

Exploring Underreporting and Respondent Records Usage in the Consumer Expenditure Survey

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Introduction

The U.S. Consumer Expenditure Quarterly Interview Survey (CEQ) is a monthly survey developed to capture continuous information about the buying habits of American consumers. The U.S. Census Bureau conducts the CEQ on behalf of the U.S. Bureau of Labor Statistics (BLS). The CEQ is a long, complex survey that presents a number of challenges for both the interviewer and respondent. As a result, BLS and the Census Bureau were concerned that the CEQ might be subject to various forms of measurement error. These forms of measurement error include underreporting attributed to recall error, panel conditioning, and respondent fatigue. The Census Bureau and BLS are interested in improving data quality on the CEQ by exploring the magnitude, direction, and patterns of measurement errors, as well as investigating the use of respondent records and having respondents refer to external sources such as bills and receipts to reduce error. The specific objectives are outlined below:

1. **Evaluate the availability and feasibility of respondent records.** Do respondents have records for the types of expenditures asked about in the CEQ? How well do these records match the information requested in the CEQ?
2. **Measure the direction and magnitude of measurement error.** How accurate is the information provided by respondents without the use of records? How much do respondents over- or underreport expenses? How much do respondents over- or underestimate the amount of expenses?
3. **Understand respondents' interview experience.** What is the respondent's perception of the CEQ interview with respect to burden, difficulty, perceived accuracy, and reaction to materials? How do the respondents' experiences affect data quality?

Methodology

The Census Bureau contracted with RTI International and Avar Consulting, Inc. to conduct the Consumer Expenditure Records (CE Records) study to explore these objectives. The RTI team conducted interviews in a non-probability sample with 115 participants who varied with respect to several demographic characteristics: education level, employment status, age, household size, and household income. Participants were recruited via flyers and online posts in two metropolitan areas: Raleigh-Durham, North Carolina, and Washington, DC. Each participant completed two interviews within a four- to seven-day period.

In the first interview of the study, participants completed nine sections of the standard CEQ instrument and answered a short set of debriefing questions about their experience with the CEQ. After this first interview, participants were asked to collect records (e.g., receipts, bank statements, credit card bills) for the expenditures asked about during the interview, to be used in the second interview. The second interview, conducted four to seven days after the first interview, used a semi-structured interview format that focused on matching the self-reported expenditures from the first interview with records provided by the participants.

All interviews were conducted using computer-assisted personal interviewing (CAPI) in the participants' homes. Participants were compensated \$40 for completing the first interview and \$60 for completing the second interview.

Results

The 115 participants who participated in the CE Records study reported a total of 3,039 expenditures and 241 income items in the first interview of this study. The availability of records and the accuracy of participant reports are summarized by section and overall in Table 1. The various factors affecting the availability of records and accuracy of records are provided as well.

Percent of Expenditures with Records.

This is the percent of expenditures reported in first study interview that had a record. To be considered a record, an amount for the expenditure had to be included on the record. Self-produced documentation, such as spreadsheets or handwritten notes, were considered to be records, provided they included an amount..

Matching Reports.

This is the percent of reports in the first interview of this study that matched the participant records. A match was determined as follows:

The amount on the record / the amount reported in first interview of this study.

For amounts over \$200, a match was when the record was between 95% and 105% of the reported value. For amounts that were \$200 or less, a match was when the record was between 90% and 110% of the reported value. For Sections 2 (Rent), 3 (Mortgages/Loans), and 22 (Income), a 95% to 105% match rate was used for all items, regardless of cost. In each section, it only includes expenditures for which an amount was reported in first interview of this study.

Table 1. Summary of Findings by Section

| Section | Percent with Records | Factors Positively Associated with Having Records | Percent Matching | Factors Positively Associated with Matching Reports |
|---------------------|----------------------|--|------------------|---|
| 2. Rent | 28% | Older, recent ¹ , DC ² | 76% | Women, DC, working |
| 3a. Property Tax | 59% | Non-Hispanic (NH ³) white | 65% | - |
| 3bc. Mortgage/loans | 59% | NH white, married, younger, smaller CUs ⁴ | 69% | Higher income, women |

¹ The closer in time it was to the purchase the more likely they were to have a record for it.

