The Annual CE Data Quality Profile - 2020

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Consumer Expenditure Surveys Program Report Series

Contents

Overview

In keeping with Statistical Policy Directive No. 1, covering the Fundamental Responsibilities of Federal Statistical Agencies, the Bureau of Labor Statistics (BLS) is committed to consistently producing high quality data , i.e., accurate, objective, relevant, timely, and accessible. The Consumer Expenditure Surveys (CE) Program provides data users with a variety of metrics to assist them in evaluating overall data quality including: official tables with standard errors, response rates, data comparisons with other household survey estimates, as well as the results of nonresponse bias studies. Additionally, the public-use microdata (PUMD) provide variables and flags for users to create their own quality measures.

Adding to these resources, the Data Quality Profile (DQP) provides a comprehensive set of metrics that are timely, routinely updated, and accessible to users. Prior DQPs are available on our Data Quality and Data Comparisons page. BLS began providing DQPs every year beginning with the 2017 data, and began providing midyear DQPs with the 2020 midyear data release. For data users, the DQP metrics are an indication of quality covering both the Interview and Diary Surveys. For internal stakeholders, they can signal areas for survey improvements. Since the quality of survey estimates is affected by errors that can occur throughout the survey lifecycle, we expect that the set of DQP metrics will evolve over time as the BLS continually researches methods to monitor and improve data quality. For each metric, a brief description is provided along with the results, which are tabulated and graphed. The DQP Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021) provides detailed descriptions of the metrics, computations, and methodology.

The metrics are reported quarterly, where each quarter is the three-month period in which the survey data were collected. Because the respondents to the Interview Survey are asked to recall their expenditures over the prior three months, data collected in January refer to expenditures made in October, November, and December in the previous year. In contrast, Diary Survey expenditures are reported as they occur. This is why the PUMD Getting Started Guide recommends using 5 quarters of Interview Survey data, and it is why this profile provides metrics up to 2021q1 for the Interview Survey and up to 2020q4 for the Diary Survey.

Highlights

This section summarizes the trends in metrics over the past three years. This time frame covers the first quarters of the 2018 collection period to the first quarter of the 2021 collection period. Because the respondents to the Interview Survey are asked to recall their spending over the prior three months, data collected in January refer to expenditures made in October, November, and December of the previous year. Hence, the Interview Survey metrics in this profile cover the time period of 2018q2 through 2021q1. Respondents to the Diary Survey report their spending as it occurs, so Diary Survey metrics in this profile cover the time period of 2018q1 through 2020q4. Subsequent sections describe the individual metrics with detailed data tables.

Trends that are encouraging
- Diary and Interview Survey response rates show signs of recovering in July of 2020 with the resumption of in-person interviews (Section 1).
- Nonresponse reclassifications for both the Diary and Interview Surveys recovered from the impacts of the COVID-19 suspension of in-person interviews (Section 1).
- Roughly half of respondents used records, and this trend continues to be stable (Section 2).
- Information Book use rates began recovering in July of 2020 as in-person interviews and as Interview Survey respondents were provided with disposable copies (Section 3).

Trends that cause concern
- Diary and Interview Survey response rates remain at historical lows, and saw their largest single-quarter declines with the beginning of the COVID-19 pandemic (Section 1).
- Information Book usage saw large declines for both the Diary and Interview Survey following the onset of the COVID-19 pandemic. A large portion of Interview Survey cases report not having access to the Information Book (Section 3).
- Income imputation rates rose for both the Diary and Interview Surveys (Section 5).
- Perceived burden (Section 6) increased for the Interview Survey, along with median time spent taking the survey (Section 8).

1. Final disposition rates of eligible sample units (Diary and Interview Surveys)

Final disposition rates of eligible sample units (often called response rates) report the final outcome of field staff's survey participation recruitment effort. The BLS classifies the final outcome of eligible sample units into four main categories: *completed interview*, nonresponse due to *refusal*, nonresponse due to *noncontact*, and nonresponse due to *other* reasons. Completed interviews reclassified to a nonresponse by BLS staff are included within the *other nonresponse* category and are presented in the nonresponse reclassification tables (Tables 1.1 and 1.3). More information on the non-response reclassification edit, along with information on how we calculate response rates can be found in the DQP Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021).

Low response rates, examined with other indicators, may indicate non-response bias of an expenditure estimate if nonresponse is correlated with expenditures. A nonresponse study conducted by the BLS showed no meaningful bias in survey estimates (King, Chopova, Edgar, Gonzalez, McGrath, and Tan, 2009), but in a world of declining response rates, BLS continues to evaluate this risk. In addition, higher response rates are preferred for more precise estimates. We present unweighted response rates in this report because unweighted rates measure the effectiveness of our data collection efforts. When we have previously calculated weighted response rates, they showed no meaningful difference from the unweighted rates.

Diary Survey

Pre-COVID-19 trends (2018q1 – 2019q4)

- Response rates declined 6.6 percentage points from 55.5 to 48.9 percent (Table 1.1).
- Refusal rates rose 4.9 percentage points from 25.0 to 29.9 percent and accounted for the largest share of the decline in response rates (Table 1.1).
- Noncontact rates rose from 6.9 to 7.6 percent and accounted for 0.7 percentage points of the decline in response rates (Table 1.1).

***COVID-19 lockdown impacts (2020q1 and 2020q2)***

- In mid-March 2020, the Census Bureau suspended all in-person interviews, causing response rates to drop 22.8 percentage points from 2019q4 to 2020q2 (Table 1.1).
- Other nonresponse rates rose 45.6 percentage points, but were partially offset by a 17.8 percentage point decline in refusal rates and a 4.9 percentage point decline in noncontact rates (Table 1.1).

- Nonresponse reclassifications increased by 3,205 cases as the BLS reclassified a large number of interviews from ineligible to eligible nonrespondents (Table 1.2).[1]

COVID-19 post-lockdown impacts (2020q3-2020q4)

- Beginning in July 2020, interviewers resumed in-person interviews in some locations. As a result, other nonresponse rates decreased 40.3 percentage points from 2020q2 to 2020q4 (Table 1.1).

- This was partially offset by a 22.6 percentage point increase in refusal rates, and a 7.4 percentage point increase in noncontact rates from 2020q2 to 2020q4 (Table 1.1).

- As in-person interviews began to resume, the number of reclassifications declined by 3,145 cases from 2020q2 to 2020q4 (Table 1.2).

Diary final disposition rates
Eligible consumer units

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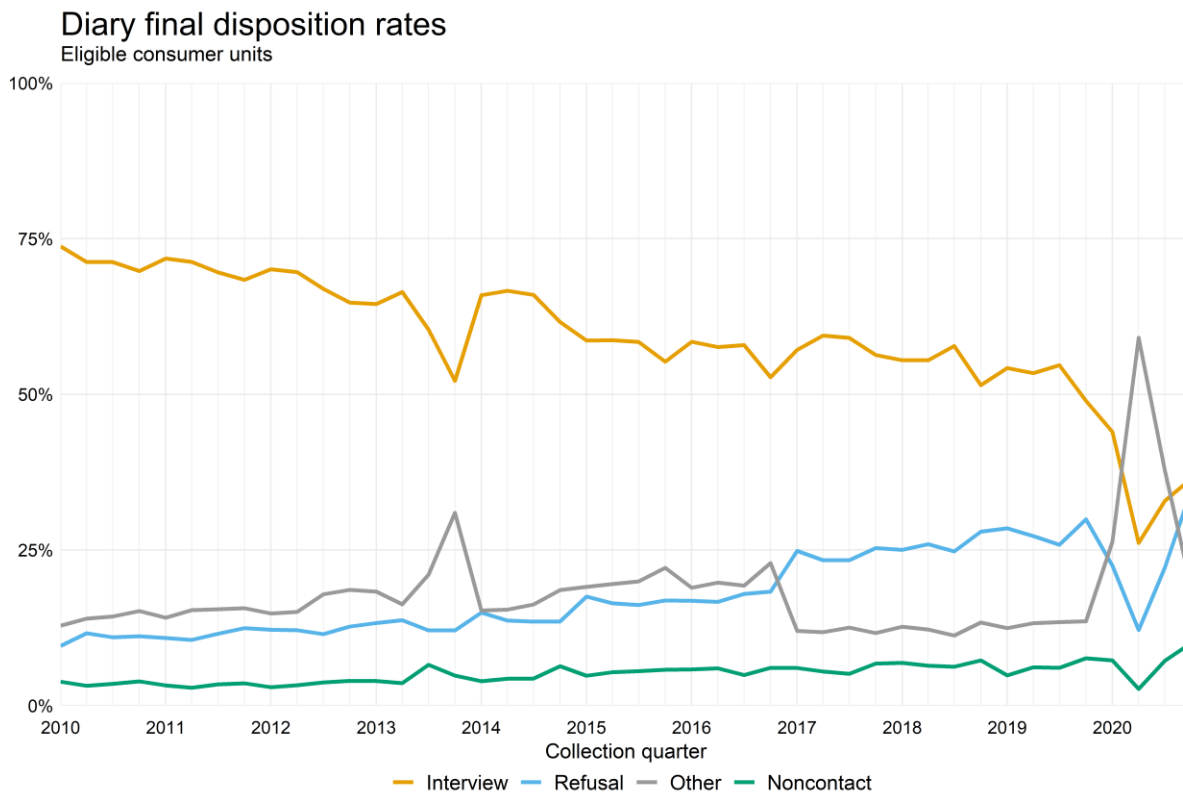
[1] Many respondents could not be reached by telephone because interviewers did not have a working telephone number for the respondent. Interviewers were instructed to classify these cases as ineligible nonrespondents and BLS elected to reclassify the majority as eligible other nonrespondents. For more information on this nonresponse reclassification see the DQP Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021).

