CE data: quintiles of income versus quintiles of outlays

Classifying data from the Consumer Expenditure Survey by quintiles of outlays may be a better indicator of consumers' economic well-being than is classifying the same data by quintiles of income

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The Bureau of Labor Statistics (BLS) Consumer Expenditure (CE) Surveys are among the oldest of the BLS surveys; more than a century has passed since the first survey was undertaken in 1888–89. The specific purpose and design of the surveys have evolved over time, but all have been based on the idea that data collected from the surveys can be used in analyzing and evaluating economic and social problems.

The primary advantage to users of CE Survey data is the ability to associate consumer expenditures on all types of goods and services with the demographic and financial characteristics of the consumers making those expenditures. Data on expenditures, consumer unit characteristics, and income from the current CE Survey, which began in 1980, are published in tables classified by standard variables such as income, age, consumer unit size, and consumer unit composition.[1] Income has been used as a primary means of classifying households for presenting CE Survey results. Two different income tables—quintiles of before-tax income and classes of income levels ranging from less than $5,000 to $70,000 or more—are used to classify households in the current survey.[2] An additional characteristic by which the data can be classified—quintiles of expenditures—has some advantages over the standard income classifications and is examined in this article.

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Income as a classifying variable

Intuitively, income is a natural choice for a classifying variable because it is an indicator of consumers' financial ability to purchase goods and services and therefore is assumed to be a measure of their economic well-being. However, there are theoretical and practical drawbacks pertaining to income that make alternative measures more attractive, at least for some applications.

With regard to theory, consumers' income is subject to transitory variations that result from events such as changes in employment, changes in the family unit (for example, through marriage or divorce), and windfall gains or losses. Income losses may be mitigated somewhat to the extent that consumers are able to draw on savings, borrow, use credit, or obtain support from persons outside the consumer unit to maintain their expenditure levels. Consumers may spend more or less in response to income gains or losses, but will not make long-term adjustments to spending if they believe that the changes in their income are temporary. Thus, expenditure levels are less variable over time than income levels and may be a better indicator of the economic welfare of the consumer unit.[3] This has been discussed extensively in the economic literature pertaining to what is known as the *permanent-income hypothesis*.[4] According to this hypoth-

esis, as a result of transitory income losses and gains, low-income consumers will include those consumers with temporary reductions in their incomes that result in high ratios of expenditures to income, and high-income consumers will include those with temporary increases in income that result in low ratios of expenditures to income.

As regards practical drawbacks, respondents may be unable to recall some of their income from one or more sources, or they may be reluctant to report some or all of their income. Incomplete reporting and underreporting of income, problems common to most household surveys, limit the usefulness of income as a classifying variable. Consumer units that report income from a major source, such as wages and salaries, self-employment, or Social Security, are classified as *complete income reporters*. Income data published from the CE Survey are for complete reporters only; however, even complete income reporters may not have provided a complete accounting of income from all sources.

Also, some consumer units report income losses from a business they own, which may result in low or negative incomes, even if they report income from other sources. Because these consumer units may have expenditure levels that are more typical of higher income consumers, the losses they report affect both the average income and the average expenditures of the lower income classes and can be seen in the income quintile and income level tables. Specifically, their low or negative incomes may depress the average income level, while their higher expenditures raise the average expenditure level. These consumers are not what are considered to be typical low-income consumers.

Another factor to consider when using income to classify data is how income is measured. Various measures can be used to suit different purposes. Before-tax income, after-tax income, and disposable income, measured over a year or some other period, are among the measures that are likely to be used. Annual income before taxes has generally been used to classify data in the CE Survey.

