

The Impact of COVID-19 on CE Survey Estimates for 2020

January 24, 2022

Scott Curtin

Consumer Expenditure Surveys Program Report Series



This report is a follow-up to the May 5th CE Program Series report [impact of COVID-19 on CE survey estimates](#). The prior report highlighted changes in collection that were introduced as a result of the COVID-19 pandemic, as well as initial CE estimates from the first and second quarters of 2020. This report provides an update to those results, giving data users an indication of the impact COVID-19 had on collection, processing, and estimation in all four quarters of 2020.

The Bureau of Labor Statistics (BLS) Consumer Expenditure Surveys (CE) program has continued to pursue obtaining high-quality data from its respondents in both the Interview Survey and the Diary Survey.¹ Starting on March 19, 2020, the U.S. Census Bureau, which collects CE data for BLS, ceased in-person collection of CE data for both the Interview Survey and the Diary Survey, and transitioned all in-person interviews to telephone interviews. Phone-only interviews were required through June 2020. In July of 2020, The U.S. Census Bureau authorized the reinstatement of in person data collection, and while this option was again available to Field Representatives (FRs), the initial contact attempt was still required to be over the phone. When in-person interviews were necessary, FRs were prohibited from collecting data inside of respondent's homes. Specific to the Diary Survey, from March 2020 through June 2020, FRs transcribed expenditures from respondents via phone instead of collecting completed paper diaries from residences. Additionally, a prototype online instrument for the Diary Survey was introduced in June 2020 as an additional option for data collection. This online instrument continues to be available to FRs for collection purposes and will continue to undergo refinement and improvement for use with future iterations of the Diary Survey.

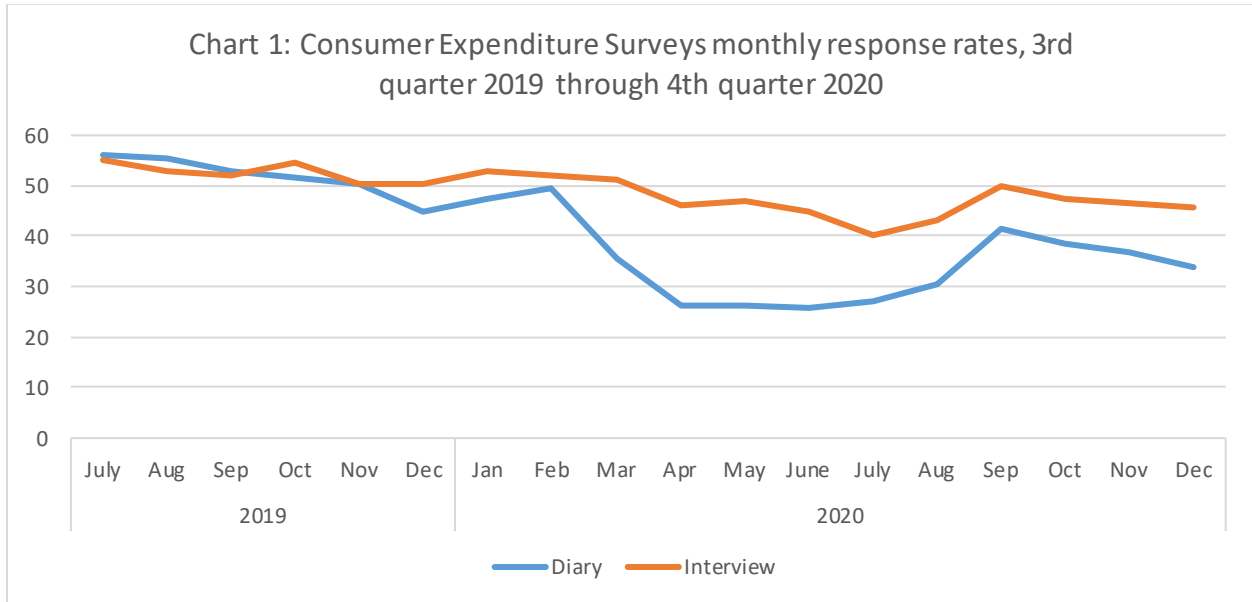
This report focuses on three different analyses, providing a brief overview of the observed changes in the CE data for 2020 compared to, or relative to 2019. This report continues the analysis approach outlined in the May 5th report, with updated year-over-year percent change figures, and introduces annual means and associated relative standard errors (RSEs) for comparison with 2019. The report also expands on the comparison of quarterly CE aggregate estimates with quarterly aggregates from the Bureau of Economic Analysis's (BEA) Personal Consumption Expenditures (PCE) measure. The results found in this report provide some initial indication of the full impact COVID-19 had on consumers during 2020.

