15]

Estimates of out-of-pocket health care expenditures in the CE Survey are compared with estimates of out-of-pocket health care expenditures in the National Health Accounts over the 1988–92 period.[16] These estimates include expenditures for over-the-counter drugs, prescription drugs, medical equipment, professional medical care services, and hospital care not covered by third-party payers. These expenditures include copayment and deductible amounts required by third-party payers and out-of-pocket expenditures for medical care by the uninsured. (Third-party payers include governments, commercial insurance companies, and other nonhousehold sources, such as philanthropic organizations.)

Estimates of expenditures for nursing homes are excluded from the comparisons because the nursing home population is not covered in the CE Survey. Also excluded are estimates for health insurance premiums, medical equipment rentals, and medical equipment repairs, none of which are covered in the out-of-pocket estimates from the National Health Accounts.

Table 4 shows that in 1992, out-of-pocket estimates of medical care expenditures from the CE Survey amounted to $90 billion, 70 percent of the National Health Accounts. This difference reflects the CE Survey's much lower estimates for drugs and supplies, which account for 33 percent of the out-of-pocket total, and lower estimates for professional services, which account for 48 percent of the same total. CE Survey data show that $34 billion was spent out of pocket for medical commodities and $52 billion was spent out of pocket for medical services. As before, these estimates are about 70 percent of those from the National Health Accounts.

The CE–to–National Health Accounts ratios

Table 3. **Comparison of aggregate expenditures for household fuels, Consumer Expenditure (CE) Survey and Residential Energy Consumption Survey, 1984–90**

Expenditure category	CE Survey[1] (in billions)			Ratio of CE Survey to Residential Energy Consumption Survey[2]		
	1984[3]	1987	1990	1984[3]	1987	1990
Major household fuel, total	$91.9	$91.9	$103.01	1.09	.96	1.05
Natural gas	26.5	21.8	23.8	1.06	1.00	1.02
Electricity	58.0	64.7	73.0	1.12	.94	1.06
Fuel oil[4]	7.4	5.4	6.2	1.00	.93	.95

[1] For purposes of comparison, CE Survey estimates are adjusted to exclude expenditures for owned or rented vacation property.

[2] Residential Energy Consumption Survey estimates are for households that pay all their utilities. Households for which utility costs are included in their rent are excluded.

[3] Residential Energy Consumption Survey estimates are for the 12-month period from April 1984 to March 1985. CE estimates are for calendar year 1984.

[4] Residential Energy Consumption Survey estimates for fuel oil include estimates for kerosene.

NOTE: The Residential Energy Consumption Survey is conducted every 3 years.

SOURCES: The Residential Energy Consumption Survey data on which the 1990 ratios are based are from *Household Energy Consumption and Expenditures 1990*, DOE/EIA-0321(90) (Department of Energy, February 1993); data for earlier periods are from *Consumption and Expenditures, Part 1: National Data*, DOE/EIA-0321(85) and DOE/EIA-0321(87) (Department of Energy, 1987).

Table 4. Comparison of estimated aggregate expenditures for health care, Consumer Expenditure (CE) Survey and National Health Accounts, 1988–92

Expenditure category	CE Survey (in billions)					Ratio of CE Survey to National Health Accounts				
	1988	1989	1990	1991	1992	1988	1989	1990	1991	1992
Health care, total[1]	$74	$81	$85	$86	$90	0.71	0.75	0.73	0.71	0.70
Medical commodities	28	31	33	34	38	.69	.71	.68	.66	.71
Drugs and supplies	22	25	26	27	30	.64	.65	.64	.61	.61
Medical equipment	5	7	6	7	7	.92	1.10	.94	1.00	1.00
Medical services, total	46	50	52	52	52	.73	.77	.77	.75	.69
Professional services	37	41	46	44	44	.70	.75	.78	.72	.67
Hospital care	9	9	7	9	8	.86	.91	.66	.91	.87

[1] Excludes health insurance premiums, nursing home care, and medical equipment repairs.

NOTE: Sums may not equal totals due to rounding. CE categories have been grouped as needed to match those of the National Health Accounts.

SOURCE: National Health Accounts data used to obtain the ratios are from Health Care Financing Administration, "National Health Expenditures, 1993," *Health Care Financing Review*, Fall 1994.

are relatively consistent, with very moderate variations in the total and major components. Most of the difference between out-of-pocket estimates from the CE Survey and the National Health Accounts reflects the difference in the kind of data used to derive the estimates, namely, household versus administrative data. Also, some of the difference can be attributed to differences in the populations covered by the two sources. (That is, military on post and U.S. citizens living abroad are counted in the National Health Accounts, but not in the CE Survey.) CE estimates for medical equipment and (except for 1990) hospital care are very close to the National Health Accounts estimates, reflecting the use of CE data as part of constructing out-of-pocket estimates in the National Health Accounts.