² Refers to respondents who reside in the District of Columbia.

³ As defined by the US Bureau of Census, individuals who are of the White race and are not of Hispanic or Latino origin/ethnicity.

⁴ A consumer unit comprises either: (1) all members of a particular household who are related by blood, marriage, adoption, or other legal arrangements; (2) a person living alone or sharing a household with others or living as a roomer in a private home or lodging house or in permanent living quarters in a hotel or motel, but who is financially independent; or (3) two or more persons living together who use their income to make joint expenditure decisions. Financial independence is determined by the three major expense categories: Housing, food, and other living expenses.

| Section | Percent with Records | Factors Positively Associated with Having Records | Percent Matching | Factors Positively Associated with Matching Reports |
|-----------------------------|----------------------|---|------------------|--|
| 4a. Phone lines | 32% | Recent, DC, married, residential | 61% | Women |
| 4b. Phone, other | 20% | - | 75% | - |
| 4c. Internet Service | 57% | NH white, married, high income, owners ⁵ , larger items, same expense each month | 66% | Larger items |
| 4d. Utilities | 37% | Women, owners, recent | 36% | NH white, lower income, lower education, working, recent |
| 6a. Major appliances | 24% | - | 80% | - |
| 6b. Minor appliances | 24% | NH white | 62% | Not married |
| 8a. Home furnishings | 25% | Not working, DC, larger items, recent | 52% | Owners, low income |
| 8b. Furniture repair | 0% | - | NA | - |
| 9ab. Clothing | 40% | Recent | 45% | Non-white, DC, older, larger CU, Coats/suits |
| 9cd. Services / Sewing | 16% | - | 50% | - |
| 14. Health insurance | 44% | Recent, NH white, married | 59% | - |
| 17. Subscriptions | 53% | Larger items | 61% | Not married, renters |
| 19. Miscellaneous | 31% | Owners, not married, DC, type of item (larger items) | 63% | High income, men, type of item |
| Overall Expenditures | 36% | NH white, women, DC, home owners, recent, cost | 53% | Not working, married |
| 22a. Gross Income | 43% | NH white, other CU members | 50% | - |
| 22b. Last Pay | 40% | NH white, renters, younger | 45% | - |
| Overall Income | 41% | NH white, not married, DC, larger CUs | 48% | Working |

Conclusions and Discussion

1. Availability and Feasibility of Records

Overall, records were provided for only 36% of all items reported in first interview of this study. There were four primary factors affecting the availability of participant records:

1. **Demographic characteristics.** Several demographic characteristics were consistently associated with the availability of participants' records across the different sections of the CEQ. While not observed for every type of purchase asked about in the CEQ, in general,

To be considered financially independent, at least two of the three major expense categories have to be provided entirely, or in part, by the respondent.

⁵ Refers to homeowners.

participants who were non-Hispanic white, from the Washington, DC area (as opposed to Raleigh-Durham, NC), married, and home owners were more likely to have records. Other demographic variables emerged for some types of expenditures but overall the aforementioned demographic characteristics were most strongly associated with having records.

2. **Date or frequency of purchase.** With respect to when the item was purchased, two patterns emerged. In some sections, participants were more likely to have records for items that were purchased on a regular basis and more likely to have records for items purchased in recent months.
3. **Significance of the item.** The likelihood of having a record was associated with the cost of the item for several sections. Participants were more likely to have records for more expensive items. When participants did not have records for a given item, they frequently explained that they do not keep records for items that are insignificant, such as items that were inexpensive or that they were not planning to return.
4. **Online records.** There is some evidence that participants considered records or receipts to be largely hard copy documents of a purchase, rather than electronic documentation of purchased and payments. A common reason cited by participants for not having a record was that the record was online. In many cases participants were unwilling or unable to print out online records.

When records were provided, the quality of the records tended to be high. Only 8% of all records were inaccurate and thus inappropriate for use. Furthermore, most records included the date of the item, although service period dates, for certain items, were much more limited. The majority of participants and Field Representatives (FRs) found it easy to map the records to the expenditures reported in first interview of this study.