Data Quality

As a means to monitor data quality, the CE program not only continually tracks response rates for each survey, but also compares estimates against other data sources to help identify potential under- or over-reporting. Beginning in February 2020, prior to the World Health Organization categorizing a pandemic, both surveys saw declines in response through the first half of the year. In an effort to combat decreases in sample, The U.S. Census Bureau partnered with the Economic Reimbursable Surveys Division (ERD) to use their research contact frame to supplement the CE surveys. Beginning in April 2020, phone numbers

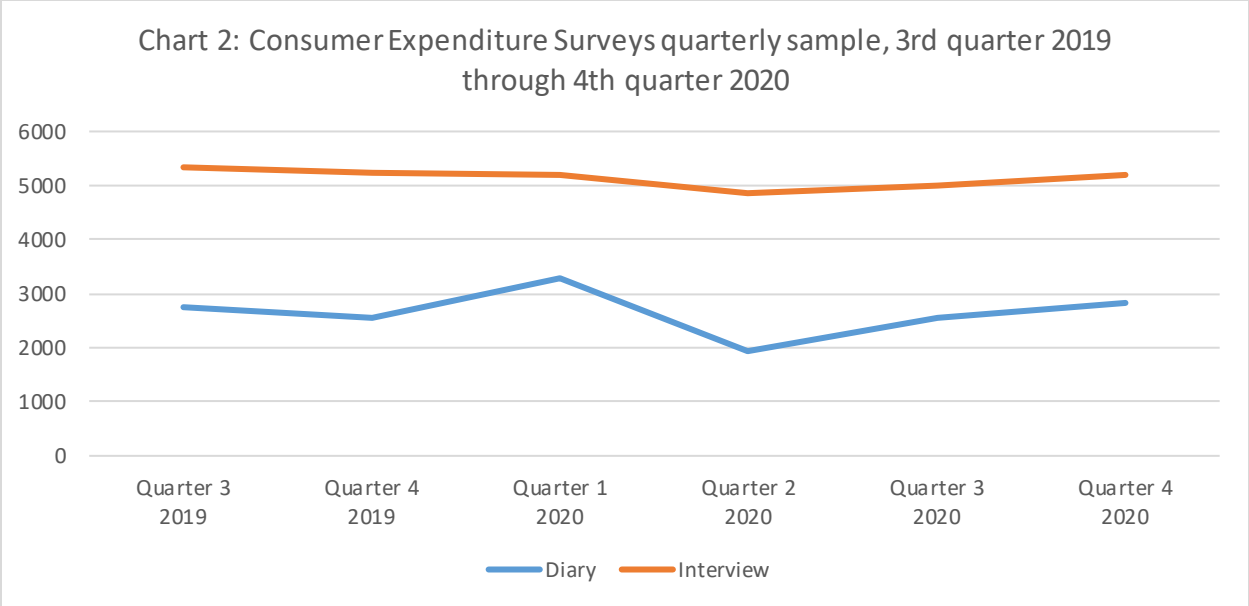
¹ The Consumer Expenditure Surveys (CE) data are collected by the U.S. Census Bureau. The U.S. Census Bureau collects Consumer Expenditure Surveys (CE) data for Bureau of Labor Statistics (BLS) in two surveys, the Quarterly Interview Survey (CEQ) for major or recurring items and the weekly Diary Survey (CED) for more minor or frequently purchased items. CE's data are primarily used to revise the relative importance of goods and services for the Consumer Price Index market basket. The CE are the only set of federal household surveys to provide information on the complete range of consumers' expenditures and incomes. It also collects information on income, demographics, and, in the Interview Survey, assets and liabilities.

from the ERD contact frame were included. As seen in Chart 1 below, the Interview Survey response rate rose almost 10 percentage points from July to September 2020². Response rates from September to December 2020 declined slightly, falling to 45.8 percent. The Diary Survey showed a similar uptick in response from April to September 2020, with response rates then falling slightly to 33.9 percent.



