The CE 2017 Data Quality Profile

September 7, 2018

Evan Hubener, Clayton Knappenberger, Yezzi Lee, & Lucilla Tan

Consumer Expenditure Surveys Program Report Series

U.S. BUREAU OF LABOR STATISTICS • bls.gov | @BLS_gov

Dedication

We dedicate this report in honor of the memory of our colleague, Scott S. Fricker, Office of Survey Methods Research. Scott had significantly contributed to the development of the data quality framework and infrastructure to support and sustain the routine production of data quality profiles for the CE Program.

Contents

Overview

The Consumer Expenditure Surveys Program (CE) has historically provided a variety of metrics for data users to evaluate the overall quality of its products. Official tables provide standard errors, the public-use microdata user documentation provides response rates, and the datasets contained in the public-use microdata provide all the variables and flags necessary for users to create their own quality measures. One of the goals of the CE is the routine production of an annual Data Quality Profile (DQP) that reports on a comprehensive set of metrics tracked over time for the CE Interview Survey (CEQ) and the CE Diary Survey (CED). For external users, these metrics are an indication of data quality; for internal users, the metrics are actionable and provide a basis for survey improvements. Since the quality of survey estimates is affected by errors that occur anywhere in the survey lifecycle, it is expected that the set of DQP metrics will evolve over time as the CE continually researches methods to monitor and improve data quality.

The *2017 CE Data Quality Profile* is the third in a series of iterations towards an annual CE DQP. The metrics in this report include indicators for Measurement, Nonresponse, and Processing error. The metrics are based on data collected in 2010 through 2017. Future metrics will measure Coverage error and Sampling error. The data quality dimension that each metric is an indicator for is denoted by a "✔" in the following table:

Metrics reported in the CE 2017 Data Quality Profile

Metric	Total Survey Error dimensions associated with the metric		
	Measurement	Nonresponse	Processing
Final disposition rates of eligible units in the CEQ and CED		✔	
Records use by CEQ respondents	✔		
Edit rate of reported expenditures in the CEQ & CED	✔	✔	✔
Edit rate of income in the CEQ and CED	✔	✔	✔

In the next section, we present visualizations to highlight findings about the metrics. The subsequent sections provides detailed metric tables and interpretations. Definitions used to construct the metrics appear in the Appendix.

Highlights

In this section, we highlight metric trends for the reporting period (2010 through 2017) with the description below and a panel of graphs in Figure 1. Further details about the individual metrics and detailed data tables are provided in the sections that follow the visual summary.

Trends for concern

The trend of declining **response rates** continued for both the CEQ and CED through 2017 (see Section 1). The CE Program currently has a nonresponse study underway to better understand if and how differences between respondents and nonrespondents affect nonresponse bias of key survey estimates. **Survey refusal** rates continued to rise in 2017 for both the CEQ and CED. For the CEQ, the issue of time was a dominant reason for refusals. For the CED, changes in diary placement procedures in 2017 largely account for the shift in nonresponse because of "other reasons" to nonresponse because of refusals. **Nonresponse reclassification** rates as a proportion of "Other reasons for nonresponse" also rose in 2017 for both CEQ and CED, although it consistently remains much lower in the CEQ.

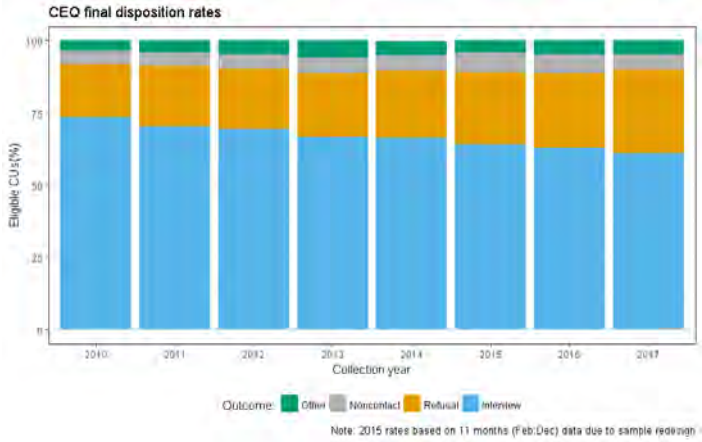
Trends that are encouraging

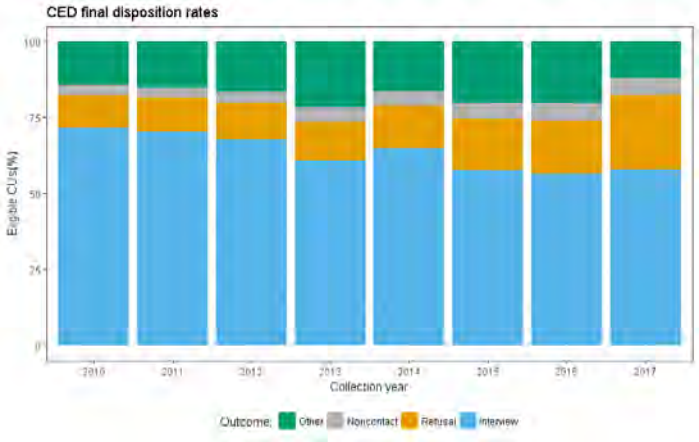
While the overall **edited reported expenditures** for the CEQ remained relatively constant between 2015 and 2017, there was an increase in ***allocation rate*** offset by a decrease in ***imputation rate*** in 2017. This is largely attributable to modifications made to the processing procedure for *Section 4 Part A (Telephone, Internet, and Cable/Satellite TV Expenses)* that sought to preserve reported expenditure totals and component proportions in the imputation process (see Section 3). The overall **edited reported expenditures** for the CED has also remained relatively constant and has been consistently lower than the CEQ.

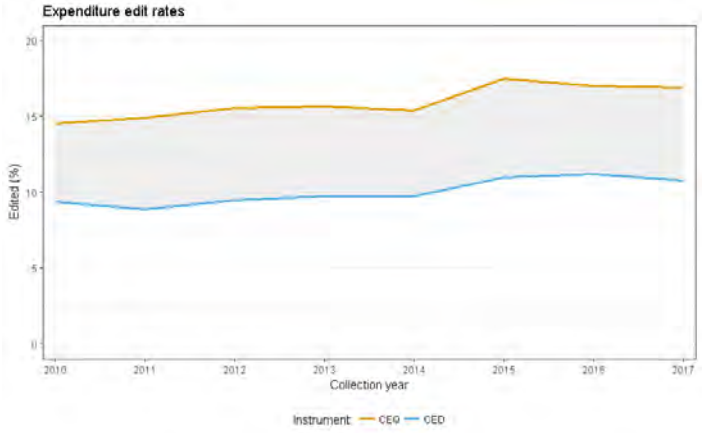
The trend for **unimputed income** sources in "Total CU income before tax" continued to rise for both the CEQ and the CED in 2017, due primarily to the decline in the rate of *model-based imputation* (see Section 4). For two dominant income sources examined – Salary/wage, and Social Security/Retirement benefits – the prevalence of model-based imputation declined for both these sources in the CEQ and for Salary/wage in the CED.