Results from the CE Survey have typically shown that when the data are classified by income quintile, the expenditures-to-income ratio is quite high for the lowest income quintile. Table 1 shows the relationship between expenditures and income for 1992, using data from the interview component of the CE Survey. The trend in the expenditures-to-income ratios from the first to the fifth quintile is decreasing, as expected, with expenditures exceeding income in the first and second quintiles. That expenditures exceed income in these quintiles is not unreasonable, given consumers' access to savings, borrowing, and credit, mentioned earlier. However, the degree by which expenditures exceed income—a factor greater than 2 for the lowest quintile—seems extreme. Indeed, one of the most commonly asked questions about CE Survey data pertains to expenditures exceeding income for the lower income classes.

Measures of expenditures

Given the preceding problems with using income as a classifying variable of consumers' economic well-being, some measure of expenditures may serve as a more suitable substitute. Just as for income, there are a number of alternative measures for expenditures. The manner in which expenditures are defined can have a large effect on the distribution of consumer units across expenditure classes. Three different measures of expenditures are described in what follows: *current consumption expenditures*, used in CE Surveys prior to 1980; *total expenditures*, used in CE Surveys from 1980 to the present; and *current outlays*, the measure used for analysis in this article.

The current consumption expenditures measure used in many of the earlier CE Surveys included the transaction costs of goods and services, as well as excise and sales taxes, and excluded gifts to persons outside the consumer unit, personal insurance, and retirement and pension payments. As previously defined by BLS in the surveys, current consumption expenditures were not a measure of consumption in the true economic sense. This is because no attempt was made to measure the flows of services provided by durables; rather, the prices of the durables (net of trade-ins) were included in current consumption expenditures. For example, when a consumer unit purchased an automobile, the net purchase price of the vehicle was included in that consumer unit's expenditure total in the period the purchase was made.

The total expenditures measure used in the current CE Survey produced the results shown in

Table 1. **Average income and expenditures of consumer units, by quintiles of income, interview component of Consumer Expenditure Survey, 1992**

Category	Income before taxes	Expenditures	Expenditures-to-income ratio
All consumer units	$33,854	$28,340	0.837
Income quintiles:			
First	5,981	12,306	2.058
Second	14,606	17,864	1.223
Third	25,108	24,825	.989
Fourth	40,284	34,033	.845
Fifth	83,131	54,824	.659

table 1. A more comprehensive measure than current consumption expenditures, total expenditures include gifts and contributions, personal insurance, and retirement and pension payments, which are not expenditures for current consumption within the household. Purchases of durable goods are treated in the same manner as under the current consumption expenditures approach.

Initially, expenditure quintile tables were run based on expenditure rankings, using the total expenditures definition from the current survey. However, this approach created some problems, described in the next section. Because of these problems, the total outlays approach was adopted for this article. Total outlays are similar to total expenditures, but with the modifications that the net purchase price of financed vehicles is excluded, payments of principal on all financed vehicles are included, and payments of principal on home mortgages are included. The total outlays approach is believed to be a better measure of the regular out-of-pocket outlays of consumers than is the total expenditures measure. The relationship among the three measures of expenditures is as follows:

Current consumption expenditures

Includes:
- transaction costs of goods and services
- excise and sales taxes
- purchase price of financed vehicles
- home mortgage interest payments

Excludes:
- home mortgage principal payments

Total expenditures

Includes:
- items in current consumption
- personal insurance
- retirement and pension payments, including Social Security
- gifts
- contributions

Total outlays

Includes:
- items in total expenditures
- principal payments on home mortgages
- principal payments on financed vehicles

Excludes:
- purchase price of financed vehicles

Payments of principal on home mortgages are included in total outlays, as are payments of principal on financed vehicles, in keeping with the idea that total outlays are a measure of the regular outlays of consumers. The total outlays approach does not treat purchases of other durable goods in the same manner as it does vehicle and housing purchases because the information on transactions involving the purchase of other durable goods is not as complete as that on transactions involving vehicle and housing purchases. Because other durable goods typically cost much less than vehicles, including their total purchase price in a measure of consumer expenditures has, on average, a considerably smaller effect on the expenditure distribution than does including the price of vehicle purchases.