The Diary Survey drop in sample was partially offset due to a larger sample introduced in January 2020. As seen in Chart 2 below, this sample increase, paired with the ERD supplement mentioned above, helped support moderate gains in terms of sample size for both the Interview Survey and Diary Survey in quarters 3 and 4 of 2020.

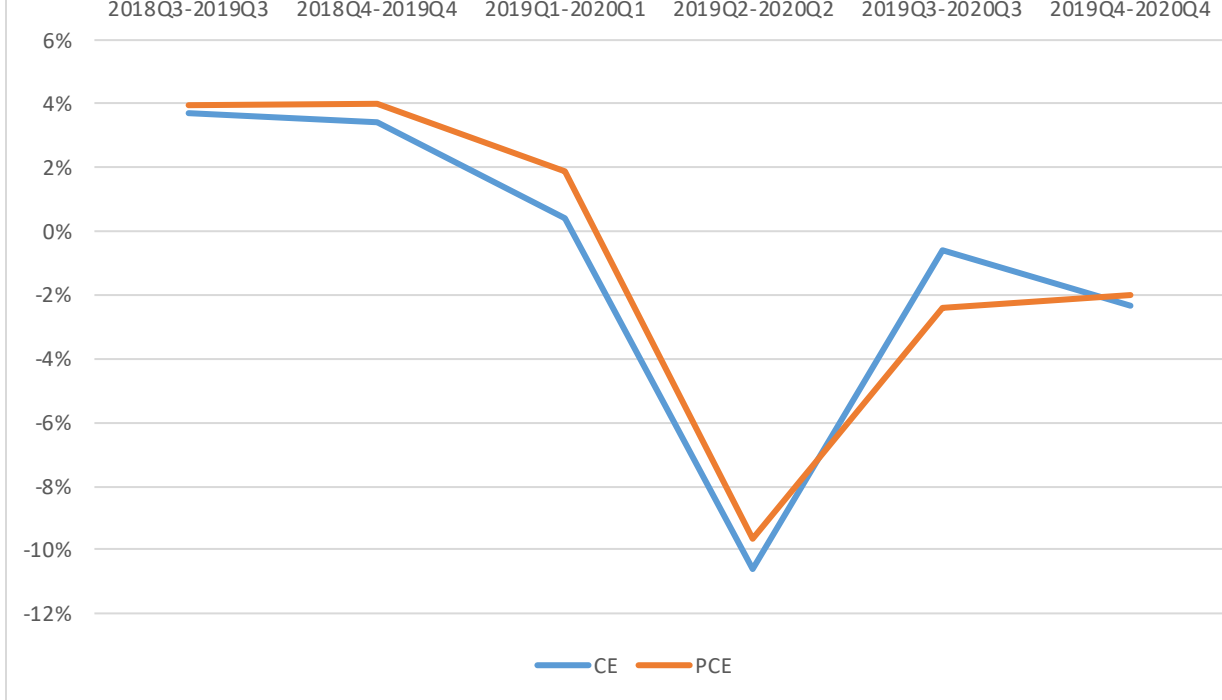
² Estimation response rates are calculated based on the set of Consumer Units (CUs) that were included in the computation of mean expenditures and other estimated statistics produced on the CE website. These response rates will differ slightly from the response rates published on the [household and establishment response rates](#) webpage, which include CUs that responded, but do not meet the minimum threshold for inclusion in estimation.



The CE and the PCE are two leading sources of household expenditure data in the United States. While the two measures result in significantly different accounts of consumer spending, the relative change observed between the two can provide some indication of the reliability of either estimate. The year-over-year percent change in CE quarterly expenditure estimates in the first half of 2020 showed very similar trends, with decreasing percent change figures for both the 1st and 2nd quarters of 2020³. As seen in Chart 3 3A below, year-over-year percent changes for the 3rd and 4th quarters of 2020 for both the CE and PCE continued to show similar trends.