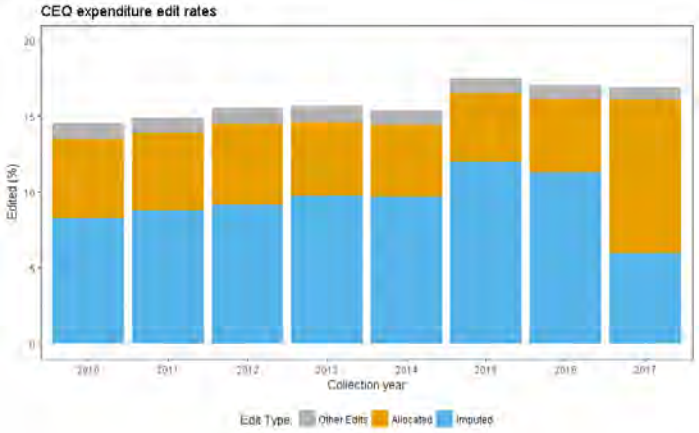
Athough still not more than half the CEQ respondents are reported to use records, the prevalence of declining **overall record use** among CEQ respondents between 2010 and 2015 appears to have halted with a slight upturn in 2016 and 2017(see Section 2).

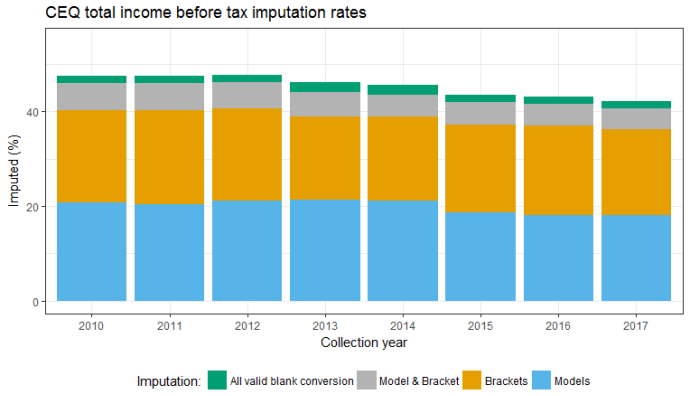
Figure 1. Select metric trends from 2010 to 2017











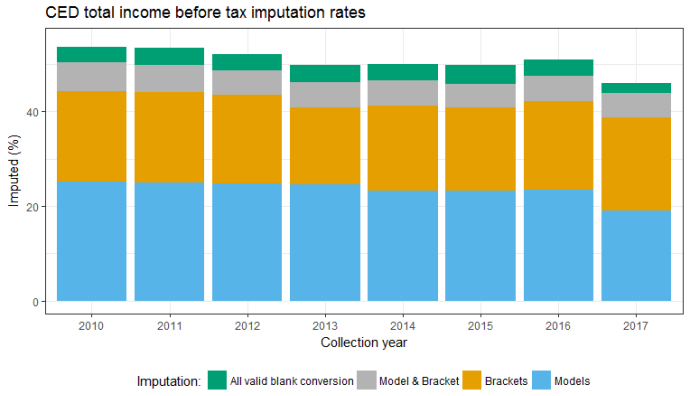
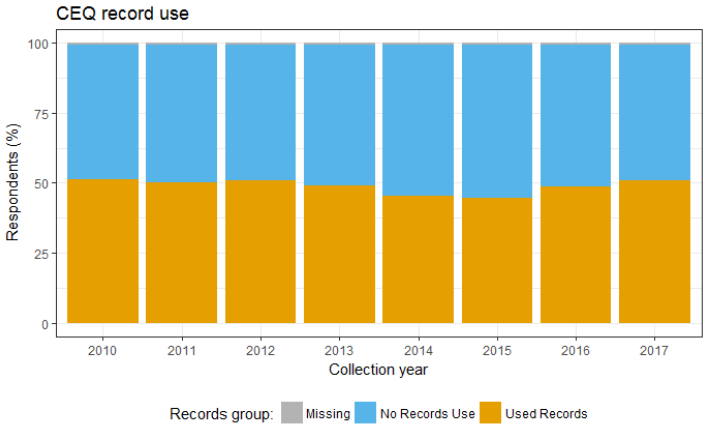


Figure 1. Select metric trends from 2010 to 2017



1. Final disposition rates of eligible sample units

The unit of observation for the CE is the Consumer Unit (CU), so response and nonresponse rates are computed at the CU level. The CE adopts the Census Bureau's categorization of eligible CUs who do not respond to the survey as a "Type A nonresponse." Type A nonresponse is differentiated into subcategories of reasons for nonresponse: "*Noncontact*" when the interviewer is unable to contact an eligible member of the CU; "*Refusal*" when the contacted CU member refuses; and "*Other nonresponse*" for miscellaneous other reasons. Among the "Type A Other nonresponse" reasons is a minimal expenditure edit check performed at BLS (CE) that could change an interviewer-coded "completed interview" for a CU to "nonrespondent" if too few purchases are reported; this type of edit is referred to as the *nonresponse reclassification*. A mapping of the CE to AAPOR final disposition codes for in-person, household survey is presented in the Appendix.

Response and nonresponse rates are measures of cooperation levels in a survey. Since not all eligible sample units will be available or agree to participate in the survey, there will be some nonresponse to the survey request. Characteristics of nonrespondents may differ from respondents, and if these characteristics correlate with their expenditures, their omission from the survey may result in bias in the estimates produced from the survey. While weighting adjustments may reduce bias, the effectiveness of this approach depends on the availability and quality of variables used in the weighting, so concerns about bias persist. A single, survey-level measure, such as a survey response rate, in itself is an inadequate measure of nonresponse error. Nevertheless, higher response rates are preferred in the absence of other indicators of nonresponse bias.

The nonresponse reclassification is conducted in both the CEQ and CED. The nonresponse reclassification rates can serve as an indicator of the potential for nonresponse bias because the minimal expenditure edit (which triggers reclassification) converts these respondents to nonrespondents. If those reclassified as nonrespondents are systematically different from respondents, nonresponse bias will result. Thus, all else being equal, lower reclassification rates are desired.

Response rates can be reported unweighted or weighted. *Unweighted response rates* provide an indication of the proportion of the sample that resulted in useable information to produce estimates. They also serve as a useful means of monitoring the progress of fieldwork and for identifying problems with nonresponse that can be addressed during fieldwork operations. *Weighted response rates* provide an indication of the proportion of the survey population for which useable information is available, since the weights allow for inference of the sample to the population. The weights typically used are base weights (the inverse probability of selecting the sample units). Since past analyses found weighted and unweighted rates to be similar in both the CEQ and CED, only unweighted rates are presented in this report.

Each survey wave is treated as independent from another wave in computing official CEQ survey estimates, so each survey wave is treated as independent from another wave for computing CEQ response rates. Similarly for the official CED survey estimates and response rates, each diary week is treated as independent from another diary week. In the tables on final disposition rates shown in this section, the number of eligble CUs is the number of CU addresses eligible for the interview in the collection period, and thus are not counts of unique CUs.