It should be noted that the expenditure measures decribed above and, indeed, a myriad of other choices as well, may all be valid measures, depending on one's use of the data. The choice of the total outlays approach used in this article was made to provide an alternative method of examining expenditures from the perspective of a household budget.

Methodology and results

The data in this article are from the interview component of the CE Survey. The interview component is a continuous, rotating panel survey in which data on expenditures, income, and consumer unit characteristics are collected from respondents in five consecutive quarterly interviews. Approximately 5,000 consumer units are sampled each quarter. Expenditure and income quintiles were tabulated using data from the interview component of the survey rather than from the diary component and rather than using data integrated from both survey components. This is because the variables used to rank consumer units are computed from data taken from the interview component and because that component provides more complete information on expenditures and income than does the diary component. Also, total expenditures are not available in the diary component. Integrated data cannot be used because ranking is possible only when all expenditures on individual consumer units are available.

Initial results. Results from one of the earlier attempts at using expenditures as a classifying variable are shown in table 2. For that study, a ranking variable was created using total expenditures as defined in the current survey, for the purpose of showing the data by expenditure quintiles. However, the manner in which purchases of vehicles are treated in the current survey—that is, with the net purchase price of the vehicle included in the expenditure amounts—resulted in ranking practically all consumer units that purchased a vehicle in the highest expenditure quintile. Unlike the *income* quintile tables, the rankings by *expenditure* quintiles resulted in the level of average total expenditures of consumer units in the lowest expenditure quintiles being less than the average income of those same consumer units before taxes. However, because

Table 2. **Income and expenditures for selected categories, by quintiles of total expenditures, interview component of Consumer Expenditure Survey, 1986**

Category	All consumer units	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Income before taxes	$25,481	$7,376	$14,440	$22,446	$32,907	$50,168
Total expenditures	22,710	6,031	11,818	17,821	26,230	53,442
Transportation	4,815	558	1,514	2,565	3,883	15,736
New cars and trucks	1,414	—	—	4	22	7,003

NOTE: Dash indicates no data reported.

such a large portion of consumer units that bought a vehicle were ranked in the top expenditure quintile, and because the net purchase price of the vehicle is included in total expenditures, total expenditures actually exceeded average income for consumer units in the highest expenditure quintile. Relatively few consumer units actually purchase a new vehicle in any year—about 7 percent of all consumers in 1992—but the high cost of new vehicles has a large impact on the distribution of expenditures across quintiles. It was because of this effect that the total outlays measure of expenditures was used in this article as the ranking variable for constructing quintiles.

Outlays quintiles versus income quintiles. Table 3 compares data from the interview component of the CE Survey classified by outlays quintile with data classified by income quintile. Incomplete income reporters are excluded from the rankings by quintile for both sets of data. The variable used to rank consumer units by their income is created on the basis of their before-tax income, and incomplete reporters are excluded. For comparison purposes, the rankings by outlays also exclude incomplete reporters. However, it should be noted that incomplete income reporters could be included in the rankings by outlays, which would then result in larger sample sizes. Total outlays are used for the expenditure means for both methods of ranking, so that the only difference between the two sets of data is that one is ranked by total outlays and the other by before-tax income. Because the mean expenditures in the ranking by income are based on total outlays, they do not match the expenditures in the standard income quintile tables published from the interview component of the CE Survey.

The table shows that there is less variation in income across outlays quintiles than across income quintiles. Mean income ranged from $9,664 to $71,628 for the outlays quintiles, compared with a range of $5,981 to $83,131 for the income quintiles. Total outlays were well above income for the two lowest income quintiles. This can be attributed to problems discussed earlier: underreporting income and consumers reporting income losses who have expenditures typical of higher income consumers. Income is greater than total outlays for all five outlays quintiles.

The average age of the reference person was 53 years for the lowest outlays quintile, compared with 50 years for the lowest income quintile. The higher average age for the former is reflected in the percent of consumer units that own their homes without a mortgage—37 percent, as against 28 percent for the first income quintile. The housing share of total expenditures was similar for the two ranking methods.