American Housing Survey. This longitudinal household survey is conducted by the Bureau of the Census for the Department of Housing and Urban Development every other year. The American Housing Survey provides information on the housing inventory, characteristics of occupants, and housing costs. In 1991, approximately 55,000 households[17] were interviewed from July through December. Beginning in 1989, the Department of Housing and Urban Development revised the method of collecting data on electricity and natural gas expenditures to correct for overreporting of about 15 percent to 20 percent. For the 1991 estimates, the weights are based on the 1990 Census of Housing, and the estimates include changes made by the Census Bureau since then.[18]

Comparisons of the CE Survey and American Housing Survey data cover selected expenditures for owned and rented dwellings, utilities, fuels, and public services. For comparability, BLS uses the 1991 historical estimates, which include 1980 census-based weights. Comparisons are based on medians rather than means, because the American Housing Survey publishes only medians. In general, no assumptions are made about the surrounding data when evaluating data at the median. Therefore, the ratios are a very rough signal of differences between the two surveys.

Table 5 shows that in 1991, the medians for several categories of the two distributions were relatively close. For example, ratios for the market value of owned homes were more than 90 percent and ratios for mortgage principal and interest were 85 percent or more. The 1989 change in the American Housing Survey's methods for collecting data on electricity and natural gas expenditures may partly explain the closer medians than those observed in previous years. Medians for trash and garbage collection expenditures, as well as expenditures for water and sewer, were also closer beginning in 1989. The ratios for several categories fluctuate over the 1985–91 period. Some of the divergence may reflect differences in the reference period over which the data are collected and differences in housing unit coverage, as well as revisions to the American Housing Survey.

Income comparisons

Current Population Survey. The Bureau of the Census collects income data in the March Supplement to the Current Population Survey (CPS). The CPS interviews approximately 60,000 households consisting of the U.S civilian noninstitutional population and members of the Armed Forces living in the United States. Income data are collected for each person in the sample who is 15 years or older.[19]

There are several notable differences between the CE and the CPS. The CPS collects data on income in March for the previous calendar year. In contrast, income data in the CE Survey are collected in the second and fifth interviews of

the consumer unit and refer to the previous 12 months from the date of the interview. These interviews may occur anytime during the year. Missing CPS income data (attributable to nonresponse to questions about income) are imputed on the basis of demographic characteristics. By comparison, CE income estimates are for complete income reporters only; missing income data are not imputed in the CE Survey. Neither procedure accounts for underreporting by the respondent, which is especially prevalent in regard to property income.

Table 6 shows that over the 1988–91 period, estimates of total income compare well with similar estimates from the CPS.[20] Total income before taxes for the CE Survey was 85 percent to 90 percent of the CPS. This reflects comparative levels for wages and salaries and Social Security and retirement income. Some differences are expected because the population covered in the CPS is about 3 percent larger than that covered in the CE Survey. The low ratios for property income reflect imputations for missing data in the CPS and the result of underreporting in the CE Survey.

CE Survey compares well

The preceding analysis shows that estimates from the CE Survey are generally lower than those from PCE of the National Income and Product Accounts, primarily because of two factors: differences in definitions and methods that cannot be completely reconciled and population coverage. Particularly low ratios may indicate underreporting in the CE Survey; for example, CE-to-PCE ratios for expenditures on alcoholic beverages, household textiles, and major appliances are well below 50 percent.

Comparisons between expenditure estimates from the CE Survey and other sources reflect differences between household and administrative data, as well as the different purposes for which the data are collected. The comparisons show that estimates of detailed food expenditures from the diary component of the CE Survey are almost always higher than those of food expenditures reported in *Supermarket Business* and *Progressive Grocer* because of differences in coverage among the sources. CE estimates of expenditures for natural gas and fuel oil are relatively close to

Table 5. **Comparison of annual median expenditures for shelter and utilities, Consumer Expenditure (CE) Survey and American Housing Survey, 1985–91**

Expenditure category	CE Survey				Ratio of CE Survey to American Housing Survey (medians)			
	1985	1987	1989	1991	1985	1987	1989	1991
Market value of owned home	$61,750	$68,749	$71,000	$80,000	0.99	1.01	0.94	1.00
Homeowner expenditures[1]								
Mortgage principal and interest	3,300	4,008	4,704	4,924	.89	.92	.90	.85
Property taxes	622	728	829	855	1.06	1.10	1.10	1.00
Property insurance	234	256	256	377	.89	.85	.79	1.05
Electricity[2]	696	792	818	879	.91	.99	1.18	1.18
Natural gas[2]	516	480	471	479	.77	.77	.96	.95
Fuel oil	725	529	570	563	.92	.73	.79	.72
Trash and garbage collection	78	85	87	120	(3)	.71	.73	.77
Water and sewer service	194	184	208	234	.95	.85	.87	.89
Renter expenditures[4]								
Rent[5]	3,096	3,468	3,600	4,050	.87	.90	.86	.85
Electricity[2]	408	420	494	524	.79	.77	1.00	1.02
Natural gas[2]	372	276	294	278	.91	.72	.91	.83
Trash and garbage collection	67	77	101	96	(3)	.64	.84	.80
Water and sewer service	134	159	199	208	.74	.83	.98	.91

[1] CE homeowners are consumer units living in an owned sample unit. American Housing Survey data are for households living in owner-occupied housing units. Estimates from both surveys exclude data on second homes and vacation homes.