CEQ disposition rates

CEQ *response rates* declined from 73.4 percent to 60.9 percent between 2010 and 2017 (Table 1.1). This decline is primarily attributable to a rise in *refusal rates,* from 18.6 percent to 29.1 percent between 2010 and 2017. Interviewers have several pre-coded options for describing a refusal, which are: "Refusal: Hostile respondent", "Refusal: Time related excuses", "Refusal: Language problems", and "Refusal: Other". There was an increase in rates of "Refusal: Time related excuses" and "Refusal: Other" in 2017. Interviewer notes for "Refusal: Other" showed a high prevalence of these keywords: "silence", "avoidance", "interest", and "privacy.". *Nonresponse reclassification rates* as a proportion of "Type A Other nonresponse" increased from 0.6 percent to 3.1 percent between 2016 and 2017 (Table 1.2).

Table 1.1 CEQ distribution of final dispositions for eligible CUs (unweighted)

Year*	No. eligible CUs*	Interview	Refusal	Noncontact	Other nonresponse
		Row percent distribution			
2010	38,718	73.4	18.6	4.3	3.7
2011	38,348	70.4	20.8	4.6	4.2
2012	38,835	69.5	20.8	5.0	4.7
2013	39,142	66.7	22.1	5.4	5.8
2014	39,003	66.4	23.3	5.2	5.0
2015	36,692	64.2	24.8	6.8	4.2
2016	40,375	63.0	25.8	6.5	4.7
2017	40,193	60.9	29.1	5.4	4.5

* [1] For years prior to 2015, bounding interviews in Wave 1 were excluded and only Waves 2 through 5 were used in computing final disposition rates. Starting in 2015, the bounding interview was dropped from the CEQ so all four waves (1 through 4) were used in computing final disposition rates. [2] Data from January 2015 were excluded due to sample redesign.

Table 1.2 CEQ: prevalence of nonresponse reclassifications (official tables, unweighted)

			Nonresponse reclassifications		
Year*	No. eligible CUs	No. other nonresponse	No. CUs	Other nonresponse(%)	Eligible CUs (%)
2010	38,718	1,427	30	2.1	0.077
2011	38,348	1,606	24	1.5	0.063
2012	38,835	1,816	13	0.7	0.033
2013	39,142	2,258	18	0.8	0.046
2014	39,003	1,960	10	0.5	0.026
2015	36,692	1,537	13	0.8	0.035
2016	40,375	1,884	12	0.6	0.030
2017	40,193	1,861	58	3.1	0.144

* [1] For years prior to 2015, bounding interviews in Wave 1 were excluded and only Waves 2 through 5 were used in computing final disposition rates. Starting in 2015, the bounding interview was dropped from the CEQ so all four waves (1 through 4) were used in computing final disposition rates. [2] Data from January 2015 were excluded data due to sample redesign.

CED disposition rates

CED response rates have been consistently lower than the CEQ, but moved closer to the CEQ in 2017. The CED response rate fell from 71.5 percent in 2010 to 56.7 percent in 2016, but rose to 58.0 percent in 2017 (Table 1.3). A diary placement procedural change implemented in 2017 likely explains this increase in response rates: the "Early Placement Date" was eliminated so interviewers had the full month to place Week 1 and Week 2 diaries. This change reduced the incidence of nonresponse from a diary being placed too late). A second procedural change in 2017 was the elimination of "double placement" of diaries (i.e. the two one-week diaries were placed simultaneously instead of sequentially) with the sample unit. However, these procedural changes may have decreased one type of nonresponse but increased another type of nonresponse – while there was a sharp decline in *Other nonresponse* rate from 20.2 percent to 11.9 percent in 2017, there was a sharp rise in *refusal rates* from 16.7 percent in 2015 to 24.2 percent in 2017. The longer window for diary placement reduced nonresponse due to diaries being placed too late, but the refusal rate also increased since more eligible CUs who were contacted refused participation in the survey.

The CED *noncontact rate* rose from 3.6 percent to 5.8 percent from 2010 to 2017 (Table 1.3). The nonresponse reclassification rate among eligible CUs declined from 6.0 to 4.9 percent from 2010 to 2017 (Table 1.4). The *nonresponse reclassification rate* as a proportion of *Other nonresponse* declined from 43.0 percent to 24.3 percent between 2010 and 2016, but rose sharply to 41.1 percent in 2017.

Table 1.3 CED distribution of final dispositions for eligible CUs (unweighted)

Year	No. eligible CUs	Interview	Refusal	Noncontact	Other Nonresponse
		Row percent distribution			
2010	19,988	71.5	10.8	3.6	14.1
2011	19,823	70.2	11.4	3.3	15.1
2012	20,298	67.8	12.1	3.5	16.6
2013	20,296	60.8	12.8	4.7	21.7
2014	20,476	65.0	13.9	4.7	16.4
2015	20,517	57.7	16.7	5.4	20.2
2016	20,391	56.7	17.4	5.7	20.2
2017	20,110	58.0	24.2	5.8	11.9

Table 1.4 CED: prevalence of nonresponse reclassifications (unweighted)

			Nonresponse reclassifications		
Year	No. eligible CUs	No. other nonresponse	No. CUs	Other nonresponse (%)	Eligible CUs (%)
2010	19,988	2,811	1,209	43.0	6.0
2011	19,823	3,000	1,129	37.6	5.7
2012	20,298	3,370	1,109	32.9	5.5
2013	20,296	4,411	1,112	25.2	5.5
2014	20,476	3,357	1,141	34.0	5.6
2015	20,517	4,141	1,045	25.2	5.1
2016	20,391	4,124	1,001	24.3	4.9
2017	20,110	2,397	985	41.1	4.9

2. Records use in the CEQ

Responses to survey questions about spending based on expenditure records result in higher reporting accuracy and lower measurement error. Thus, a higher prevalence of records use is desirable. Respondents to interviews conducted by personal visit and by telephone, and whose data were used to produce CE's official tables, were included for this analysis.

Use of records during the interview

The creation of the comparison groups for records usage analysis is based on the overall *records used* question asked of the interviewer at the end of the CEQ survey. (For details, see Appendix.) Records usage is optional for respondents, so it is likely that respondents who do choose to use *any* records at all – even if only for occasional reference on an as needed basis - are more engaged than those respondents who choose not to consult records. In addition, it is plausible that "no or very few records were used" would be more salient in the interviewer's recollection of the interview than the varying extent of records used in the other response options. For these reasons, and for simplicity of interpretation, two comparison groups were created for analysis: "*Records*" vs "*No records*", where the latter group consisted of CUs whom the interviewer reported as using records "never or almost never (less than 10% of the time)." It is important to note that respondents' use of records is reported by interviewers based on their subjective judgement at the end of the interview. In addition, interviewers need not respond to the question to close out the case, hence the high incidence of item nonresponse for the records use question.

Overall, the prevalence of records use declined slightly from 51.3 percent to 50.8 percent between 2010 and 2017 (see Table 2.1, last column). This overall trend obscures the 6.8 percentage point decline in records use from 2010 to 2015 and the subsequent 6.3 percentage point rise in records use from 2015 to 2017. From 2010 to 2014, records use by wave tended to follow a similar pattern of declining from waves 2 to 4 and then rising in wave 5. Beginning in 2015, this pattern mostly disappeared with records use declining in every wave except for the final wave of 2017 where records use increase by about 2 percentage points.