The share of total expenditures spent on transportation ranged from 9 percent to 17 percent across quintiles of outlays, compared with a range of 14 percent to 17 percent across income quintiles. The share of the total spent on new cars and trucks ranged from less than 1 percent for consumer units in the lowest outlays quintile to 5 percent for consumer units in the highest outlays quintile (not shown in table 3). For the classification by income quintile, the range was from 1.6 percent to 4.1 percent.

The share of total expenditures spent on education averaged 1.1 percent for consumer units in the lowest outlays quintile, compared with 2.6 percent for consumer units in the lowest income quintile. This is because fewer college students were ranked in the lowest outlays quintile than in the lowest income quintile and because fewer consumer units with children attending college were included in the lowest outlays quintile than were included in the lowest income quintile.

The share of total expenditures spent on personal insurance and pensions (including Social Security contributions) was higher for consumer units in the lowest outlays quintile than for consumer units in the lowest income quintile. This results from the higher income levels and correspondingly larger Social Security and pension payments by the former group. Conversely, consumer units in the highest outlays quintile spent a lower share of their total expenditures on personal insurance and pensions than did consumer units in the highest income quintile.

Table 3 demonstrates that there are noticeable differences between the two methods of classification in the level of shares spent for some categories of items. However, the shares for those categories not shown in the table are similar under each method. The average levels of expenditures, outlays, and income, as well as the outlays-to-income ratios, vary substantially for the two methods, mostly for the lowest and highest quintiles.

Income and outlays rankings

We expect that the aforementioned problems of underreporting income and reporting income losses from self-employment that offset other income, coupled, in some cases, with higher levels of expenditures, affect primarily the lower income quintiles, resulting in higher expenditure-to-income ratios than would occur otherwise. If self-employment income losses are viewed as transitory, then a corresponding effect might also occur from transitory gains, resulting in lower expenditure-to-income ratios in the highest income quintile.

One method of looking at some of these effects is to compare the classifications of consumer units by income quintiles with their classifications by outlays quintiles. This was accomplished by first ranking consumer units by their before-tax income—that is, ordering them from lowest to highest income—and then dividing the distribution into five income quintiles. Consumer units in each such quintile were also classified by the outlays quintile in which they were included. Table 4 shows the results of this procedure for consumer units in the lowest and highest income quintiles. About 3 percent of the consumer units ranked in the lowest income quintile were ranked in the highest outlays quintile. Approximately 14 percent of consumer units ranked in the lowest income quintile, or 1 in 7, were ranked in the top three outlays quintiles. These are consumer units that report low overall levels of income and high levels of outlays.

Table 3. **Income, expenditures, and expenditure shares for selected categories, by income quintile and by outlays quintile, interview component of Consumer Expenditure Survey, 1992**

Category and ranking method	All consumer units	First quintile	Second quintile	Third quintile	Fourth quintile	Fifth quintile
Income before taxes						
Income	$33,854	$5,981	$14,606	$25,108	$40,284	$83,131
Outlays	$33,854	$9,664	$18,061	$28,732	$41,058	$71,628
Number of persons						
Income	2.5	1.8	2.2	2.5	2.9	3.1
Outlays	2.5	1.7	2.2	2.5	3.0	3.2
Age of reference person						
Income	47.6	50.1	51.6	46.9	44.0	45.0
Outlays	47.6	53.3	49.6	45.6	44.1	45.1
Total outlays						
Income	$28,541	$12,396	$17,920	$24,630	$34,060	$55,887
Outlays	$28,541	$8,259	$15,585	$23,356	$34,203	$63,467
Percent of total outlays						
Food:						
Income	15.3	20.9	18.0	16.2	14.8	12.1
Outlays	15.3	24.0	19.4	17.0	15.1	11.8
Housing:						
Income	33.8	37.4	35.1	32.6	31.8	33.2
Outlays	33.8	36.6	34.6	32.7	31.9	33.6
Transportation:						
Income	15.9	13.6	15.9	17.5	16.6	14.7
Outlays	15.9	9.4	13.8	15.5	15.9	16.8
Health care:						
Income	5.4	7.4	7.8	6.4	5.2	3.8
Outlays	5.4	8.1	7.2	6.2	5.3	4.3
Education:						
Income	1.4	2.6	1.2	.7	1.1	1.6
Outlays	1.4	1.1	1.1	.8	1.1	1.8
Personal insurance and pensions:						
Income	9.6	2.3	4.7	8.4	11.6	14.8
Outlays	9.6	4.0	6.9	10.2	11.6	12.1