Table 1.1 Diary Survey: distribution of final dispositions for eligible sample units (unweighted)

Quarter	Number of eligible sample units	Row percentage			
		Interview	Refusal	Noncontact	Other Nonresponse
2018q1	5,032	55.5	25.0	6.9	12.7
2018q2	5,015	55.5	25.9	6.4	12.2
2018q3	5,014	57.8	24.8	6.2	11.2
2018q4	5,072	51.5	27.9	7.3	13.3
2019q1	4,926	54.2	28.5	4.9	12.4
2019q2	5,082	53.4	27.2	6.1	13.2
2019q3	5,020	54.7	25.8	6.1	13.4
2019q4	5,216	48.9	29.9	7.6	13.5
2020q1	7,474[2]	44.0	22.5	7.3	26.3
2020q2	7,409	26.1	12.1	2.7	59.1
2020q3	7,784	32.9	22.2	7.2	37.7
2020q4	7,774	36.5	34.7	10.1	18.8

Table 1.2 Diary Survey: prevalence of nonresponse reclassifications

Quarter	Number of eligible sample units	Number of nonresponse reclassifications		
		Total reclassifications	COVID-19 reclassifications	Other reclassifications
2018q1	5,032	227	0	227
2018q2	5,015	241	0	241
2018q3	5,014	247	0	247
2018q4	5,072	205	0	205
2019q1	4,926	232	0	232
2019q2	5,082	243	0	243
2019q3	5,020	229	0	229
2019q4	5,216	188	0	188
2020q1	7,474	855	562	293
2020q2	7,409	3,393	3,202	191
2020q3	7,784	250	34	216
2020q4	7,774	248	10	238

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[2] The Diary Survey's sample size increased in 2020q1 to support the Consumer Price Index's Commodities and Services Survey sample frame.

Interview Survey

Pre-COVID-19 trends (2018q2 – 2019q4)

- Response rates declined 7.0 percentage points from 58.6 to 51.6 percent (Table 1.3).

- Refusal rates rose 5.7 percentage points from 31.1 to 36.8 percent and accounted for the largest share of the decline in response rates (Table 1.3).

- Other nonresponse rates rose from 4.8 to 5.5 percent, accounting for 0.7 percentage points of the decline in response rates (Table 1.3).

COVID-19 lockdown impacts (2020q1 – 2020q2)

- In mid-March 2020, the Census Bureau suspended all in-person interviews, causing response rates to drop 5.7 percentage points from 2019q4 to 2020q2 (Table 1.3).

- Refusal and noncontact rates also declined in the first two quarters of 2020 but this was offset by large increases in other nonresponse rates (Table 1.3).

- The other nonresponse rate rose 32.4 percentage points from 2019q4 to 2020q2 (Table 1.3) and nonresponse reclassifications increased by 2,944 cases through 2020q2 (Table 1.4).[3]

- These impacts were largest for Wave 1 interviews because interviewers were less likely to have a working telephone number for these cases.

COVID-19 post-lockdown impacts (2020q3-2021q1)

- Beginning in July 2020, interviewers were resumed in-person interviews in some locations. As a result, other nonresponse rates decreased 29.6 percentage points while refusal rates increased 23.5 percentage points, and noncontact rates increased 6.0 percentage points from 2020q2 to 2021q1 (Table 1.3).

- As in-person interviews began to resume, the number of reclassifications declined by 2,883 cases from 2020q2 to 2021q1 (Table 1.4).

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[3] Many respondents could not be reached by telephone because interviewers did not have a working telephone number for the respondent. Interviewers were instructed to classify these cases as ineligible nonrespondents and BLS elected to reclassify the majority as eligible other nonrespondents. For more information on this nonresponse reclassification see the DQP Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021).
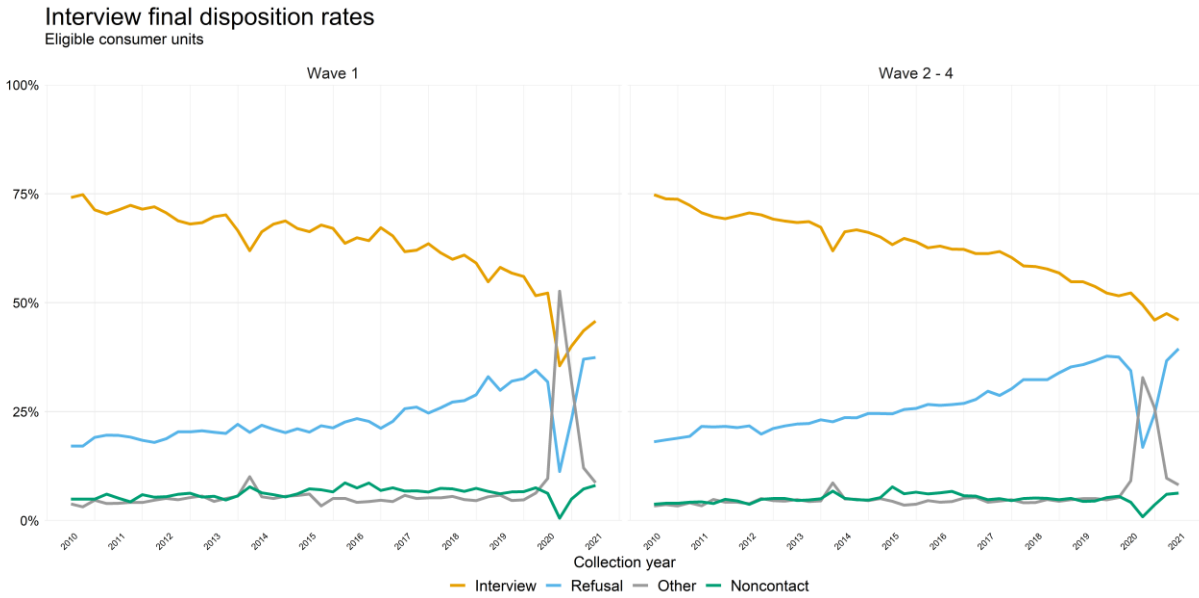
Interview final disposition rates
Eligible consumer units

Table 1.3 Interview Survey: distribution of final dispositions for eligible sample units (unweighted)

Quarter	Number of eligible sample units	Row percentage			
		Interview	Refusal	Noncontact	Other nonresponse
2018q2	10,075	58.6	31.1	5.5	4.8
2018q3	10,053	57.4	32.6	5.5	4.5
2018q4	10,161	54.8	34.7	5.5	5.0
2019q1	10,108	55.6	34.3	4.8	5.2
2019q2	10,075	54.5	35.5	5.0	5.0
2019q3	10,036	53.2	36.5	5.6	4.8
2019q4	10,170	51.6	36.8	6.1	5.5
2020q1	9,956	52.2	33.8	4.7	9.3
2020q2	10,581[4]	45.9	15.4	0.8	37.9
2020q3	11,190	44.5	24.2	3.9	27.4
2020q4	11,185	46.5	36.8	6.3	10.4
2021q1	11,125	46.0	38.9	6.8	8.3

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[4] The Interview Survey sample size increased in 2020q2 to support the Consumer Price Index's Commodities and Services Survey sample frame.

Table 1.4 Interview Survey: prevalence of nonresponse reclassifications

Quarter	Number of eligible sample units	Number of nonresponse reclassifications		
		Total reclassifications	COVID-19 reclassifications	Other reclassifications
2018q2	10,075	1	0	1
2018q3	10,053	8	0	8
2018q4	10,161	5	0	5
2019q1	10,108	8	0	8
2019q2	10,075	2	0	2
2019q3	10,037	9	0	9
2019q4	10,170	14	0	14
2020q1	9,956	197	186	11
2020q2	10,581	2,955	2,944	11
2020q3	11,190	88	74	14
2020q4	11,185	32	14	19
2021q1	11,125	72	2	70

2. Records Use (Interview Survey)

The records use metric measures the proportion of respondents who used records while answering the Interview Survey questions. Examples of records include receipts, bills, checkbooks, and bank statements. Interviewers record whether the respondent used records at the end of the interview. Past research has shown that respondents who use expenditure records reported more items with lower levels of missingness (Abdirizak, Erhard, Lee, and McBride, 2017), so a higher prevalence of records use is desirable.

Interview Survey

- Records use temporarily rose in 2016 for Wave 1 respondents concurrently with a field test in which a subset of respondents received monetary incentives to use records.
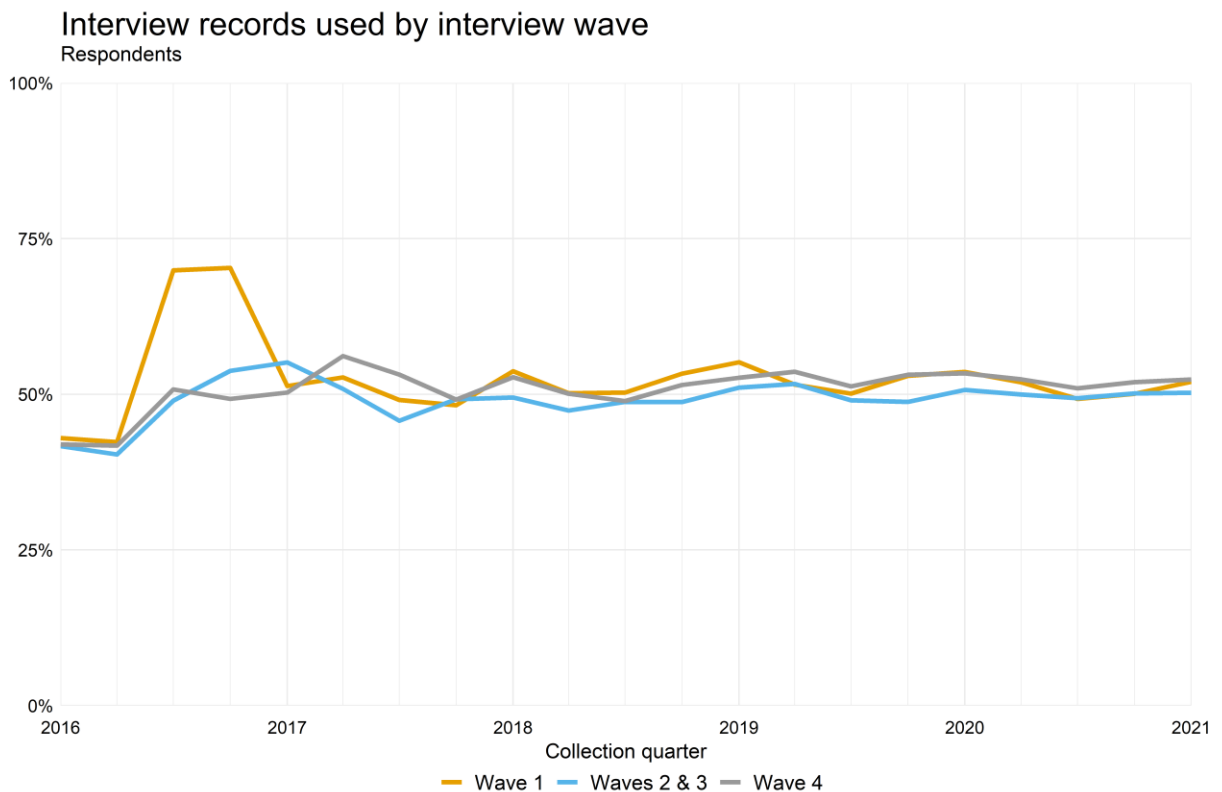- Since 2017, records use has been stable across interview waves.