Table 2.1 Prevalence of records use among CEQ respondents by survey wave

Year	Wave*	No. of respondents	Missing	No record	Record use	Overall record use
2010	2	7,040	1.1	46.9	52.0	51.3
2010	3	7,028	0.7	49.0	50.3	
2010	4	7,073	0.7	49.2	50.1	
2010	5	7,288	0.5	46.9	52.6	
2011	2	6,898	1.2	47.6	51.2	50.0
2011	3	6,664	0.7	50.5	48.8	
2011	4	6,605	0.6	50.5	48.9	

Table 2.1 Prevalence of records use among CEQ respondents by survey wave

Year	Wave*	No. of respondents	Missing	No record	Record use	Overall record use
2011	5	6,823	0.9	48.0	51.1	
2012	2	6,727	1.1	46.5	52.3	50.7
2012	3	6,654	0.7	49.0	50.3	
2012	4	6,709	0.6	50.1	49.4	
2012	5	6,903	0.8	48.4	50.8	
2013	2	6,565	0.9	48.9	50.2	48.8
2013	3	6,444	0.5	52.3	47.3	
2013	4	6,430	0.7	51.5	47.8	
2013	5	6,669	0.9	49.0	50.0	
2014	2	6,599	0.7	53.3	46.0	45.4
2014	3	6,429	0.5	54.3	45.2	
2014	4	6,364	0.5	54.8	44.7	
2014	5	6,516	0.9	53.6	45.5	
2015	1	5,432	1.1	53.9	46.0	44.5
2015	2	4,825	0.4	55.0	44.6	
2015	3	4,789	0.4	55.5	44.1	
2015	4	4,779	0.6	54.8	44.5	
2015	5	3,749	0.7	56.5	42.7	
2016	1	6,612	1.0	42.5	56.5	48.8
2016	2	6,293	0.5	52.2	47.3	
2016	3	6,176	0.5	54.5	45.0	
2016	4	6,360	0.8	53.3	45.9	
2017	1	6,303	1.0	48.6	50.3	50.8
2017	2	6,037	0.5	49.2	50.3	
2017	3	5,912	0.6	49.1	50.3	
2017	4	6,227	0.7	47.0	52.3	

* For years prior to 2015, bounding interviews in Wave 1 were excluded and only Waves 2 through 5 were used in computing official CE tables. Starting in 2015, the bounding interview was dropped from the CEQ so all four waves (1 through 4) were used in computing official CE tables.

3. Expenditure data edit rate

At the completion of an interview, data from the interviewer's laptop are transmitted to the Census Master Control System. The Census Bureau's Demographics Surveys Division performs some preliminary processing and reformatting of the data before transmitting the data to BLS on a monthly basis. At BLS, a series of automated and manual edits are applied to the data in order to ensure consistency, fill in missing information, and to correct errors in the collected data. (For more description about the data collection and processing for the CE surveys, see Handbook of Methods: Consumer Expenditure Survey).

Edits are defined as any changes in the data made during processing with the exception of calculations (e.g.. conversion of weekly value to quarterly value). Imputation and allocation are two major types of data edits to improve estimates derived from the Interview and Diary Surveys (see Appendix for definitions of edits):

- *Data imputation* replaces missing or invalid entries
- *Allocation* edits are applied when respondents provide insufficient detail to meet tabulation requirements. For example, if a respondent provides a non-itemized overall expenditure report for the category of fuels and utilities, that overall amount will be allocated to the target items mentioned by the respondent (such as natural gas and electricity).

In addition to allocation and imputation, data are reviewed and manually edited as needed by BLS economists based on their research and expert judgment.

The need for data imputation results from missing data (item or price nonresponse). Thus, lower imputation rates are desirable. The need for data allocation is a consequence of responses that did not contain the required details of the item asked by the survey. Likewise, lower allocation rates are also preferred, and in general, lower data editing rates are preferred since that lowers the risk of processing error. However, imputation based on sound methodology can improve the completeness of the data and improve overall survey estimates.

Ideally, the computation of edit rates are based on the edit flag values of the expenditure variables that correspond directly to the survey questions about the expenditures. Since there are hundreds of expenditure variables spread across more than 40 data tables that currently cannot be easily identified, we modified the processed expenditure interview monthly tabulation file (MTAB) data files to create a file of reported expenditure records before data editing. The modifications made to MTAB data are described in the Appendix. We acknowledge that the current modifications made are not comprehensive enough to remove all post-data collection computed or derived expenditure variables, but these modifications do make some strides towards that goal.

CEQ edit rates

Between 2010 and 2017 the overall edit rate of reported expenditures increased from 14.5 percent to 16.9, respectively (Table 3.1). Imputation rates rose from 8.3 percent to 11.3 percent between 2010 and 2016. In 2017, imputation rates decreased to 6.0 percent. This decline in imputation rates is offset by a similar increase in allocation rates and is attributable to a change in how expenditures are processed in Section 4 Part A (Telephone, Internet, and Cable/Satellite TV Expenses). Combined bills of some combination of telephone, internet, and television that were previously imputed are now allocated. The processing change was motivated by a desire to keep as much reported data as possible. For example, suppose a respondent reports having spent a combined $100 on their cable and internet bill but did not break down the expenditure into cable and internet components. This expenditure might previously have been overwritten via a hot deck imputation using a complete donor record of $120 in total with $60 on cable and $60 on internet. Beginning in 2017, these expenditures are allocated based on calculated proportions derived from the pool of potential donors to allocate the $100 total into cable and internet components – say $45 and $55 if the proportions are 45% for cable and 55% for internet. This change allows us to provide complete expenditures for microdata users, while preserving reported expenditure totals and component proportions. Summary statistics (e.g.. means and variances) will reflect a more complete use of reported data.

CED edit rates

In general, edit rates for CED are lower than edit rates for CEQ. Between 2010 and 2017, the overall edit rate for reported expenditure records increased from 9.4 percent to 10.8 percent (Table 3.2). Almost all edits in CED are allocations. The allocation rate increased from 9.1 percent to 10.7 percent from 2010 to 2017. The other edits category encompasses all other expenditure edits including manual edits.

Table 3.1 CEQ reported expenditure records: edit type rate

		Type of Edit				
		Allocated*	Imputed & allocated	Imputed	Other edit	Unedited
Year	No. expn reports	Row percent distribution				
2010	1,269,117	5.1	0.1	8.3	1.0	85.5
2011	1,218,306	5.1	0.1	8.8	0.9	85.1
2012	1,211,102	5.3	0.1	9.2	1.0	84.4
2013	1,122,318	4.9	0.1	9.7	1.0	84.4
2014	1,095,782	4.7	0.1	9.7	0.9	84.6
2015	1,003,449	4.5	0.1	12.0	0.9	82.5
2016	1,097,966	4.8	0.1	11.3	0.8	83.0
2017	1,108,023	10.1	0.2	6.0	0.6	83.1

*One invalid blank expenditure record included in the “Allocated” count.

Table 3.2 CED reported expenditure records

		Type of edit		
		Allocated *	**Other edit**	**Unedited**
Year	No. expn reports	Row percent distribution		
2010	410,064	9.1	0.3	90.6
2011	407,758	8.6	0.3	91.1
2012	400,708	9.2	0.2	90.5
2013	349,749	9.5	0.3	90.3
2014	375,720	9.6	0.1	90.2
2015	336,514	10.9	0.1	89.0
2016	334,443	11.1	0.1	88.8
2017	363,040	10.7	0.1	89.2

*It is possible for a record to have been split into multiple records by allocation and the allocated records manually corrected to a single record without the allocation variable being reset to 0.