[2] Beginning in 1989, the American Housing Survey collection method for electricity and natural gas was revised to correct overreporting of about 15 percent to 20 percent. The resulting estimates are lower and may not be comparable with estimates for previous years. The American Housing Survey refers to natural gas as piped gas.

[3] American Housing Survey data are not available.

[4] CE renters are consumer units living in rented sample units. American Housing Survey data are for households living in renter-occupied housing units. Both surveys' data exclude housing units rented for vacation.

[5] CE and American Housing Survey data are for contract rent, which includes fuel and utilities costs that are part of the rent payment.

NOTE: Market value is estimated by the reference person or householder as of the time of interview. Housing costs are for the past 12 months unless otherwise noted.

SOURCES: CE Survey data are from the Bureau of Labor Statistics, Division of Consumer Expenditure Surveys. American Housing Survey data are from *American Housing Survey for the United States* (biennial). The 1991 American Housing Survey median value of owner occupied units is from table 3–14. The 1991 American Housing Survey housing costs are from Appendix C, table 13, Current Population Reports, No. H150/91 (Bureau of the Census and Department of Housing and Urban Development, Office of Policy Development and Research, 1991), pp. C-30–C-31. American Housing Survey estimates of contract rent are from the Department of Housing and Urban Development, Office of Economic Affairs.

Table 6. **Comparison of money income before taxes, Consumer Expenditure (CE) Survey and Current Population Survey (CPS), 1988–91**

Income category	Aggregate money income before taxes, CE Survey[1] (in billions)				Ratio of CE Survey to CPS			
	1988	1989	1990	1991	1988	1989	1990	1991
Money income before taxes[2]	$2,694	$2,987	$3,077	$3,300	0.85	0.87	0.87	0.90
Wage and salary income	2,066	2,228	2,344	2,502	.87	.87	.90	.93
Self-employment income	170	243	225	250	.84	1.08	.98	1.11
Social Security and retirement income	291	325	332	351	.98	1.02	.97	.97
Property income	96	120	103	114	.43	.48	.39	.46
Unemployment, workers' compensation, and veterans' benefits	23	20	21	24	.80	.66	.59	.52
Public assistance and Supplemental Security Income	21	20	23	26	.86	.77	.79	.80
Regular contributions and other income	28	33	30	33	.75	.80	.63	.68

[1] CE data are for complete reporters of income.

[2] Excludes the value of food stamps, meals as pay, and rent as pay.

NOTE: Ratios are based on unrounded data.

SOURCE: CPS data are from *Money Income of Households, Families, and Persons in the United States* (Annual), Series P-60, No. 172, tables 33 and 63, and Series P-60, Nos. 174 and 180, table 34 (Bureau of the Census, published annually).

those in the Residential Energy Consumption Survey after adjustments are made for differences in population and expenditure coverage. Ratios for electricity expenditures are more volatile, but the data for 2 out of the 3 years for which comparisons are made show that the two sources are close to each other. Out-of-pocket estimates of health care expenditures reported in the CE Survey are about 30 percent lower than those in the National Health Accounts. That level mainly reflects 40 percent lower estimates for drugs, medical supplies, and professional services. For most years compared, CE estimates for hospital care and medical equipment are close to those in the National Health Accounts. CE estimates for the median market value of a home and median expenditures for mortgage principal, mortgage interest, rent, and water and sewer service compare well with those in the American Housing Survey. Ratios of CE and American Housing Survey estimates are volatile among the homeowner and renter utility expenditure categories.

Aggregate income estimates derived from the CE Survey are close to CPS estimates for wages and salaries, as well as Social Security and retirement income. CE Survey estimates for property income, unemployment compensation, workers' compensation, and veterans' benefits are historically low compared with CPS estimates, indicating underreporting in the CE.

THE CE SURVEY COMPARES WELL with the independent sources studied, and the ratios are generally consistent over the periods studied. BLS will continue to monitor its results from, and develop improvements to, the CE Survey. ▯

Footnotes

[1] Raymond Gieseman, "The Consumer Expenditure Survey: quality control by comparative analysis," *Monthly Labor Review*, March 1987, pp. 8–13.