Of the consumer units ranked in the highest income quintile, less than 1 percent are ranked in the lowest outlays quintile. Almost 8 percent, or 1 in 13, of consumer units ranked in the highest income quintile are ranked in the lowest three outlays quintiles. These consumer units report high overall levels of income, but low levels of outlays.

An additional procedure was performed to test the relationship between the expenditure-to-income ratios and income. The published tables from the CE Survey show that the expenditure-to-income ratios decrease with increases in income. Regression analysis revealed that the relevant coefficient was negative and significant.[5] As a result, we can say that expenditures as a share of income decrease with increases in income.

THIS ARTICLE HAS PRESENTED an alternative method of classifying CE Survey data than the method of classification by income currently in use. Because consumers' expenditures or outlays may be a better indicator of their economic well-being than income is, classifying the data by quintiles of expenditures provides a useful way of examining consumers' expenditure patterns according to their level of well-being. The article also shows that consumer units in the lowest income quintile are not necessarily the same consumer units in the lowest outlays quintile. Indeed, some consumer units in the lowest income quintile have expenditures that are more typical of upper-income consumers. □

Table 4. **Corresponding outlays classifications for consumer units ranked in the lowest and highest income quintiles, interview component of Consumer Expenditure Survey, 1992**

[In thousands]

Quintile	Consumer units	Percent from income quintile ranked in outlays quintile
First income quintile	17,241	100.0
First outlays quintile	11,077	64.3
Second outlays quintile	3,808	22.1
Third outlays quintile	1,251	7.3
Fourth outlays quintile	681	3.9
Fifth outlays quintile	424	2.5
Fifth income quintile	17,315	100.0
First outlays quintile	15	.1
Second outlays quintile	189	1.1
Third outlays quintile	1,139	6.6
Fourth outlays quintile	4,506	26.0
Fifth outlays quintile	11,466	66.2

NOTE: Sum of individual percents may not equal 100 percent due to rounding.

Footnotes

[1] A *consumer unit* is defined as (1) a single person living alone or sharing a household with others, but who is financially independent; (2) members of a sample household related by blood, marriage, adoption, or some other legal arrangement; or (3) two or more persons living together who share responsibility for at least two out of three of the following major types of expenses: food, housing, and other expenses.

[2] Quintiles of before-tax income are defined by ranking complete income reporters in order, by the level of their before-tax income. The ranking is then divided into five equal groups. For a definition of *complete income reporters*, see next section in text.

[3] See H.S. Houthakker and Lester D. Taylor, *Consumer Demand in the United States* (Cambridge, MA, Harvard University Press, 1970), pp. 255–59.

[4] See Angus Deaton and John Muellbauer, *Economics and Consumer Behavior* (Cambridge, England, Cambridge University Press, 1980).

[5] Regressing the ratio of expenditures to income on income is problematic because the ratio forces a negative relationship between the two. To account for this, both sides of the equation were multiplied by income prior to running the regression. Accordingly, expenditures were regressed on income and income squared. In other words, instead of

$$E/I = \alpha + \beta I,$$

the regression run was

$$E = \alpha I + \beta I^2,$$

where E denotes expenditures and I is income. Because the coefficient β on I^2 was negative and statistically significant even when other variables were added to the model, the relationship between expenditures as a share of income and income is negative.