4. Income imputation rates

The CE Program performs three types of imputations for income in the CEQ and CED. The first is "*Model-based*" imputation for when the respondent indicates an income source but fails to report an amount of income received. The second is "*Bracket response*" imputation for when the respondent indicates the receipt of an income source, fails to report the exact amount of income but does provide a bracket range estimate of the amount of income received. The third type of income imputation is referred to as "*All valid blank*" (AVB) conversion for when the respondent reports no receipt of income from any source, but the CE Program imputes receipt from at least one source. Flag indicators for income imputation are described in the Appendix. Since the need for imputation reflects item nonresponse or that insufficient item detail was provided, lower imputation rates are desirable for lowering measurement error. However, imputation based on sound methodology can improve the completeness of the data.

CEQ imputation rates

The prevalence of unimputed *total family income before tax* exhibited an increasing trend from 52.5 percent in 2010 to 57.9 percent in 2017 (Table 4.1). This increasing trend appears to be driven by declining rates of *model-based imputation* and *bracket response imputation*, which decreased by 2.7 and 1.2 percentage points from 2010 to 2017, respectively. The prevalence of combined *model-based and bracket response* imputation also decreased over this period by 1.3 percentage points. Overall, prevalence of *all valid blank conversions* from zero income to a positive income amount remained stable around 1.5 percent between 2010 to 2017, despite a slight increase to 2.1 percent in 2013 and 2014.

New for the *2017 DQP* are metrics for income imputation rates of two major components of total family income before tax: *total amount of income received from salary or wages* and *total amount of Social Security benefits and Railroad Retirement benefits*. For salary and wages, the share of unimputed income increased from 68.6 percent in 2010 to 71.5 percent in 2017 (Table 4.2). *Model-based imputation* decreased from 15.2 percent in 2010 to 12.5 percent in 2017. *Bracket-only imputation* has remained constant from 14.6 percent in 2010 to 14.5 percent in 2017 with some fluctuation in between. *Model and bracket imputation* has also remained constant, fluctuating between 1.5 and 1.8 percent during the period. Income imputation rates for Social Security benefits remained fairly constant between 2010 and 2017 at around 93 percent (Table 4.3).

CED imputation rates

Similar to the CEQ, the prevalence of unimputed *total income before tax* exhibited an increasing trend, from 46.3 percent in 2010 to 54.1 percent in 2017 (Table 4.4). This increasing trend appears to be driven by declining rates of *model-based imputation* which declined by 6.2 percentage points from 2010 to 2017. *Bracket Imputation* increased from 16.3 percent in 2013 to 19.6 percent in 2017. Other imputation rates declined slightly between 2010 and 2017.

Imputation rates for CED reports of *total salary and wages* and *total amount of Social Security and Railroad Retirement benefits* are also reported. For salary and wages (Table 4.5), the share of unimputed income increased from 65.6 percent in 2010 to 69.6 percent in 2017. *Model based imputation* fell from 19.3 percent in 2010 to 14.2 percent in 2017. *Bracket imputation* increased from 13.5 percent to 14.6 percent. *Model and bracket imputation* remained fairly constant over the period. Social Security and Railroad Retirement benefits are presented in Table 4.6. All five imputation methods changed by less than one percentage point over the 2010 to 2017 period. Unimputed and bracket imputation rates were up slightly, and model-only and valid blank converted imputation rates are down slightly.

Table 4.1 CEQ income imputation rates for total amount of family income before taxes

Year	No. CUs	Not imputed	Model imputation only	Bracket imputation only	Model and bracket imputation	Valid blank converted
		Row percent distribution				
2010	28,429	52.5	20.8	19.5	5.6	1.6
2011	26,990	52.5	20.4	19.8	5.7	1.6
2012	26,993	52.3	21.1	19.6	5.4	1.5
2013	26,108	53.8	21.4	17.6	5.2	2.1
2014	25,908	54.4	21.1	17.7	4.7	2.1
2015	23,574	56.4	18.7	18.6	4.8	1.6
2016	25,441	56.9	18.1	18.8	4.5	1.6
2017	24,479	57.9	18.1	18.3	4.3	1.5

Table 4.2 CEQ income imputation rates for total amount of income received from salary or wages

Year	No. CUs	Not imputed	Model imputation only	Bracket imputation only	Model and bracket imputation	Valid blank conversion*
		Row percent distribution				
2010	28,429	68.6	15.2	14.6	1.6	na
2011	26,990	68.6	15.0	14.7	1.7	na
2012	26,993	68.2	15.1	14.9	1.8	na
2013	26,108	69.6	14.7	14.0	1.6	na
2014	25,908	69.7	14.5	14.0	1.7	na
2015	23,574	70.8	12.9	14.7	1.7	na
2016	25,441	70.7	12.5	15.1	1.7	na
2017	24,479	71.5	12.5	14.5	1.5	na

* Receipt of salary or wages is not imputed through this process.

Table 4.3 CEQ income imputation rates for total amount of Social Security and Railroad Retirement benefits

Year	No. CUs	Not imputed	Model Iimputation only	Bracket imputation only	Model and bracket imputation	Valid blank conversion
		Row percent distribution				
2010	28,429	93.4	3.9	2.0	0.1	0.7
2011	26,990	93.5	3.5	2.2	0.1	0.7
2012	26,993	93.0	4.0	2.2	0.1	0.7
2013	26,108	92.8	4.1	2.2	0.0	0.9
2014	25,908	92.9	4.0	2.2	0.1	0.8
2015	23,574	92.9	3.5	2.8	0.1	0.7
2016	25,441	93.2	3.5	2.3	0.1	0.8
2017	24,479	93.3	3.4	2.4	0.1	0.7

Table 4.4 CED income imputation rates total amount of family income before taxes

Year	No. CUs	Not imputed	Model imputation only	Bracket imputation only	Model and bracket imputation	Valid blank conversion
		Row percent distribution				
2010	14,296	46.3	25.2	19.2	6.0	3.3
2011	13,925	46.6	24.9	19.1	5.7	3.6
2012	13,761	47.9	24.8	18.8	5.0	3.5
2013	12,335	50.2	24.5	16.3	5.3	3.7
2014	13,305	50.0	23.2	18.1	5.3	3.4
2015	11,841	50.1	23.3	17.5	5.0	4.1
2016	11,552	49.1	23.5	18.7	5.4	3.3
2017	11,658	54.1	19.0	19.6	5.3	2.0

Table 4.5 CED income imputation rates total amount of income received from salary or wages

Year	No. CUs	Not imputed	Model imputation only	Bracket imputation only	Model and bracket imputation	Valid blank conversion*
		Row percent distribution				
2010	14,296	65.6	19.3	13.5	1.6	na
2011	13,925	65.8	19.3	13.6	1.3	na
2012	13,761	66.2	19.1	13.3	1.3	na
2013	12,335	68.0	18.0	12.5	1.5	na
2014	13,305	68.6	16.5	13.6	1.4	na
2015	11,841	68.7	16.7	13.1	1.5	na
2016	11,552	66.3	16.9	15.1	1.6	na
2017	11,658	69.6	14.2	14.6	1.6	na

* Receipt of salary or wages is not imputed through this process

Table 4.6 CED income imputation rates for total amount of Social Security and Railroad Retirement benefits