Interview records used by interview wave
Respondents

Wave 1 — Waves 2 & 3 — Wave 4

Table 2.1 Interview Survey: prevalence of records use among respondents

Quarter	Wave	Number of respondents	Row percentage		
			Used	Did not use	Missing response
2018q2	Wave 1	1,529	50.2	48.7	1.1
2018q2	Waves 2 & 3	2,884	47.4	52.0	0.6
2018q2	Wave 4	1,486	50.1	49.4	0.5
2018q3	Wave 1	1,494	50.3	48.9	0.9
2018q3	Waves 2 & 3	2,815	48.8	50.9	0.4
2018q3	Wave 4	1,464	48.9	50.2	0.9
2018q4	Wave 1	1,399	53.3	45.7	0.9
2018q4	Waves 2 & 3	2,782	48.7	50.8	0.4
2018q4	Wave 4	1,390	51.5	47.4	1.1
2019q1	Wave 1	1,465	55.2	43.8	1.0
2019q1	Waves 2 & 3	2,730	51.1	48.4	0.5
2019q1	Wave 4	1,428	52.7	46.9	0.4
2019q2	Wave 1	1,443	51.6	47.6	0.8
2019q2	Waves 2 & 3	2,653	51.7	47.9	0.4
2019q2	Wave 4	1,397	53.6	45.5	0.9
2019q3	Wave 1	1,401	50.1	48.7	1.2
2019q3	Waves 2 & 3	2,651	49.0	50.2	0.8
2019q3	Wave 4	1,285	51.3	48.1	0.6
2019q4	Wave 1	1,318	53.0	46.2	0.8
2019q4	Waves 2 & 3	2,637	48.8	51.0	0.2
2019q4	Wave 4	1,293	53.1	46.3	0.5
2020q1	Wave 1	1,239	53.6	45.2	1.2
2020q1	Waves 2 & 3	2,601	50.7	48.9	0.4
2020q1	Wave 4	1,362	53.4	46.2	0.4
2020q2	Wave 1	965	51.9	47.3	0.8
2020q2	Waves 2 & 3	2,559	50	49.7	0.3
2020q2	Wave 4	1,334	52.4	47.1	0.5
2020q3	Wave 1	1,143	49.3	49.3	1.4
2020q3	Waves 2 & 3	2,444	49.4	50.3	0.3
2020q3	Wave 4	1,393	51	48.7	0.4
2020q4	Wave 1	1,230	50.1	49.6	0.3
2020q4	Waves 2 & 3	2,589	50.1	49.3	0.5
2020q4	Wave 4	1,386	51.9	47.8	0.2
2021q1	Wave 1	1,250	52.0	47.4	0.6
2021q1	Waves 2 & 3	2,515	50.3	49.4	0.4
2021q1	Wave 4	1,350	52.4	47.0	0.7

3. Information Book use (Diary and Interview Surveys)

The Information Book is a recall aide the interviewer provides for respondents' references while completing the interview. The Interview and Diary Surveys have separate Information Books, and each provides the response options for demographic questions and the income bracket response options. In addition, the Interview Information Book provides examples of the kinds of expenditures that each section is intended to collect. The Information Book use metric measures how many respondents used the Information Book during their interviews. For interviews conducted over the phone, the Information Book is typically only available to the respondent through the BLS website, so this metric should be interpreted in conjunction with the rising prevalence of telephone interviews described in Section 7. At the end of the interview, the interviewer records how often the respondent used the Information Book. Using the Information Book can improve reporting quality by clarifying concepts with concrete examples, and help recall. Therefore, higher rates of Information Book usage are preferred.

Diary Survey

Pre-COVID-19 trends (2018q1 – 2019q4)

- The prevalence of Information Book use among Diary Survey respondents declined 4.9 percentage points from 42.0 percent in 2018q1 to 37.1 percent in 2019q4 (Table 3.1).

COVID-19 lockdown impacts (2020q1 – 2020q2)

- In mid-March 2020, the Census Bureau suspended all in-person interviews and Information Book use declined by 33.0 percentage points from 2019q4 to 2020q2 (Table 3.1).

COVID-19 post-lockdown impacts (2020q3 – 2020q4)

- Beginning in July 2020, interviewers resumed in-person interviews in some locations. As a result, Information Book use increased 6.4 percentage points from its lowest value of 4.1 percent in 2020q2 to 10.5 percent in 2020q4 (Table 3.1).
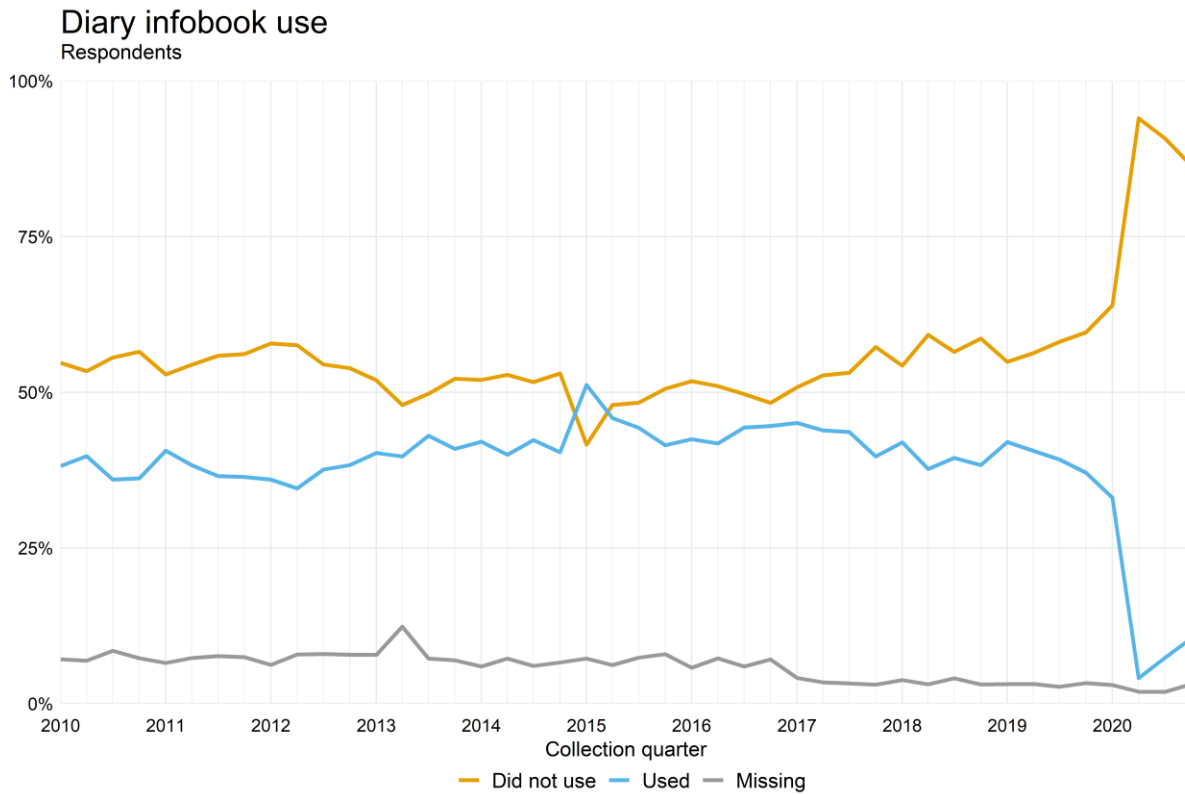
Diary infobook use
Respondents

Table 3.1 Diary Survey: prevalence of Information Book use among respondents

Quarter	Number of respondents	Row percentage		
		Used	Did not use	Missing response
2018q1	2,791	42.0	54.3	3.8
2018q2	2,781	37.7	59.2	3.1
2018q3	2,896	39.5	56.5	4.0
2018q4	2,611	38.3	58.6	3.1
2019q1	2,671	42.0	54.9	3.1
2019q2	2,713	40.6	56.3	3.1
2019q3	2,745	39.2	58.1	2.7
2019q4	2,553	37.1	59.6	3.3
2020q1	3,285	33.1	64.0	3.0
2020q2	1,936	4.1	94.0	1.9
2020q3	2,559	7.3	90.8	1.9
2020q4	2,835	10.5	86.4	3.1

Interview Survey

Pre-COVID-19 trends (2018q2 – 2019q4)

- Information Book use in Wave 1 declined 0.8 percentage points from 47.5 percent in 2018q2 to 46.7 percent in 2019q4 (Table 3.2).

- The rate of Wave 1 respondents who did not have access to the Information Book increased by 2.3 percentage points from 33.6 percent in 2018q2 to 35.9 percent in 2019q4 (Table 3.2).

- In subsequent waves, the rate of Information Book use was at least 10 percentage points lower than in Wave 1, and about half of respondents did not have access to the Information Booklet (Table 3.2).

COVID-19 lockdown impacts (2020q1 – 2020q2)

- In mid-March 2020, the Census Bureau suspended all in-person interviews and referred respondents to the Information Book on the BLS website. Information Book use rate declined 44.1 percentage points for Wave 1 respondents from 2019q4 to 2020q2 (Table 3.2).

- Declines in Information Book use were similar for subsequent waves and about 95 percent of all respondents in 2020q2 did not have access to the Information Book (Table 3.2).

COVID-19 post-lockdown impacts (2020q3 – 2021q1)

- Beginning in July 2020, interviewers resumed in-person interviews in some locations and provided respondents with disposable copies of the Information Book. As a result, Information Book use rose 4.8 percentage points from an average of 5.3 percent for all waves in 2020q3 to an average of 10.1 percent for all waves in 2021q1 (Table 3.2).