2. Direction and Magnitude of Measurement Error

For the CE Records study, we considered a reported amount for an item to match the record if the record was within 10% of the costs of the report for items that cost \$200 or less or within 5% of the report for items that cost \$200 or more. For sections where the majority of items were over \$200 (Sections 2, 3, and 22), we used the 5% range for all items regardless of cost. For the 939 items reported in first interview of this study where a corresponding record was provided in Interview 2, the reported amount matched the record for just over half of the items (53%) with a range of 36% to 80%, depending on the section of the interview.

Over/ Under Estimating

Although the overall rate of matching within the 5-10% criteria window established was low, for 30% of the items reported, participants' reports matched the record exactly. With regards to the distribution of report values, participants' underestimated costs for 37% of items reported and overestimated costs for the remaining 33% of the items. On average, participants misreported the amount of items they purchased by 36%. There were not any factors that were consistently associated with under- or overestimating the cost of items.

Over/ Under Reporting

Compared to under- or overestimating the cost of items, under- and over-reporting of items themselves was less common. There were 81 items (3%) that were identified as underreports (expenditures not reported in first interview of this study but subsequently reported in Interview 2) and 34 items (1%) that were identified as over-reports (expenditures erroneously reported in first interview of this study), compared to the 3,039 items (96%) correctly reported.

3. Understanding Respondents' Interview Experience

Overall, participants thought the first interview of this study was easy to complete. An overwhelming majority (95%) of participants said that the length of first interview of this study, which averaged 60 minutes for the CE Records study, was just about right. Despite the fact that almost half of participants said they either sometimes, often, or always guessed the cost of their expenses, most participants felt that their responses were accurate. Based on these figures, participants seem to be very confident in their ability to accurately guess the amount of their expenses. However, as we found by examining participants' records, oftentimes they were not nearly as accurate as they thought. In fact, "I guessed or estimated" was the most common response, given for approximately 40% of the reports that did not match. Perceived accuracy of response was slightly associated with the actual accuracy of response—those who were more confident about their responses tended to have more accurate reports than those who were not confident. However, participants who said they were "extremely certain" about the accuracy of their answers in the CEQ provided matching reports for only 63% of their reports.

Participants reacted favorably to the study materials, with 88% of participants using the CE information booklet and 92% of those participants finding it useful. Of the participants who received the advance letter, 95% said that they read it and only 9% of those participants found the letter to be unclear or confusing.

Study Limitations

The CE Records study was an exploratory research study involving a non-probability sample of 115 participants. Therefore the results of this study may not be generalized to the full CEQ respondent population. Participants actively volunteered to participate in this study by responding to online and newspaper advertisements and posted flyers and received \$100 for taking part in this study. Typical CEQ respondents, on the hand, do not receive any incentives. As a result, participants in this study may be more willing than the average CEQ participant to take the time to collect receipts and records. If this is true, then the availability of records may be upwardly biased in this analysis.

The small sample size is also a limitation. All statistical analyses were performed with a small sample sizes and should be considered carefully before drawing conclusions. The use of a liberal criterion for statistical significance ($p < .10$) due to the small sample size may have resulted in detecting a difference even when no difference truly exists. In addition, in some cases we were not able to adjust for the clustering of

expenditures within individuals because of the small sample sizes. This may have resulted in smaller standard errors, possibly leading to inappropriately detecting a difference even when one does not exist.

Participants were from only two geographic areas – Raleigh-Durham, NC and the Washington, DC area – therefore the results may not generalize to the nation in terms of the number and types of expenditures incurred. In addition, this study used an abridged version of the CEQ instrument. It is unclear what the effect would have been if the entire CEQ instrument was used.

Furthermore, records were provided for only 36% of items that were reported in first interview of this study. This is no way of knowing if the accuracy of the reports where records were provided is similar to the accuracy of reports when records are not provided. Further, it is unclear whether the results from this analysis generalize to other parts of the CEQ that were not included in this study.