Year	No. CUs	Not imputed	Model imputation only	Bracket imputation only	Model and bracket Imputation	Valid blank conversion
		Row percent distribution				
2010	14,296	91.5	3.9	2.3	0.1	2.2
2011	13,925	91.4	3.8	2.2	0.1	2.5
2012	13,761	91.7	3.7	2.0	0.1	2.4
2013	12,335	90.6	3.8	2.8	0.1	2.7
2014	13,305	91.8	3.4	2.7	0.1	2.0
2015	11,841	91.7	2.8	2.7	0.1	2.7
2016	11,552	91.8	3.0	2.8	0.1	2.3
2017	11,658	92.3	3.3	3.1	0.2	1.2

7. Conclusion

This concludes the Data Quality Profile for 2017. While some trends are encouraging (e.g., edited reported expenditures remained relatively constant between 2015 and 2017), other trends (declining response rates) warrant concern, or have an uncertain significance (e.g., the trend in record use). For a brief summary of these findings, see the Highlights section at the beginning of this report. The next issue of the CE Data Qualtiy Profile will be be released in 2019, with metrics incorporating data through 2018.

APPENDIX: Definitions

Response and nonresponse rates

Appendix Table A shows the mapping of the CE final disposition codes to the American Association for Public Opinion Research (AAPOR) final disposition codes for in-person household survey: [AAPOR_StandardDefinitions (2016)].

Appendix Table A. Mapping of CE final disposition codes with AAPOR codes

AAPOR(2016, p.76) Table 2: Final disposition codes for in-person, household survey		**CEQ Final Disposition Codes (OUTCOME)**	**CED Final Disposition Codes (PICKCODE)**
1. Interview	**1.0**		
Complete **(I)**	1.1	201 Completed interview	201 Completed interview
Partial **(P)**	1.2	203 Sufficient partial (through Section 20, no further follow-up)	*217 Interview- Temporarily Absent
2. Eligible, Non-Interview	**2.0**		
Refusal and break-offs (R)	2.10		
Refusals	2.11	321 Refused, hostile(A) 322 Refused, time(A) 323 Refused, language (A) 324 Refused, other (A)	321 Refused, hostile(A) 322 Refused, time(A) 323 Refused, language (A) 324 Refused, other - specify (A)
Household-level refusal	2.111	na	na
Known respondent refusal	2.112	na	na
Break-off	2.12	215 Insufficient partial (A)	
Non-contact (NC)	2.20		
Unable to enter building/reach housing unit	2.23	219 Other (A)	219 Other (A)
No one at residence	2.24	216 No one home	216 No one home
Respondent away/unavailable	2.25	217 Temporarily absent	
Other (O)	2.30		
Dead	2.31	219 Other (A)	219 Other (A)
Physically or mentally unable/incompetent	2.32	219 Other (A)	219 Other (A)
Language (did not refuse)	2.33	219 Other (A)	219 Other (A)
Household-level language problem	2.331	219 Other (A)	219 Other (A)
Respondent language problem	2.332	219 Other (A)	219 Other (A)
No interviewer available for needed language	2.333	219 Other (A)	219 Other (A)
Miscellaneous	2.36	219 Other (A)	219 Other (A) 320 Week 2 Diary pickup too early 325 Diary placed too late (A)

Appendix Table A. Mapping of CE final disposition codes with AAPOR codes

AAPOR(2016, p.76) Table 2: Final disposition codes for in-person, household survey		CEQ Final Disposition Codes (OUTCOME)	CED Final Disposition Codes (PICKCODE)
			326 Blank diary, majority of items recalled w/o receipts (A)
3. Unknown eligibility, non-interview **	**3.0**		
Unknown if housing unit occupied **(UH)**	3.10	na	na
Not attempted or worked	3.11		
Unable to reach/unsafe area	3.17		
Unable to locate address	3.18	258 Unlocated sample address (C): Treated as ineligible for CE	258 Unlocated sample address (C): Treated as ineligible for CE
Housing unit/Unknown if eligible respondent **(UO)**	3.20	na	na
No screener completed	3.21		
Other	3.90		
4. Not Eligible	**4.0**		
Out of sample	4.10		
Not a housing unit	4.50	228 Unfit, to be demolished (B) 229 Under construction, not ready (B) 231 Unoccupied tent/trailer site (B) 232 Permit granted, construction not started (B) 240 Demolished (C) 241 House/trailer moved (C) 243 Converted to permanent nonresidential (C)	228 Unfit, to be demolished (B) 229 Under construction, not ready (B) 231 Unoccupied tent/trailer site (B) 232 Permit granted, construction not started (B) 240 Demolished (C) 241 House/trailer moved (C) 243 Converted to permanent nonresidential (C)
Business, government office, other organization	4.51	243 Converted to permanent nonresidential (C)	243 Converted to permanent nonresidential (C)
Institution	4.52	na	na
Group quarters	4.53	252 Located on military base or post (C)	252 Located on military base or post (C)
Vacant housing unit	4.60	226 Vacant for rent (B) 331 Vacant for sale (B) 332 Vacant other (B) 341 CU moved (C) 342 CU merged with another CE CU within the same address (C)	226 Vacant for rent (B) 331 Vacant for sale (B) 332 Vacant other (B) 341 CU moved (C) 342 CU merged with another CE CU within the same address (C)
Regular, Vacant residences	4.61		
Seasonal/Vacation/Temporary residence	4.62	332 Vacant other (B) 225 Occupied by persons with URE (B)	332 Vacant other (B) 225 Occupied by persons with URE (B)
Other	4.63	233 Other (B) 244 Merged units within same structure (C)	233 Other (B) 244 Merged units within same structure (C)

Appendix Table A. Mapping of CE final disposition codes with AAPOR codes

AAPOR(2016, p.76) Table 2: Final disposition codes for in-person, household survey		CEQ Final Disposition Codes (OUTCOME)	CED Final Disposition Codes (PICKCODE)
		245 Condemned (C) 247 Unused serial number or listing sheet (C) 248 Other (C) 259 Unit does not exist or is out of scope 290 Spawned in error (C)	245 Condemned (C) 247 Unused serial number or listing sheet (C) 248 Other (C) 259 Unit does not exist or is out of scope
No eligible respondent	4.70	224 All persons under 16 (B)	224 All persons under 16 (B)
Quota filled	4.80	na	na

NOTES:
* CED: Type A code "217 – temporarily absent" is treated as "completed interview" by CE-SMD. The Diary survey is designed to collect data for respondents when they are at home, and the Interview survey is designed to collect data for respondents when they are both at home and away on trips. When everyone is away on a trip in a Diary household for the entire week, they are counted as completed interviews with $0 of expenditures at home. Instead, expenditures for those away on trips comes from the Interview survey. Since Diary and Interview data are merged or "integrated" during estimation, this practice is designed to capture the right amount of expenditures.
** CE does not have an "Unknown eligibility" classification because Census trains interviewers to treat any case of unknown eligibility as Type A.

Census Bureau non-interview categories: (A)=Type A (B)=Type B (C)=Type C
Reference: The American Association for Public Opinion Research (2015). *Standard Definitions: Final dispositions of case codes and outcome rates for surveys*. 8th edition.