- Nevertheless, roughly 85.2 percent of respondents continue to not have access to the Information Book (Table 3.2).
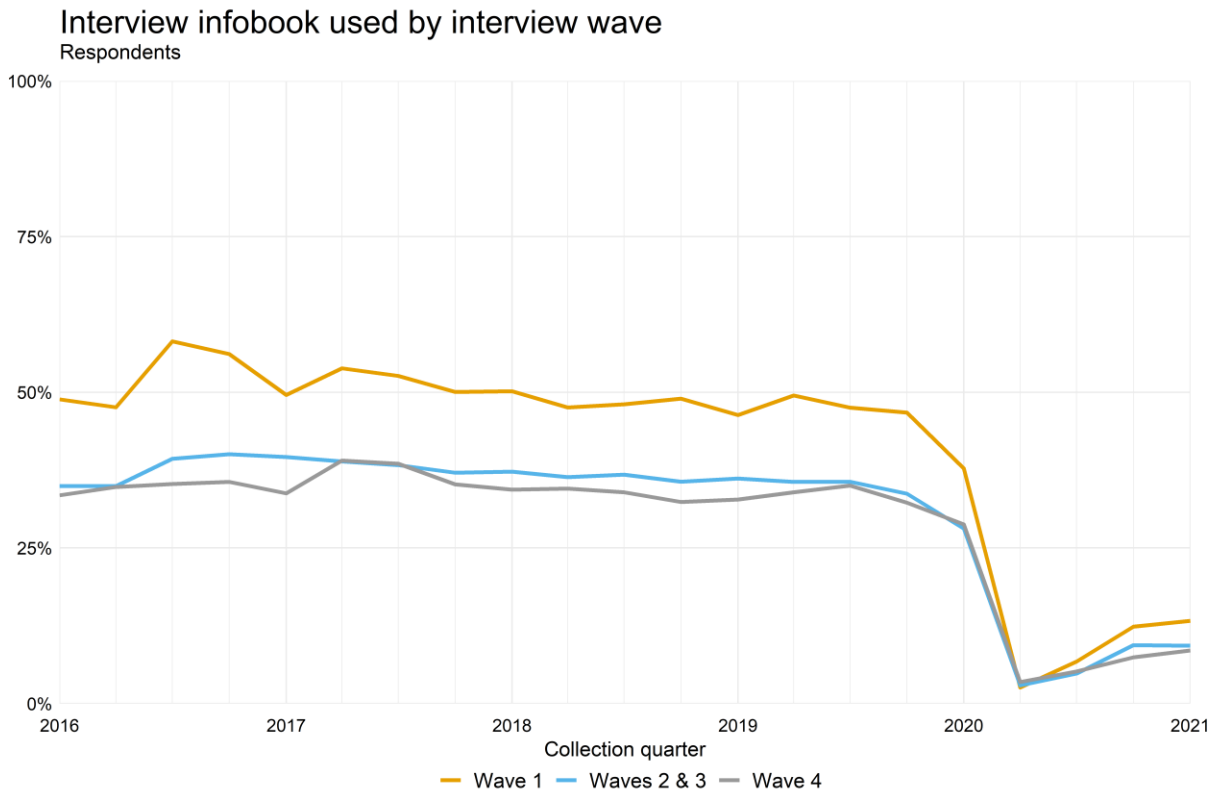
Interview infobook used by interview wave
Respondents

Table 3.2 Prevalence of Infobook use among Interview Survey respondents

Quarter	Wave	Number of respondents	Row percentage			
			Used	Did not use	No Infobook available	Missing response
2018q2	Wave 1	1,529	47.5	17.7	33.6	1.1
2018q2	Waves 2 & 3	2,884	36.4	16.3	46.7	0.6
2018q2	Wave 4	1,486	34.5	16.8	48.1	0.5
2018q3	Wave 1	1,494	48.1	20.6	30.5	0.9
2018q3	Waves 2 & 3	2,815	36.8	15.9	47.0	0.4
2018q3	Wave 4	1,464	33.9	14.9	50.3	0.9
2018q4	Wave 1	1,399	49.0	17.3	32.8	0.9
2018q4	Waves 2 & 3	2,782	35.6	15.9	48.1	0.4
2018q4	Wave 4	1,390	32.4	16.7	49.9	1.1
2019q1	Wave 1	1,465	46.3	15.8	36.9	1.0
2019q1	Waves 2 & 3	2,730	36.2	14.0	49.3	0.5
2019q1	Wave 4	1,428	32.8	14.6	52.2	0.4
2019q2	Wave 1	1,443	49.5	17.3	32.4	0.8
2019q2	Waves 2 & 3	2,653	35.6	15.9	48.1	0.4
2019q2	Wave 4	1,397	33.9	16.7	48.5	0.9
2019q3	Wave 1	1,401	47.5	18.0	33.3	1.2
2019q3	Waves 2 & 3	2,651	35.6	15.2	48.4	0.8
2019q3	Wave 4	1,285	35.0	13.8	50.6	0.6
2019q4	Wave 1	1,318	46.7	16.5	35.9	0.8
2019q4	Waves 2 & 3	2,637	33.7	14.9	51.2	0.2
2019q4	Wave 4	1,293	32.3	15.3	51.9	0.5
2020q1	Wave 1	1,239	37.8	15.7	45.4	1.2
2020q1	Waves 2 & 3	2,601	28.1	13.9	57.6	0.4
2020q1	Wave 4	1,362	28.8	13.7	57.0	0.4
2020q2	Wave 1	965	2.6	1.8	94.8	0.8
2020q2	Waves 2 & 3	2,559	2.9	1.8	95.0	0.3
2020q2	Wave 4	1,334	3.4	0.8	95.2	0.5
2020q3	Wave 1	1,143	6.7	2.4	89.5	1.4
2020q3	Waves 2 & 3	2,444	4.8	2.7	92.2	0.3
2020q3	Wave 4	1,393	5.2	2.1	92.4	0.4
2020q4	Wave 1	1,230	12.4	6.7	80.7	0.3
2020q4	Waves 2 & 3	2,589	9.4	3.6	86.5	0.2
2020q4	Wave 4	1,386	7.4	3.8	88.6	0.2
2021q1	Wave 1	1,250	13.3	6.2	79.9	0.6
2021q1	Waves 2 & 3	2,515	9.3	3.3	87.1	0.4
2021q1	Wave 4	1,350	8.5	4.2	86.6	0.7

4. Expenditure edit rates (Diary and Interview Surveys)

Edits to expenditure data are changes made to the reported expenditure data during CE data processing, excluding calculations (e.g. conversion of weekly value to quarterly value) and top-coding or suppression of reported values. Top-coding and suppression are done to protect respondent confidentiality in the PUMD and more information is available on the BLS Website. Expenditure edit rates for the Interview Survey are broken down into three categories: Imputation, allocation, and manual edits:

- *Imputation* replaces missing or invalid responses with an estimate of the true value.
- *Allocation* edits are applied when respondents provide insufficient detail to meet tabulation requirements. For example, if a respondent reports a non-itemized total expenditure for the category of fuels and utilities, that total amount will be allocated to the target items mentioned by the respondent (such as natural gas and electricity).
- *Manual* edits occur whenever responses are directly edited by CE economists based on their analysis and expert judgment.

Expenditure edit rates for the Diary Survey are only broken down into two categories: allocations and other edits. Almost all edits in the Diary survey are allocations. The "other edits" category encompasses all other expenditure edits including imputation and manual edits, though table 4.1 below shows that these are rare.

Imputation in CE data results from expenditure amount nonresponse. Allocation is a consequence of responses lacking the required details for items asked by the survey. Lower edit rates are preferred in general since that lowers the risk of processing error. However, edits based on sound methodology can improve the completeness of the data, and thereby reduce the risk of measurement error and non-response bias in survey estimates. Additional information on expenditure edits are available in the DQP Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021).

Diary Survey
- Beginning in January 2020, CE's sample size increased and led to an increase of over 22,000 reported expenditures.[5] However, as response rates dropped in 2020q2, so did the number of expenditures (Table 4.1).

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[5] This increase in sample size was made to support of the Consumer Price Index's Commodities and Services Survey sample frame.