³ For a more detailed comparison of CE and PCE estimates, please see https://www.bls.gov/cex/cecomparison/pce_profile.htm

Chart 3A: Year-over-year percent change in quarterly expenditure aggregates, Consumer Expenditure Surveys and Personal Consumption Expenditures, 3rd quarter 2019 through 4th quarter 2020

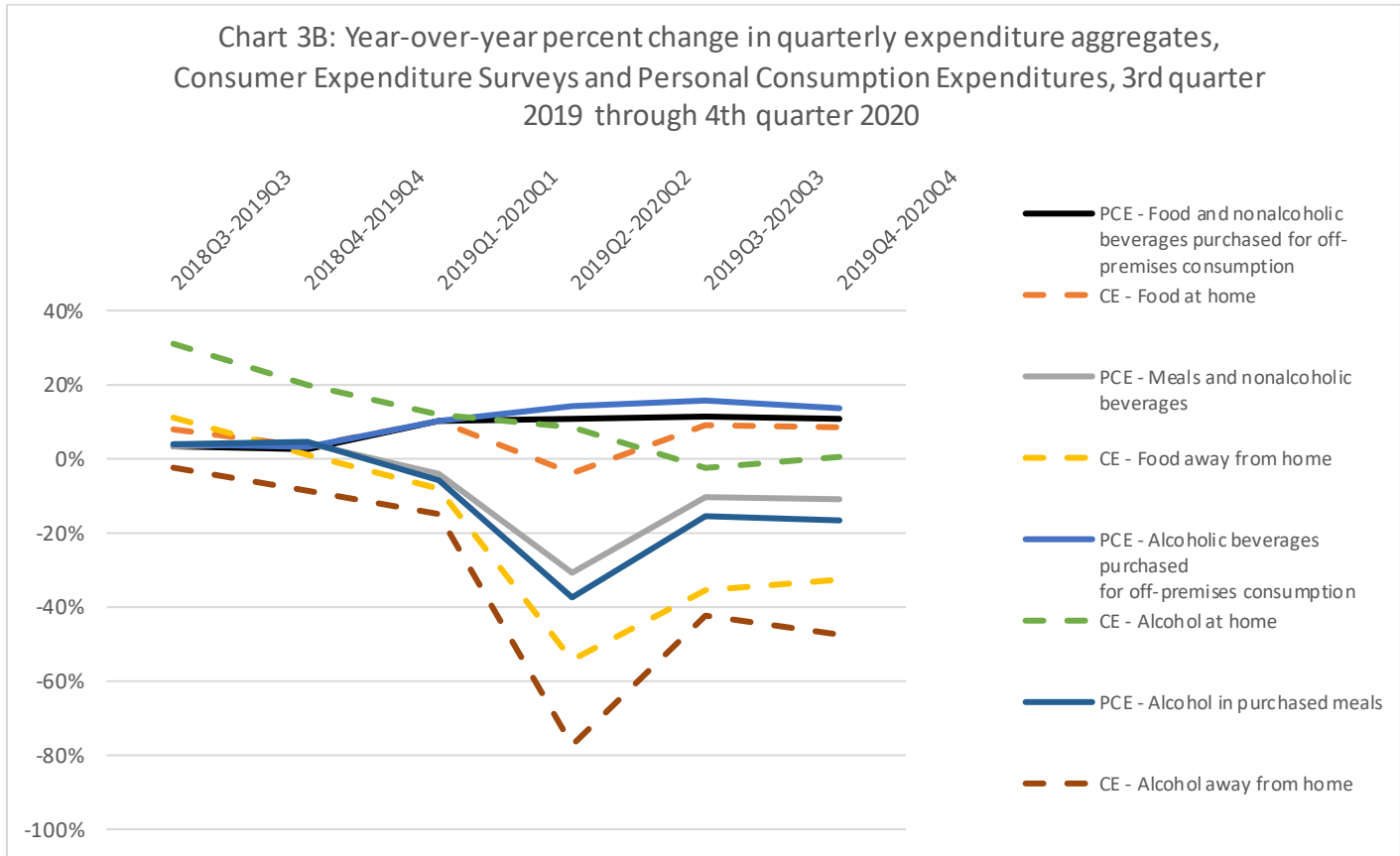


Continuing with the PCE analysis outlined in the [previous report](#), quarterly aggregates for food and alcohol from the CE were again compared to the PCE, but now for all four quarters of 2020. This comparison was made by looking at how food and alcohol expenditures compared with their counterpart categories from the PCE. The CE defines food and alcohol as part of two broad categories, at home⁴ and away from home⁵. PCE identifies spending on alcohol and food in a similar manner, classifying at home expenditures as part of their off-premise consumption categories, and away from home expenditures as part of their purchased meals categories. Chart 3B below shows that year-over-year percent change in aggregates for away from home food and alcohol expenditures in both the PCE and CE continued to show similar patterns, with CE continuing to show a more dramatic drop in spending. With the introduction of quarters 3 and 4 of 2020, year-over-year percent change figures for

⁴ Food at home refers to the total expenditures for food at grocery stores (or other food stores) and food prepared by the CU on trips. It excludes the purchase of nonfood items (e.g., paper products, detergents, home cleaning supplies, pet foods, and alcoholic beverages) that might be purchased in these venues.