In the following definitions for eligible sample, response rate, refusal rate, noncontact rate, and other non-response rate, the formula contain the alphabets I, P, R, NC, O, which refer to groupings of final disposition codes that are defined in Appendix Table A above.

Eligible Sample (denominator for response, refusal, noncontact, and other nonresponse rates)
= I + P + R + NC + O
The total number of eligible units - those who completed interviews (I, P), plus non-response due to refusals, non-contact, or other reasons (R, NC, O). This excludes any address that was sampled and ineligible (for example, an abolished household at a sampled address or a commercial business at a sampled address).

Response Rate (AAPOR definition RR2)
= (I + P) / (I + P + R + NC + O)
Defined as total number of good and partial interviews (interviews that provide data for use in the production tables), divided by the eligible sample. For the CE, unknown eligible housing units are coded as "Eligible non-interview" (i.e. Type A).

Refusal Rate (AAPOR definition REF3)
= R / (I + P + R + NC + O)
Defined as total number of eligible non-responses that were refused or started, but not completed, divided by the eligible sample. Refused interviews includes refusals due to time, language problems, and other types of refusals.

Noncontact Rate (1 - AAPOR definition CON3)
= NC / (I + P + R + NC + O)
Defined as total number of eligible non-responses due to inability to make contact with an eligible sample unit member.

Other Nonresponse Rate
= O / (I + P + R + NC + O)
Defined as total number of eligible non-responses due to reasons other than refusal and noncontact with an eligible sample unit member.

The sum of Response Rate, Refusal Rate, Noncontact Rate, and Other Nonresponse Rate comprise 100 percent of the universe of eligible sample units. In addition to these four rates, we also report on the Nonresponse Reclassification rate, which is a subset of Other Nonresponse cases.

Nonresponse reclassification rate
Defined as the total number of interviews that were changed from completed to a Type A non-interview based on a review of total expenditures (CE's Minimal Expenditure Edit routine) and other information about the CU, divided by the eligible sample.

For the CEQ
OUTCOME = 219 Other Type A Noninterview, & TYPEASP = "Minexpn**"**

For the CED

INTRVIEW =

5 Diaries with zero items reported in both weeks of the survey OR Diaries with zero items reported and the diary from the other diary week is a Type A, B, or C non-interview

6 Diaries with zero items reported and the diary from the other diary week has > 10 items reported in FDB with the total cost of these items being <= $50 OR Diaries with zero items reported and the diary from the other diary week has <= 10 items reported in FDB with the total cost of these items being <= $50 and the CU does not live in a rural area or a college dormitory and no members of the CU were away during the reference period

7 Diaries where there is one person in the CU and the total amount spent on food (at home and away from home) is <= $5 in the current week and <= $15 in the other diary week, and the number of items reported for non-food items in the current week is < 4 or the total cost of items reported for non-food items in the current week is < $30

8 Diaries where there are 2 or 3 members in the CU the total amount spent on food (at home and away from home) is <= $10 in the current week and <= $20 in the other diary week and the number of items reported of non-food items in the current week is < 4 or the total cost of non-food items reported in n the current week is < $30

9 Diaries where there are four or more CU members and CU the total amount spent on food (at home and away from home) is <= $20 in the current week and <= $30 in the other diary week and the number of items reported of non-food items in the current week is < 4 or the total cost of non-food items reported in n the current week is < $30

Summary of changes to data collection in 2015

In this section, we provide a brief overview of the changes in data collection in 2015 that impact the universe of eligible sample units included in the production of CE's official published tables, and response rate computations.

1. CE Sample Redesign

The CE sample is updated after every Decennial Census to ensure it reflects the population. The 2010 Decennial Census geographic boundaries were implemented for the CE in 2015, and are henceforth referenced as the *2010 Sample Redesign*. The first month of expenditures in 2015 that are eligible under the 2010 Sample Redesign is *January 2015*.

- CEQ: The CEQ has a three-month *retrospective* reference period *prior* to the month of data collection (sample month). Thus, *February 2015* is the first sample month for CEQ cases under the 2010 Sample Redesign for producing the official published tables for 2015 (since the February 2015 sample month has a reference period of Nov 2014, Dec 2014, and *Jan 2015*).
- CED: Unlike the CEQ, the CED has a *prospective* 1-week reference period after the diary is placed. Thus, *January 2015* is the first sample month for CED cases under the Sample Redesign for producing the official published tables for 2015.

2. Bounding Interview dropped in the CEQ

The CEQ bounding interview in Wave 1 of the five-wave survey panel was dropped starting with the 2010 Sample Redesign. The bounding interview had a 1-month recall and its data had not been previously used to produce estimates for the CE official published tables. Thus, with the dropping of the bounding interview, cases in the 2015 CEQ survey panel under the 2010 Sample Redesign, and moving forward, will comprise of four waves of interview. However, due to the rotating panel design of the CEQ, there were still Wave 5 cases from CEQ survey panels that started in 2014 but did not complete until 2015.

In summary, the CE data used to compute final disposition rates to match the data used in the production of CE's official published tables are as follows:

CEQ	Prior to 2015	2015
Calendar months of data used	Jan through Dec	Feb through Dec
Waves in survey panel	2 through 5 (Wave 1 was bounding interview)	All waves (No bounding interview)

CED	Prior to 2015	2015
Calendar months of data used	Jan through Dec	Jan through Dec
Diary week	1 and 2	1 and 2

Records use comparison groups

Respondent use of records for reporting expenditures is an indicator of accurate reporting of the amount of the expense and the details about the expense. At the end of the CEQ, there is a "Post Interview for Field Representatives" section. One of the questions in that section asks the interviewer, "How often did the respondent consult records?" in the interview, and provides four response options:

1. always or almost always (90% of the time or more)
2. most of the time (50 to 89%)
3. occasionally (10 to 49% of the time)
4. never or almost never (less that 10% of the time).

The above response options were reworded from July 2016 on:

1. always or almost always
2. most of the time
3. occasionally, or used at least one record
4. never, no records used

Two comparison groups for records usage was created for analysis, "*Records*" vs "*None*":

- Records group consisted of interviews in which the interviewer reported records were used occasionally, most of the time, or always;
- None group comprised of interviews in which the interviewer reported records were used never or almost never.

Reported expenditures

For analysis of expenditure edit rates in this report, we made a distinction between the set of expenditure records based on respondent reports ("*reported expenditure records*") from post-processed final set of expenditure records used to produce official tables and released as public-use microdata ("*processed expenditure records*"). The set of reported expenditure records is smaller than the set of processed expenditure records because during BLS data editing, additional expenditure records are generated (for example, due to time adjustment of a quarterly record value allocated to 3 monthly records values). The focus is on reported expenditures to understand how much of the collected data were edited.

Ideally, the reported expenditure records files would comprise the expenditure variables that correspond directly to the survey questions about the expenditures. However, because there are hundreds of expenditure variables spread across more than 40 data tables, for convenience, modifications were made to the MTAB data to create the reported expenditures file. The following paragraphs describe the creation of the reported expenditures file for the CEQ and the CED.

Processed expenditure records.

For the CEQ, the processed expenditure records file is sourced from the CE Production database Post Edit and Estimation Subsystem (EES) MTAB data table for the CEQ. For the CED, the data source is the CE Production database Post EES EXPN data tables (EFDB, EMLS, ECLO, EOTH). TARGRTYP="c" is a result of a blank or invalid cost in ECOM.