- The total rate of unedited expenditure amounts decreased 0.8 percentage points from 90.1 in 2018q1 to 89.3 in 2020q4 (Table 4.1).
- Allocation rates rose 0.9 percentage points and drove the increase in edit rates (Table 4.1).
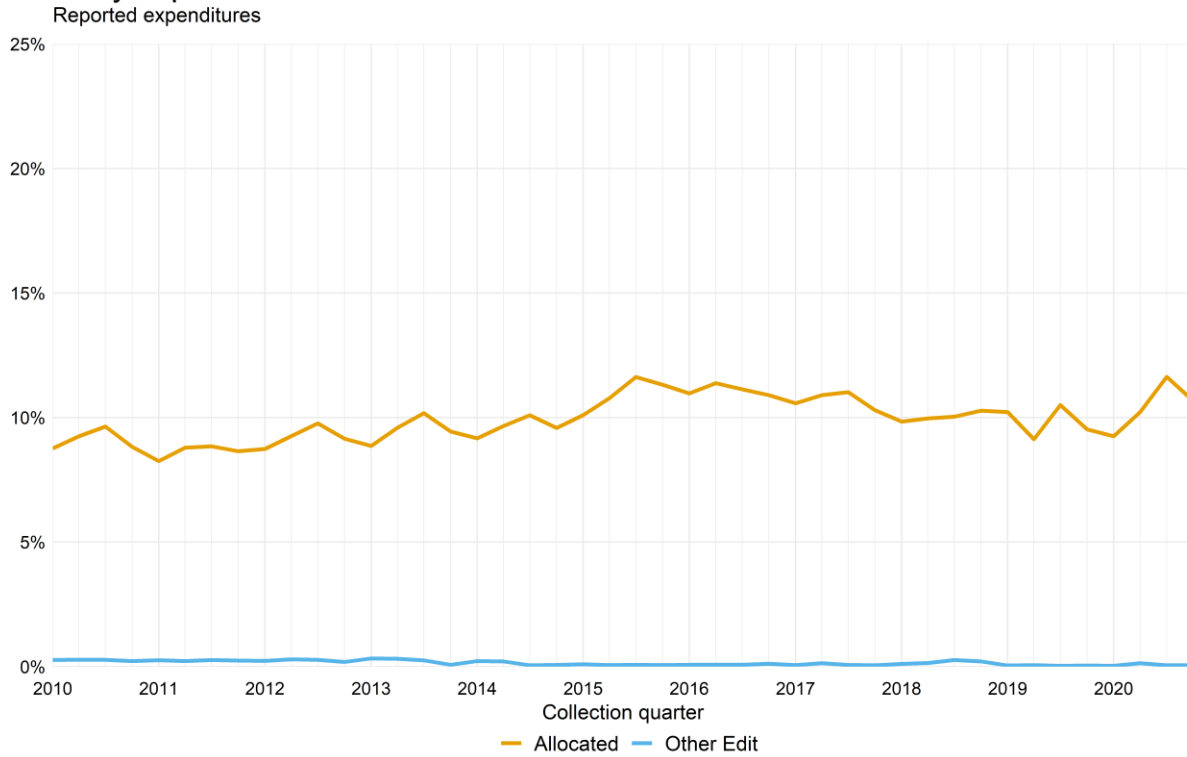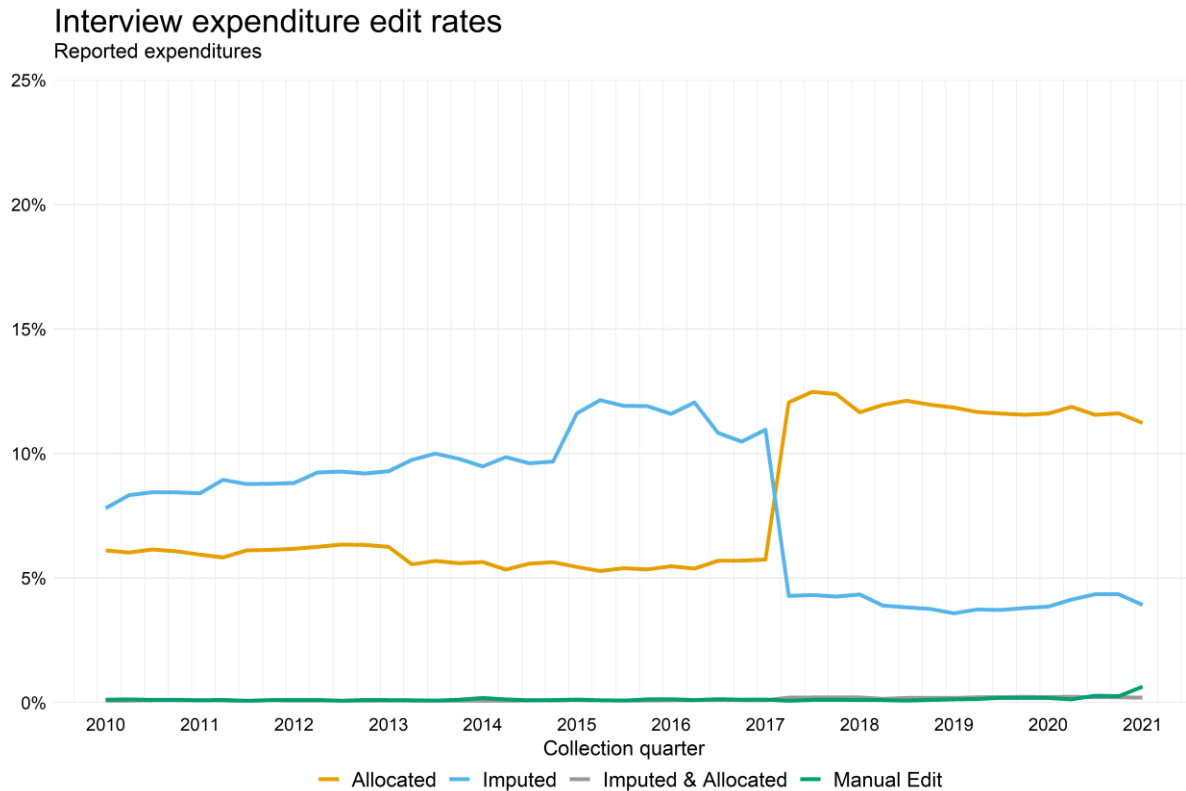
Diary expenditure edit rates
Reported expenditures

Table 4.1 Diary Survey: reported expenditure records

Quarter	Number of expenditures	Row percentage		
		Allocated	Other edit	Unedited
2018q1	86,798	9.8	0.1	90.1
2018q2	87,649	10.0	0.1	89.9
2018q3	88,342	10.0	0.3	89.7
2018q4	80,129	10.3	0.2	89.5
2019q1	79,626	10.2	0.0	89.7
2019q2	85,329	9.1	0.1	90.8
2019q3	83,639	10.5	0.0	89.5
2019q4	80,510	9.5	0.0	90.4
2020q1	102,693	9.2	0.0	90.7
2020q2	41,257	10.2	0.1	89.6
2020q3	56,071	11.6	0.0	88.3
2020q4	69,959	10.7	0.0	89.3

Interview Survey

- The total rate of unedited expenditure amounts increased 0.1 percentage points from 83.9 percent in 2018q2 to 84.0 percent in 2021q1 (Table 4.2).

- Even with slight fluctuation in this time period, imputation rates remained stable at 3.9 percent between 2018q2 and 2021q1 (Table 4.2).[6]

- Decreasing edit rates were primarily driven by declines in the allocation rate from 12.0 percent in 2018q2 to 11.2 percent in 2021q1 (Table 4.2).

- Manual edit rates increased by 0.5 percentage points from 0.1 percent in 2018q2 to 0.6 percent in 2021q1 (Table 4.2).

- The rate of expenditures that were both imputed and allocated was steady at 0.2 from 2018q2 through 2021q1 (Table 4.2).

Interview expenditure edit rates
Reported expenditures

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[6] Imputation rates fell sharply in 2017q2 and allocation rates rose by an almost equal amount. Both were the result of a change in how BLS processes cable, internet, and telephone utility expenditures. These had previously been imputed, but are now allocated to preserve more of the data provided by respondents.

Table 4.2 Interview Survey: reported expenditure records

Quarter	Number of expenditures	Row percentage				
		Allocated	Imputed	Imputed & allocated	Manual Edit	Unedited
2018q2	270,726	12.0	3.9	0.2	0.1	83.9
2018q3	269,909	12.1	3.8	0.2	0.1	83.8
2018q4	259,508	12.0	3.8	0.2	0.1	84.0
2019q1	264,424	11.8	3.6	0.2	0.1	84.3
2019q2	255,037	11.7	3.7	0.2	0.1	84.2
2019q3	251,370	11.6	3.7	0.2	0.2	84.3
2019q4	244,834	11.6	3.8	0.2	0.2	84.2
2020q1	246,488	11.6	3.9	0.2	0.2	84.1
2020q2	217,785	11.9	4.1	0.2	0.1	83.6
2020q3	224,639	11.6	4.3	0.2	0.3	83.6
2020q4	232,195	11.6	4.3	0.2	0.3	83.6
2021q1	231,850	11.2	3.9	0.2	0.6	84.0

5. Income imputation rates (Diary and Interview Surveys)

This metric describes the rate of editing performed on a consumer unit's nonresponse to at least one source of income. Edits made during the income imputation process covers three types of imputation methods, applicable to both the Interview and Diary Surveys:

1. *Model-based* imputation: when the respondent mentions receipt of an income source but fails to report the amount or to specify the range in which it falls.
2. *Bracket response* imputation: when the respondent mentions receipt of an income source, but only reports that income as falling within a specified range.
3. *All valid blank (AVB) conversion*: when the respondent reports no receipt of income from any source, but the CE imputes receipt from at least one source.

After imputation, the sum of each income component source computes total income before taxes. In the text that follows, income before taxes is defined as *unimputed* if no source of total income required imputation.

Since the need for imputation reflects either 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 and reduce the risk of nonresponse bias due to dropping incomplete cases from the dataset. Further details on the income imputation methodology can be found in the Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021) and the User's Guide to Income Imputation in the CE (Paulin, Reyes-Morales, and Fisher, 2018).

Diary Survey
- The rate of unimputed total income before taxes declined from 56.5 percent in 2018q1 to 53.3 in 2020q4 (Table 5.1).
- The number of respondents requiring both model-based and bracket response imputation increased 1.9 percent from 4.1 to 6.0 percent from 2018q1 to 2020q4, and contributed the most to the decline in unimputed income (Table 5.1).
- Model-based imputation rates are responsible for a further increase of 1.2 percentage points from 18.7 percent in 2018q1 to 19.9 percent in 2020q4 (Table 5.1).

- Bracket response imputation rates remained stable at 18.9 percent, and AVB conversion rates also remained stable at 1.9 percent from 2018q1 to 2020q4 (Table 5.1).
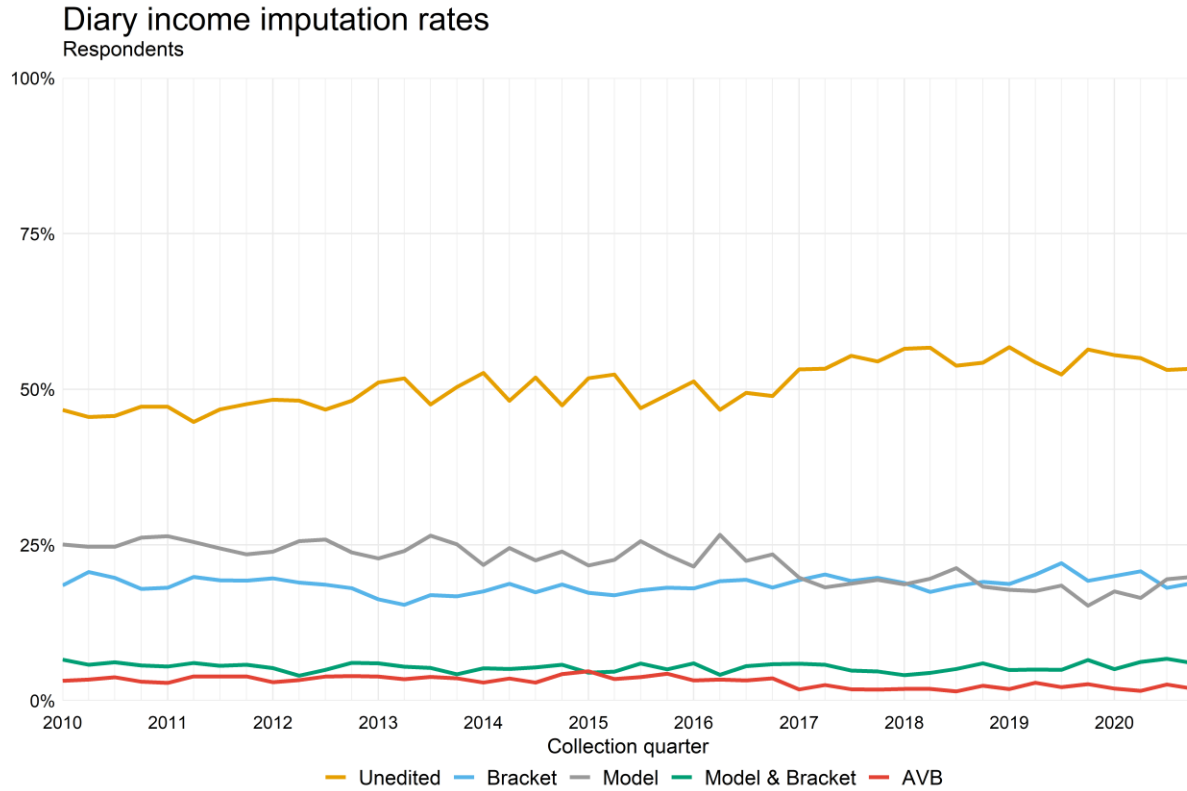
Diary income imputation rates
Respondents