[2] E. Raphael Branch, "Comparing medical care expenditures of two diverse U.S. data sources," *Monthly Labor Review*, March 1987, pp. 15–18.

[3] Data were published separately for 1980–84. Beginning with 1984, published data are integrated using the two survey components.

[4] Income in the CE Survey is defined as the combined income earned by all consumer unit members 14 years or older during the 12 months preceding the interview. Income is measured using complete reporters, that is, consumer units reporting at least one of the major sources of income: wages and salaries, self-employment income, Social Security, private and government retirement income, interest, dividends, rental income, other property income, unemployment and workers' compensation, veterans' benefits, public assistance, Supplemental Security Income, food stamps, rent as pay, meals as pay, and regular contributions for support, such as alimony and child support. Note that even complete income reporters may not have provided a full accounting of all income from all sources.

[5] Sample surveys are subject to two types of errors: nonsampling and sampling. Nonsampling errors can be attributed to many sources—for example, errors in data collection, response, processing, coverage, and estimation of missing data. The full extent of nonsampling error is unknown, although the levels of expenditures are probably understated because of difficulties with recall on the part of respondents. Sampling errors occur because observations are not taken from the entire population. For more information on the reliability of CE Survey data, see *Consumer Expenditure Sur-*

vey, 1990–91, Bulletin 2425 (Bureau of Labor Statistics, September 1993).

[6] At approximately 5-year intervals, when the results of the quinquennial censuses become available, the Bureau of Economic Analysis establishes the levels (benchmarks) of PCE and its components as part of the comprehensive revision of its Input-Output Accounts for the U.S. economy. For a discussion of the 1982 benchmark revision, see "Benchmark Input-Output Accounts for the U.S. Economy, 1982," *Survey of Current Business* (Bureau of Economic Analysis, July 1991), pp. 30–71.

[7] Annual revisions update PCE by interpolation or extrapolation, using current data mostly from the Annual Retail Trade Survey and the Monthly Retail Trade Survey of the Bureau of the Census, and include revisions to the PCE methodology. The PCE's annual revisions affect the data for 3 years, in this instance, 1990 through 1992. Therefore, data for prior years may not be comparable with data for these years. See "Annual Revision of the U.S. National Income and Product Accounts," *Survey of Current Business* (Bureau of Economic Analysis, August 1993), pp. 9–51; and "National Income and Product Accounts," pp. 52–119.

[8] See stub expenditure categories in *Consumer Expenditure Survey, 1990–91* (Bureau of Labor Statistics, September 1993).

[9] CE Survey data comparisons cover published CE Survey estimates. Historical CE Survey data on rental equivalence are available for comparison from the BLS Division of Consumer Expenditure Surveys.

[10] Percent reporting is a weighted average percent of consumer units reporting an expenditure on a category. BLS tabulates quarterly weighted percents reporting, which are available from the Division of Consumer Expenditure Surveys. The coefficient of variation is a statistic derived by dividing the standard error by the mean. The coefficient-of-variation percent is used to assess the reliability of an estimate and to compare reliability across estimates.

[11] Supermarket Business, Inc., "Consumer Expenditure Study," *Supermarket Business* (FM Business Publications, Inc., September issues, 1990–93).

[12] Progressive Grocer Company, "The [year] Supermarket Sales Manual," *Progressive Grocer* (Maclean Hunter Media Inc., July issues, 1989–92).

[13] See *Household Energy Consumption and Expenditures, 1990*, DOE/EIA–0321(90) (Energy Information Administration, February 1993), Appendix A.

[14] Total expenditure estimates of the Residential Energy Consumption Survey include imputations for the money value of utilities included in residential rents. These totals were used in previously published comparisons between the CE Survey and the Residential Energy Consumption Survey.

[15] For a complete discussion of the National Health Accounts, see "National Health Accounts: Lessons from the U.S. Experience," *Health Care Financing Review* (Health Care Financing Administration, Summer 1992).

[16] Data used for this article are from "National Health Expenditures, 1993," *Health Care Financing Review* (Health Care Financing Administration, Fall 1994).

[17] A household is defined in the American Housing Survey as all the persons who occupy a housing unit. Thus, by definition, the count of households is the same as the count of occupied housing units. Households may be larger than consumer units, the unit of measure in the CE Survey.

[18] *American Housing Survey for the United States in 1991*, Current Population Reports, No. H150/91 (Department of Commerce and Department of Housing and Urban Development, April 1993).

[19] For a complete description of the CPS, see *Money Income of Households, Families, and Persons in the United States, 1988 and 1989*, Current Population Reports, Series P–60, No. 172 (Bureau of the Census, July 1991).

[20] *Ibid.*, see tables 33 and 63; Series P–60, No. 174, August 1991, table 34; Series P–60, No. 180, table 34.