Reported expenditure records.

For the CEQ. We made modifications to the MTAB file to attempt to get as accurate a count as possible for the number of uniquely reported items for each CU, while still taking advantage of the convenience of the MTAB data file. We subset the MTAB data file to records that were unique by the combination of three variables on the MTAB file: CU identifier (FAMID or NEWID), SEQNO, and EXPNAME. Then, the COST_ flag associated with each record was used to determine the type of data edit for each record. We acknowledge these modifications are not comprehensive enough to capture all post-data collection edits (for example edits made to a source variable may not carry forward to the mapped variable and edits made to non-cost fields are not captured), but these modifications make some strides towards that goal.

For the CED. We made modifications to the Post EES EXPN files by extracting records that were unique by the combination of two variables on the EXPN files: CU identifier (FAMID or NEWID) –SEQNO. Then, the flag variable COST_ was used to determine the type of edit. Again, this modification does not capture the universe of all edits made in processing, but it does improve the accuracy of our computed edit rates relative to what has been reported previously.

Expenditure edits

CEQ

Interview expenditure edits are calculated using the MTAB data. The flag variable COST_ is used to identify if an expenditure was edited and what type of edit was done (imputation, allocation, combination, other). In addition, the "allocation number" is used to determine whether the resulting estimate has been allocated. The different types of edits (or non-edits) was identified by the following flag values for the CEQ:

CEQ MTAB Flag value	Flag Description	Edit group	Edit Subgroup
0	All of the source fields were flagged either as 0 (No Census adjustment) or -300 output from screens selected for microfilm review/no change or -400 output from screens; but not selected for microfilm review (no change)	Unedited	NA
1	One of the source fields was flagged by Census (source flag >0)	Unedited	NA

CEQ MTAB Flag value	Flag Description	Edit group	Edit Subgroup
2	Manually updated (expenditure flag = -100) Changed in superfix (not a valid data adjustment source record field [-500]) Changed in superfix (is a valid data adjustment source record field [-600]) (Note: All of the following flags (3-9 & Q-S) indicate the source field was data adjusted by BLS. The two digit numbers in the parenthesis are the trailing digits of the source field flag, and indicate the method(s) of adjustment named after the parenthesis.)	Edited	Other
3	(-01 through -10) IMPUTATION	Edited	Imputed
4	(-12 through -19) ALLOCATION	Edited	Allocated
5	(-20 through -27) IMPUTATION and ALLOCATION	Edited	Combination
6	(-30 through -32) COMPUTATION only	Unedited	NA
7	(-35 through -43) COMPUTATION and IMPUTATION	Edited	Imputed
8	(-45 through -52) COMPUTATION and ALLOCATION	Edited	Allocated
9	(-53 through -68) COMPUTATION, IMPUTATION and ALLOCATION	Edited	Combination
Q	(-70 through -74,-75,-76) MANUAL IMPUTATION	Edited	Imputed
R	(-78 through -85,-86,-87,-88) MANUAL ALLOCATION	Edited	Allocated
S	(-90) SECTION 18 SPECIAL PROCESSING	Edited	Other

CED

The diary expenditure edit rate is calculated using the expenditure files from diary. The flag variable COST_ is used to identify if an expenditure was edited. In addition, the "allocation number" is used to determine whether the resulting estimate had been allocated. An expenditure record will be considered unedited if it has one of the following flags:

CED EES Flag Value	**Description**	**Explanation**
'0'	Default - no change to data	No adjustments were made during processing.
'-3'	Reviewed, no update; default adjustment status	The value was reviewed during processing, but no adjustments were made.
'11'	Sales Tax, Preliminary edits, or Minimal expenditure reclassification edit	Sales tax is a calculation applied to the data and will be treated as unedited for these rates.
'15'	Phase 1 Confirmed. Operator/Error Resolution Overrides (confirms value)	This flag is carried from the CAPI instrument and is present when a Field Representative suppresses a prompt to check the value (confirming the reported value). No changes are made to the data.
'16'	Phase 1 Changed. Error Resolution Changes value	This flag is carried from the CAPI instrument and is present when a Field Representative updates a value after prompted to check the value. Though the data is changed, it is assumed that it is edited based on the respondent's input and not considered as edited during processing.

All other flags indicate some type of adjustment during processing and are considered edited. An allocation rate is also produced using the allocation number of a given item (ALCNO). Any allocation number not equal to '000' is an allocated value. It is important to note that the values that are allocated are included in the editing rate; however, these values may also have been edited in some other way during the processing. It is not possible to delineate other edits from the current data available.

Note: for both CEQ and CED, the number of targets selected for an allocation will affect the adjustment rates - the total number of items that are allocated will add to both the numerator and the denominator for analysis using *processed* expenditure records (but not reported expenditure records).

Income imputation

The CE implemented multiple imputations of income data, starting with the publication of 2004 data. Prior to that, only income data collected from complete income reporters were published. However, even complete income reporters may not have provided information on all sources of income for which they reported receipt. With the collection of bracketed income data starting in 2001, this problem was reduced but not eliminated. One limitation was that bracketed data only provided a range in which income falls, rather than a precise value for that income. In contrast, imputation allows income values to be estimated when they are not reported. In multiple imputations, several estimates are made for the same CU, and the average of these estimates is published.

Income data from the Diary Survey are processed in the same way as in the Interview Survey.

Imputation rates for income are calculated based on the processed CE data (Post EES data that are used to produce the published tables) for each collection period. Following the model of the production tables, each wave of data will be treated independently for the CE quarterly interview survey (CEQ), and each weekly diary is treated independently for the Diary survey (CED). Imputation rates are calculated for final income before taxes. The income is counted as imputed if any of its summed components were imputed during processing. This will be identified using the imputation indicator flag. Any value of the flag not equal to '100' is considered imputed.

Imputation Flag Value	Description
100	No imputation. This would be the case only if NONE of the variables that are summed to get the summary variables is imputed.
2nn	Imputation due to invalid blanks only. This would be the case if there are no bracketed responses, and at least one value is imputed because of invalid blanks.
3nn	Imputation due to brackets only. This would be the case if there are no invalid blanks, and there is at least 1 bracketed response
4nn	Imputation due to invalid blanks AND bracketing
5nn	Imputation due to conversion of valid blanks to invalid blanks. (Occurs only when initial values for all sources of income for the consumer unit and each member are valid blanks.)

"All Valid Blank" (AVB) conversion rate

This measure quantifies the instances when all valid non-responses (i.e., the respondent replied that the CU did not receive income from any source) are converted to invalid non-responses, which were subsequently imputed during processing. This will be based on the indicator flag with a value of '500' or above.

NOTE: AVB conversion is not applicable to wage or salary income (SALARYX in the CEQ, or WAGEX in the CED). The reason is that AVB consumer units are by definition "non-earners." That is, if the respondent answered, "no" to every income receipt question, including SALARYX or other labor income (NONFARMX and FFRMINCX before 2013Q1, SEMPFRMX after), then the "earner" variables such as INCWEEKQ, INC_HRSQ, and NO_EARNR should equal 0. However, if INCWEEKQ, INC_HRSQ or NO_EARNER is positive (or perhaps even if invalidly blank), someone must have earned something, and therefore, the consumer unit is not a true AVB case.