Table 5.1 Diary Survey: income imputation rates for total amount of family income before taxes

Quarter	Number of respondents	Row percentage				
		AVB conversions	Bracket imputation	Model imputation	Model & bracket imputation	Unedited
2018q1	2,791	1.9	18.9	18.7	4.1	56.5
2018q2	2,781	1.9	17.4	19.6	4.5	56.7
2018q3	2,896	1.5	18.4	21.3	5.1	53.8
2018q4	2,611	2.4	19.1	18.3	6.0	54.3
2019q1	2,671	1.8	18.7	17.8	4.9	56.8
2019q2	2,713	2.9	20.2	17.6	5.0	54.3
2019q3	2,745	2.1	22.1	18.5	4.9	52.4
2019q4	2,553	2.6	19.2	15.2	6.5	56.4
2020q1	3,285	1.9	20.0	17.5	5.1	55.5
2020q2	1,936	1.5	20.8	16.5	6.2	55.5
2020q3	2,559	2.6	18.1	19.5	6.7	53.1
2020q4	2,835	1.9	18.9	19.9	6.0	53.3

Interview Survey

- The rate of unimputed total income before taxes declined 4.3 percentage points from 59.8 in 2018q2 to 55.5 percent in 2021q1 (Table 5.2).

- Model-based imputation rates rose 2.8 percentage points from 17.1 percent in 2018q2 to 19.9 percent in 2021q1, which accounted for the largest share of the decline in unimputed income (Table 5.2).

- Bracket response imputation also contributed to the decline in unimputed income, rising 1.0 percent points from 16.8 in 2018q2 to 17.8 in 2021q1 (Table 5.2).

- The proportion of respondents requiring both model-based and bracket response imputation rose 0.3 percentage points from 5.2 percent in 2018q2 to 5.5 percent in 2021q1 (Table 5.2).

- The 0.2 percentage point increase in AVB conversion rates from 1.2 in 2018q2 to 1.4 in 2021q1, contributes the least to the decline in unimputed income (Table 5.2).
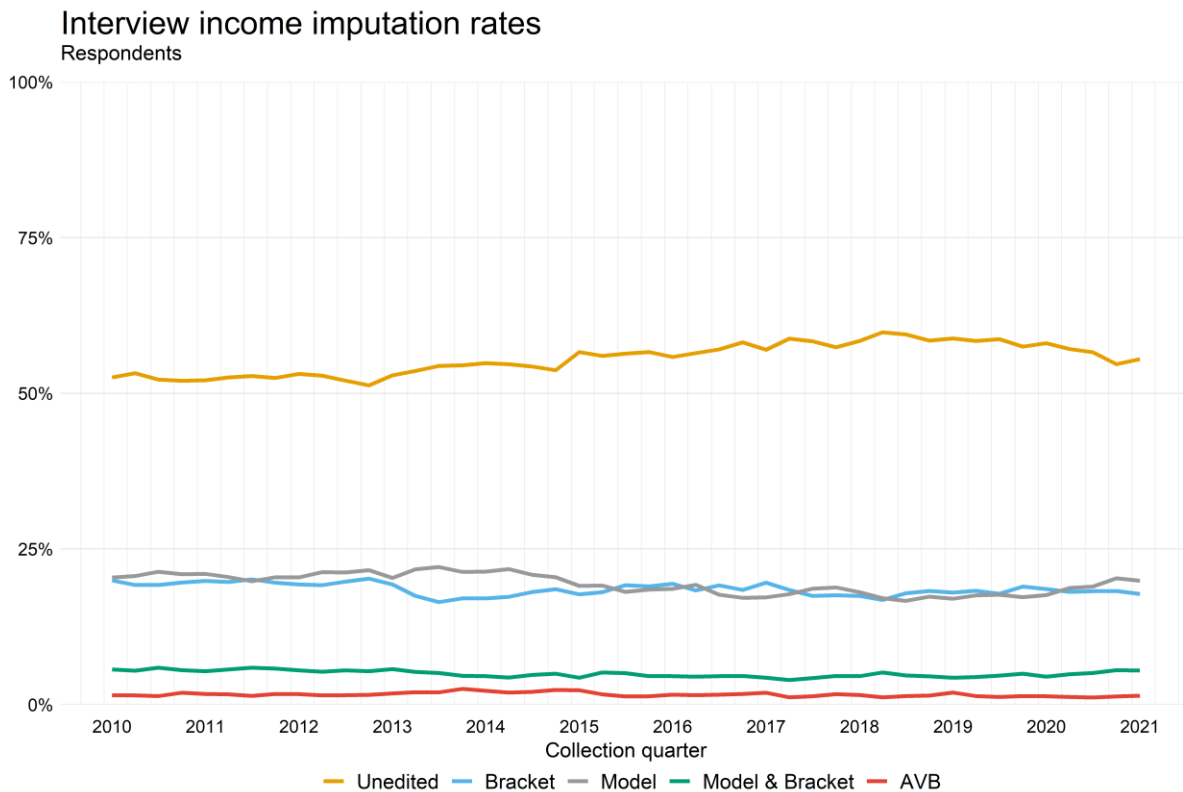
Interview income imputation rates
Respondents

Table 5.2 Interview Survey: income imputation rates for total amount of family income before taxes

Quarter	Number of respondents	Row percentage				
		AVB conversions	Bracket imputation	Model imputation	Model & bracket	Unedited
2018q2	5,899	1.2	16.8	17.1	5.2	59.8
2018q3	5,773	1.4	17.9	16.6	4.7	59.4
2018q4	5,571	1.4	18.2	17.3	4.5	58.5
2019q1	5,623	1.9	18.0	17.0	4.3	58.8
2019q2	5,493	1.4	18.3	17.5	4.4	58.4
2019q3	5,337	1.2	17.8	17.7	4.6	58.7
2019q4	5,248	1.4	18.9	17.2	5.0	57.5
2020q1	5,202	1.3	18.6	17.6	4.5	58.1
2020q2	4,858	1.2	18.1	18.7	4.9	57.1
2020q3	4,980	1.1	18.2	19.0	5.1	56.6
2020q4	5,205	1.3	18.2	20.3	5.5	54.7
2021q1	5,115	1.4	17.8	19.9	5.5	55.5

6. Respondent burden (Interview Survey)

Respondent burden relates to the respondent's perceived level of effort exerted to answer survey questions. BLS is concerned about respondent burden because higher levels of burden could negatively impact response rates and the quality of responses. Beginning in April 2017, the Interview Survey introduced a response burden question with response options describing five different levels of burden at the end of the Wave 4 interview. The respondent burden metric is based on this question and maps the five burden categories to three metric values: not burdensome, some burden, and very burdensome. Please see the Reference Guide (Knappenberger, Lee, Pham, and Armstrong, 2021) for more details on the question wording and the burden categories.

A caveat to the interpretation of this metric is that since the burden question only comes at the end of Wave 4, the metric likely underestimates survey burden due to self-selection bias. Respondents who agree to participate through the final wave of the survey likely find the survey less burdensome than respondents who dropped out of the survey prior to completing the final survey wave. It is also possible that the respondent answering this question did not participate in prior interview waves. For example, a respondent who participates in the first three survey waves might move out of the sampled address prior to the final interview. If someone else moves into the sampled address in time for the final wave, then they would be asked these questions.

Interview Survey

- The rate of respondents who report feeling no burden declined 6.4 percentage points from 32.4 percent in 2018q2 to 26.0 percent in 2021q1 (Table 6.1).
- Rising rates of respondents who felt that the survey was very burdensome accounted for 3.4 percentage points of this change, rising from 12.2 percent in 2018q2 to 15.6 percent in 2021q1 (Table 6.1).
- Respondents who felt some burden participating in the survey also increased 2.2 percentage points from 52.8 percent in 2018q2 to 55.0 percent in 2021q1 (Table 6.1).
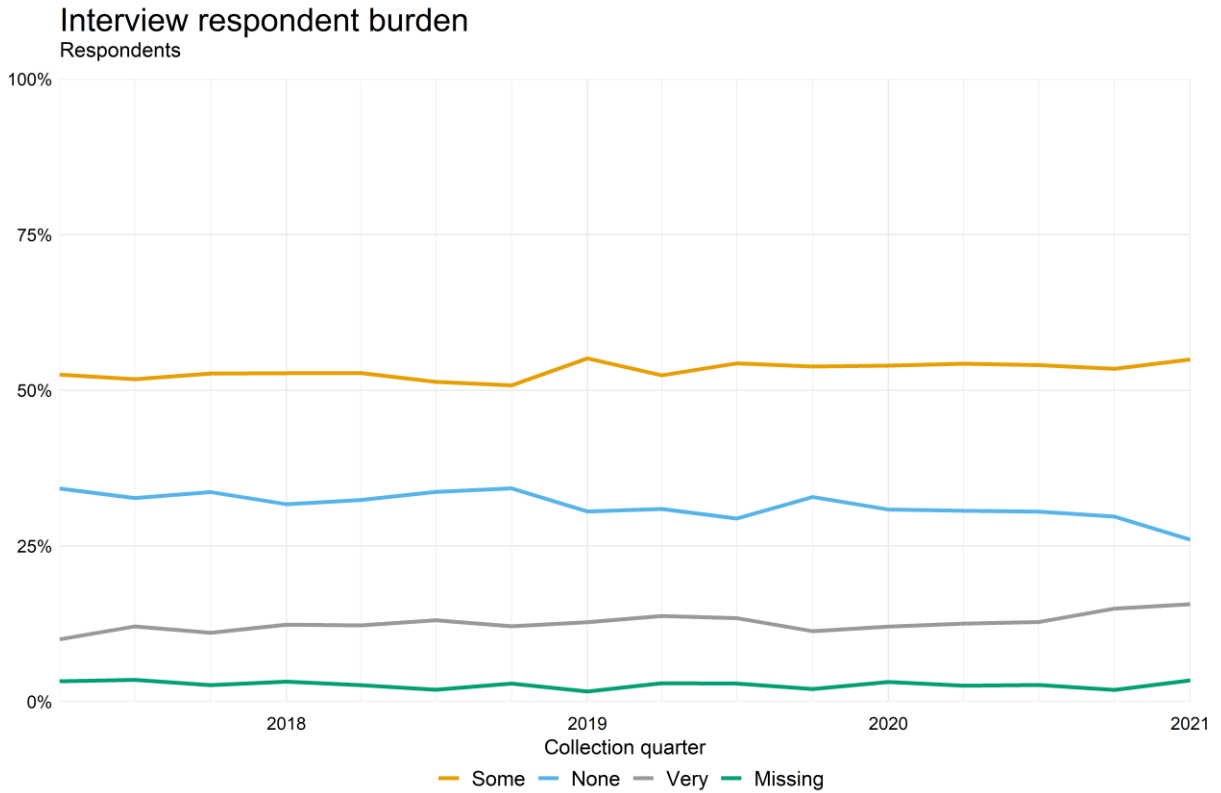
Interview respondent burden
Respondents

Table 6.1 Interview Survey: respondents' perceived burden in the final survey wave

Quarter	Number of respondents	Row percentage			
		Not burdensome	Some burden	Very burdensome	Missing response
2018q2	1,486	32.4	52.8	12.2	2.6
2018q3	1,464	33.7	51.4	13.0	1.9
2018q4	1,390	34.2	50.8	12.1	2.9
2019q1	1,428	30.5	55.1	12.7	1.6
2019q2	1,397	30.9	52.4	13.7	2.9
2019q3	1,285	29.4	54.3	13.4	2.9
2019q4	1,293	32.9	53.8	11.3	2.0
2020q1	1,362	30.8	54.0	12.0	3.2
2020q2	1,334	30.7	54.3	12.5	2.5
2020q3	1,393	30.5	54.1	12.8	2.7
2020q4	1,386	29.7	53.5	14.9	1.9
2021q1	1,350	26.0	55.0	15.6	3.4

7. Survey mode (Interview Survey)

This metric measures the share of interviews collected in-person. The Interview Survey was designed to be an in-person interview. However, the interviewer can also collect data for the Interview Survey over the phone, or by a combination of the two modes. Higher prevalence of in-person data collection is preferred since the interviewer can actively prompt the respondent, as well as encourage the use of recall aids, thereby reducing the risk of measurement error. Conducting first wave interviews in-person is important because this is typically the respondent's first experience with the survey. BLS has agreements with the Census Bureau that no more than 24 percent of first interviews or 48 percent of subsequent interviews will be collected over the phone. This agreement is still in effect, but the COVID-19 pandemic has made collecting in-person interviews unsafe for respondents and interviewers. BLS expects to return to the agreed upon rates as it becomes safer for in-person interviews to resume. Some locations may return to in-person interviews more quickly than others, but local conditions and interviewer safety will set the pace. Additionally, BLS is investigating the impacts of this shift to telephone interviews. Early results from Lee et al. (2021) suggest that households who switched from in-person to telephone did not meaningfully change the amount of time spent on the interview or the number of entries reported. The proportion of rounded entries also did not change for these respondents. Total expenditures reported however, did decrease, and more research is forthcoming.

Interview Survey

Pre-COVID-19 trends (2018q2 – 2019q4)

- The rate of Wave 1 respondents whose interviews were conducted in-person declined 2.1 percentage points from 76.3 percent in 2018q2 to 74.2 percent in 2019q4 (Table 7.1).
- In all but two quarters (2019q1 and 2019q4) the rate of Wave 1 telephone interviews remained below the 24 percent threshold (Table 7.1).
- The rate of subsequent interviews conducted in-person declined 1.8 percentage points from an average of 58.7 percent in 2018q2 to an average of 56.9 percent in 2019q4 (Table 7.1).
- In every quarter the rate of Wave 2 through 4 telephone interviews remained below the 48 percent threshold (Table 7.1).

COVID-19 lockdown impacts (2020q1 – 2020q2)

- In mid-March 2020, the Census Bureau suspended all in-person interviews and by April close to 98 percent of all interviews were conducted over the phone regardless of wave (Table 7.1).

COVID-19 *post-lockdown* impacts (2020q3 – 2021q1)

- Beginning in July 2020, interviewers resumed in-person interviews in some locations and the rate of telephone interviews declined 16.3 percentage points from an average of about 98 percent across all waves in 2020q2 to an average of 81.7 percent across all waves in 2021q1 (Table 7.1).
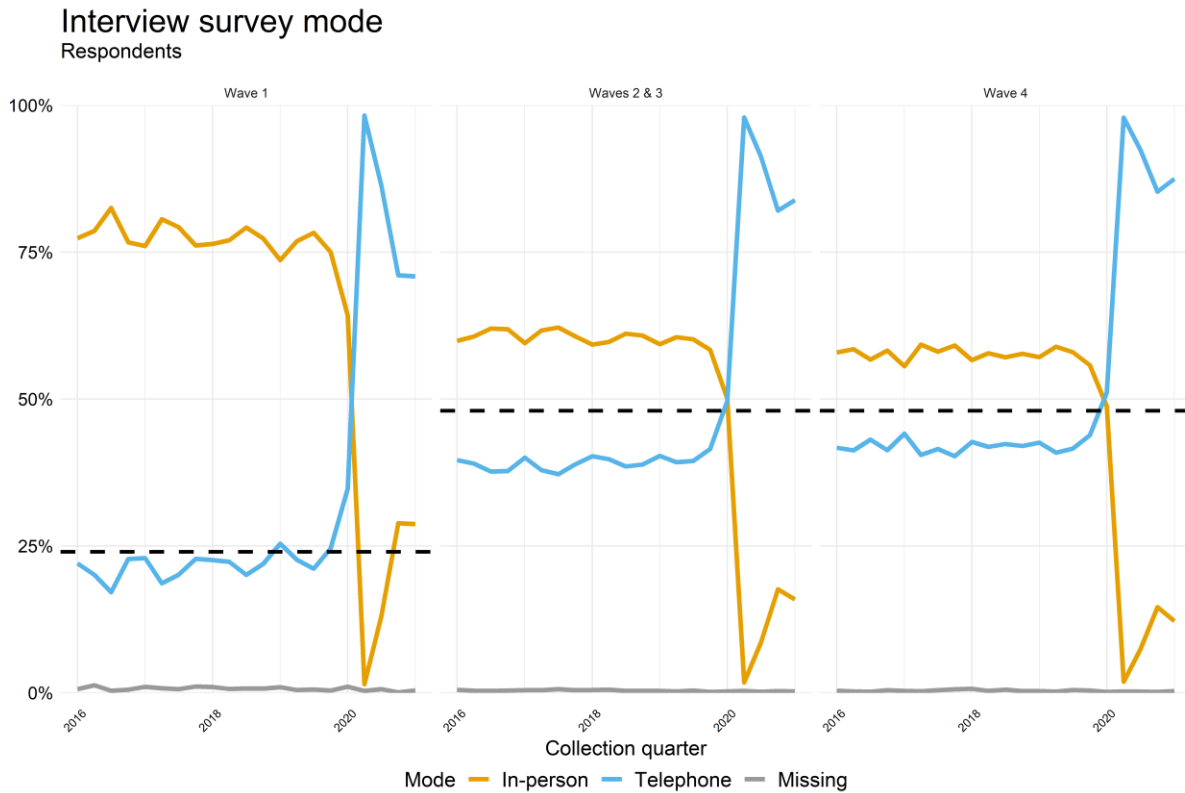
Interview survey mode
Respondents

Table 7.1 Interview Survey: survey mode

Quarter	Wave	Number of respondents	Row percentage		
			In-person	Telephone	Missing
2018q2	Wave 1	1,529	76.3	22.3	0.7
2018q2	Waves 2 & 3	2,884	59.4	39.8	0.5
2018q2	Wave 4	1,486	57.2	41.9	0.3
2018q3	Wave 1	1,494	77.6	20.1	0.7
2018q3	Waves 2 & 3	2,815	60.8	38.5	0.3
2018q3	Wave 4	1,464	56.8	42.3	0.5
2018q4	Wave 1	1,399	76.1	21.9	0.7
2018q4	Waves 2 & 3	2,782	60.1	38.9	0.4
2018q4	Wave 4	1,390	57.3	42.0	0.3
2019q1	Wave 1	1,465	71.9	25.4	1.0
2019q1	Waves 2 & 3	2,730	59.0	40.3	0.3
2019q1	Wave 4	1,428	56.7	42.6	0.3
2019q2	Wave 1	1,443	75.6	22.7	0.5
2019q2	Waves 2 & 3	2,653	60.0	39.2	0.2
2019q2	Wave 4	1,397	58.3	40.9	0.2
2019q3	Wave 1	1,401	77.3	21.1	0.6
2019q3	Waves 2 & 3	2,651	59.7	39.5	0.4
2019q3	Wave 4	1,285	57.7	41.6	0.5
2019q4	Wave 1	1,318	74.2	24.6	0.4
2019q4	Waves 2 & 3	2,637	57.9	41.5	0.2
2019q4	Wave 4	1,293	55.0	43.9	0.4
2020q1	Wave 1	1,239	64.2	34.7	1.0
2020q1	Wave 2 & 3	2,601	50.1	49.7	0.2
2020q1	Wave 4	1,362	48.8	51.1	0.1
2020q2	Wave 1	965	1.5	98.2	0.3
2020q2	Waves 2 & 3	2,559	1.8	97.9	0.3
2020q2	Wave 4	1,334	1.9	97.9	0.2
2020q3	Wave 1	1,143	13.0	86.4	0.6
2020q3	Wave 2 & 3	2,444	8.6	91.3	0.2
2020q3	Wave 4	1,393	7.4	92.4	0.2
2020q4	Wave 1	1,230	28.9	71.1	0.1
2020q4	Waves 2 & 3	2,589	17.6	82.1	0.3
2020q4	Wave 4	1,386	14.6	85.3	0.1
2021q1	Wave 1	1,250	28.7	70.9	0.4
2021q1	Waves 2 & 3	2,515	15.9	83.9	0.2
2021q1	Wave 4	1,350	12.2	87.5	0.3

8. Survey Response Time (Diary and Interview Surveys)

For both Interview and Diary Surveys, survey response time is the amount of time needed to complete an interview. For the Interview Survey, the survey response time metric is the median length of time to complete the interview. For the Diary Survey, the survey response time metric is the median length of time to complete the computer assisted personal interview (CAPI) component that collects information about income and demographics. Survey response time is an objective indicator for respondent burden: the longer the time needed to complete the survey, the more burdensome the survey. Fricker, Gonzalez, and Tan (2011) find that higher respondent burden negatively affects both response rates and data quality. However, survey response time could also reflect the respondent's degree of engagement. Engaged and conscientious respondents might take longer to complete the survey because they report more thoroughly, or use records more extensively. Tracking the median survey response time can be useful for assessing the effect of changes in the survey design.

Diary Survey

- The time to complete the personal interview component for income and demographics in the Diary Survey remained just over one-half hour from 31.2 minutes in 2018q1 to 32.7 minutes in 2020q4 (Table 8.1).
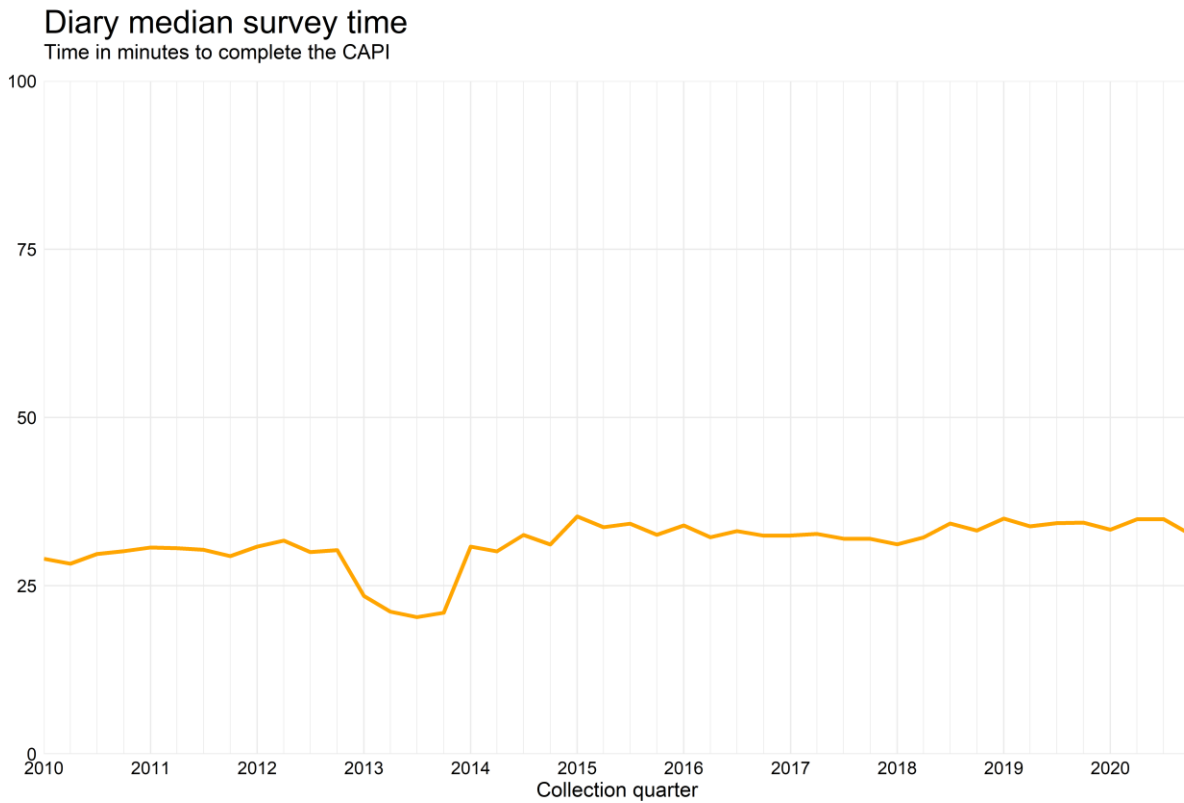
Diary median survey time
Time in minutes to complete the CAPI

Collection quarter

Table 8.1 Diary Survey: median length of time to complete the interview components (income and demographics)

Quarter	Number of respondents	Minutes
2018q1	2,791	31.2
2018q2	2,781	32.2
2018q3	2,896	34.2
2018q4	2,611	33.2
2019q1	2,671	35.0
2019q2	2,713	33.8
2019q3	2,745	34.3
2019q4	2,553	34.4
2020q1	3,281	33.3
2020q2	1,936	34.9
2020q3	2,559	34.9
2020q4	2,835	32.7

Interview Survey

- Median time to complete Wave 1 interviews was, at its lowest, 70.5 minutes in 2018q2, but was between 74.1 and 78.8 minutes each quarter thereafter (Table 8.2).

- Median time to complete Waves 2 and 3 interviews rose 5.0 minutes from 49.6 minutes in 2018q2 to 54.6 minutes in 2021q1 (Table 8.2).

- Wave 4 interviews similarly took 5.3 minutes longer, rising from 56.4 minutes in 2018q2 to 61.7 minutes in 2021q1 (Table 8.2).

- These increases in survey response time can in part be explained by the addition of a new extended recall section in 2019q2.

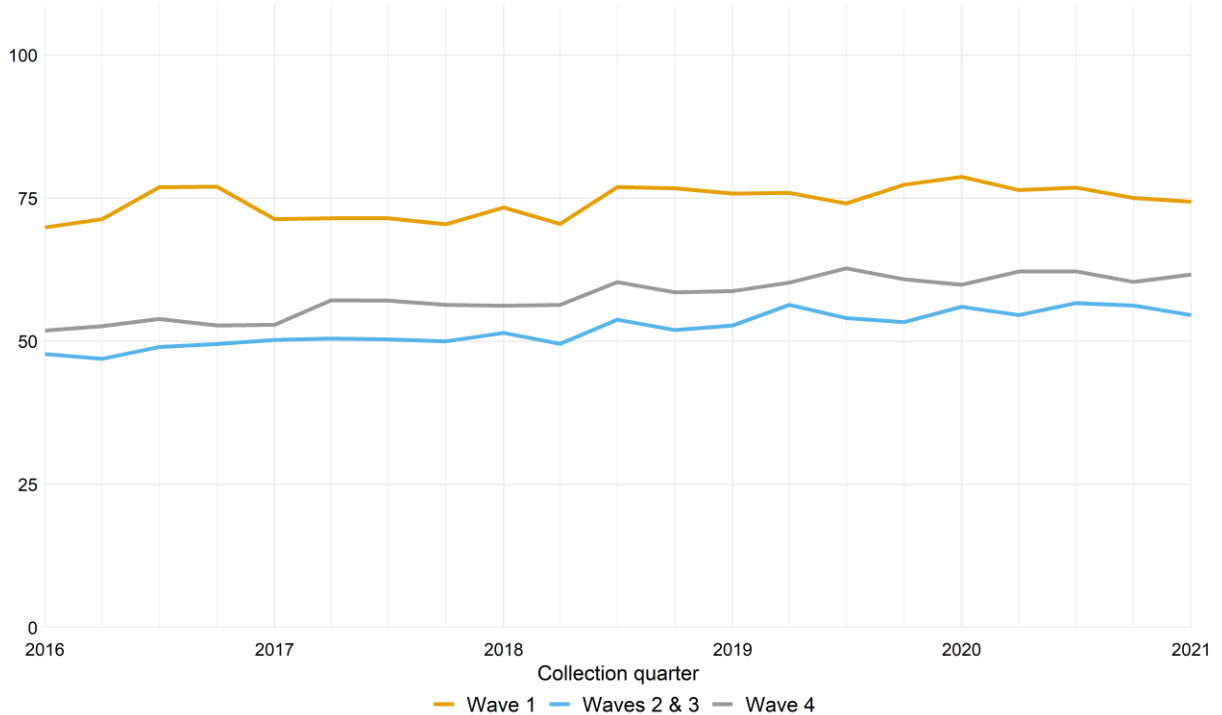## Interview median survey time by interview wave
Time in minutes

Table 8.2 Interview Survey: median length of time to complete survey

Quarter	Number of respondents	Minutes		
		Wave 1	Waves 2 & 3	Wave 4
2018q2	5,894	70.5	49.6	56.4
2018q3	5,771	77.0	53.8	60.3
2018q4	5,570	76.7	52.0	58.6
2019q1	5,618	75.8	52.8	58.8
2019q2	5,486	75.9	56.4	60.2
2019q3	5,332	74.1	54.0	62.8
2019q4	5,239	77.4	53.3	60.8
2020q1	5,199	78.8	56.0	59.9
2020q2	4,855	76.4	54.6	62.2
2020q3	4,980	76.8	56.7	62.2
2020q4	5,205	75.0	56.2	60.4
2021q1	5,115	74.4	54.6	61.7

Conclusion

BLS is committed to producing data that are consistently of high statistical quality. As part of that commitment, BLS publishes the DQP and its accompanying [Reference Guide](#) (Knappenberger, Lee, Pham, and Armstrong, 2021) to assist data users as they evaluate CE data quality and as they judge whether CE data fit their needs. DQP metrics therefore cover both the Interview and Diary Surveys, multiple dimensions of data quality, and several stages of the survey lifecycle. Additionally, BLS uses these metrics internally to identify areas for potential survey improvement, evaluate the effects of survey changes, and to monitor the health of the surveys.

Some trends are encouraging. With the limited resumption of in-person interviews in July of 2020, several metrics impacted by the COVID-19 pandemic have begun to recover. This includes response rates, nonresponse reclassification rates, and Information Book use rates for the Diary and Interview Surveys. Additionally, half of respondents used records over the analyzed time frame. On the other hand, some trends warrant concern. Over the same time period, response rates and Information Book use remained at historical lows due to the COVID-19 pandemic. Additionally, income imputation rates increased for both the Diary and Interview Surveys and perceived respondent burden increased for the Interview Survey. Despite allowing some in-person interviews to resume, almost every interview continues to be conducted over the phone rather than in-person. A few metrics either showed little change over this time period, or had trends with an uncertain impact on data quality. Survey time for the Diary Survey remained stable around just over half-an-hour. Survey time did increase for the Interview Survey, and BLS believes that this is related to the addition of new survey questions requested by our customers to improve CE's fitness for their use.

BLS will continue to monitor these trends, and the next issue of the CE Data Quality Profile will be released in April 2022 with BLS's midyear release of CE data and will report on the first half of the 2021 data.

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