⁵ Food away from home includes all meals (breakfast and brunch, lunch, dinner and snacks and nonalcoholic beverages) including tips at fast food, take-out, delivery, concession stands, buffet and cafeteria, at full-service restaurants, and at vending machines and mobile vendors. Also included are board (including at school), meals as pay, special catered affairs, such as weddings, bar mitzvahs, and confirmations, school lunches, and meals away from home on trips.

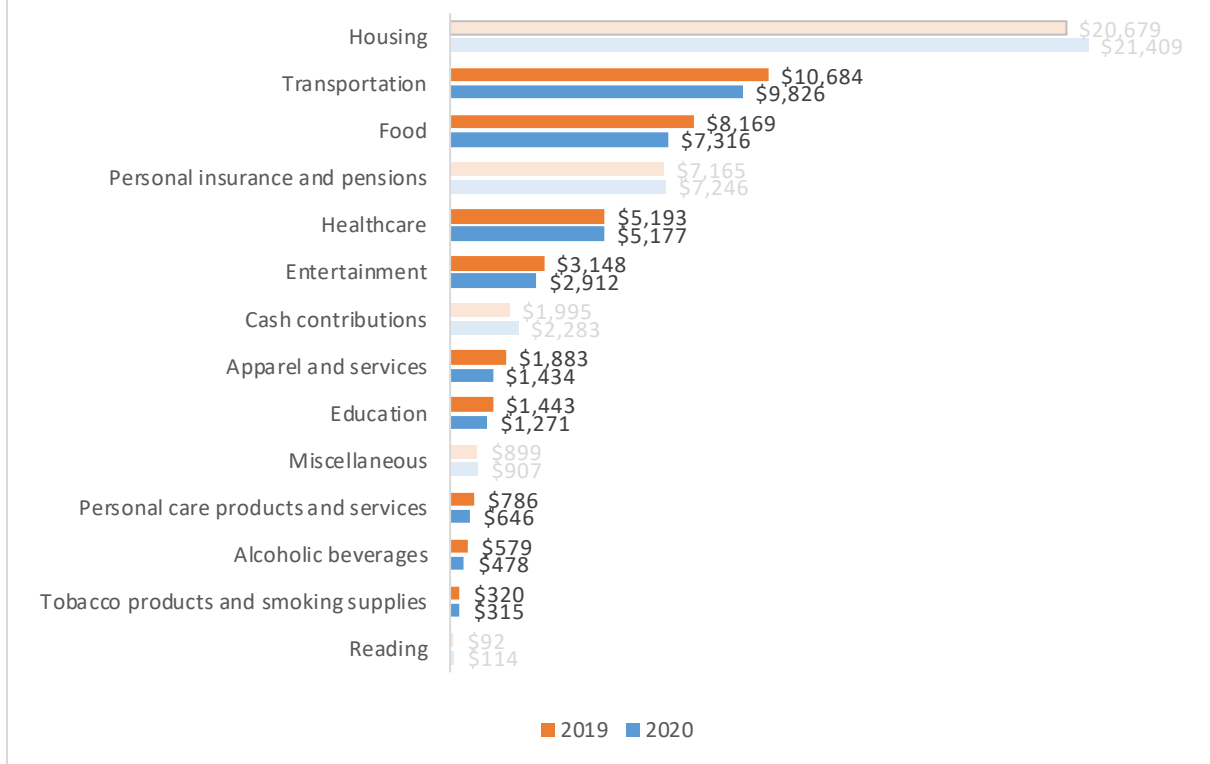
at home spending in the CE showed a much stronger correlation with PCE than it did in quarter 2 of 2020.



Expenditure Mean and Variance Estimates

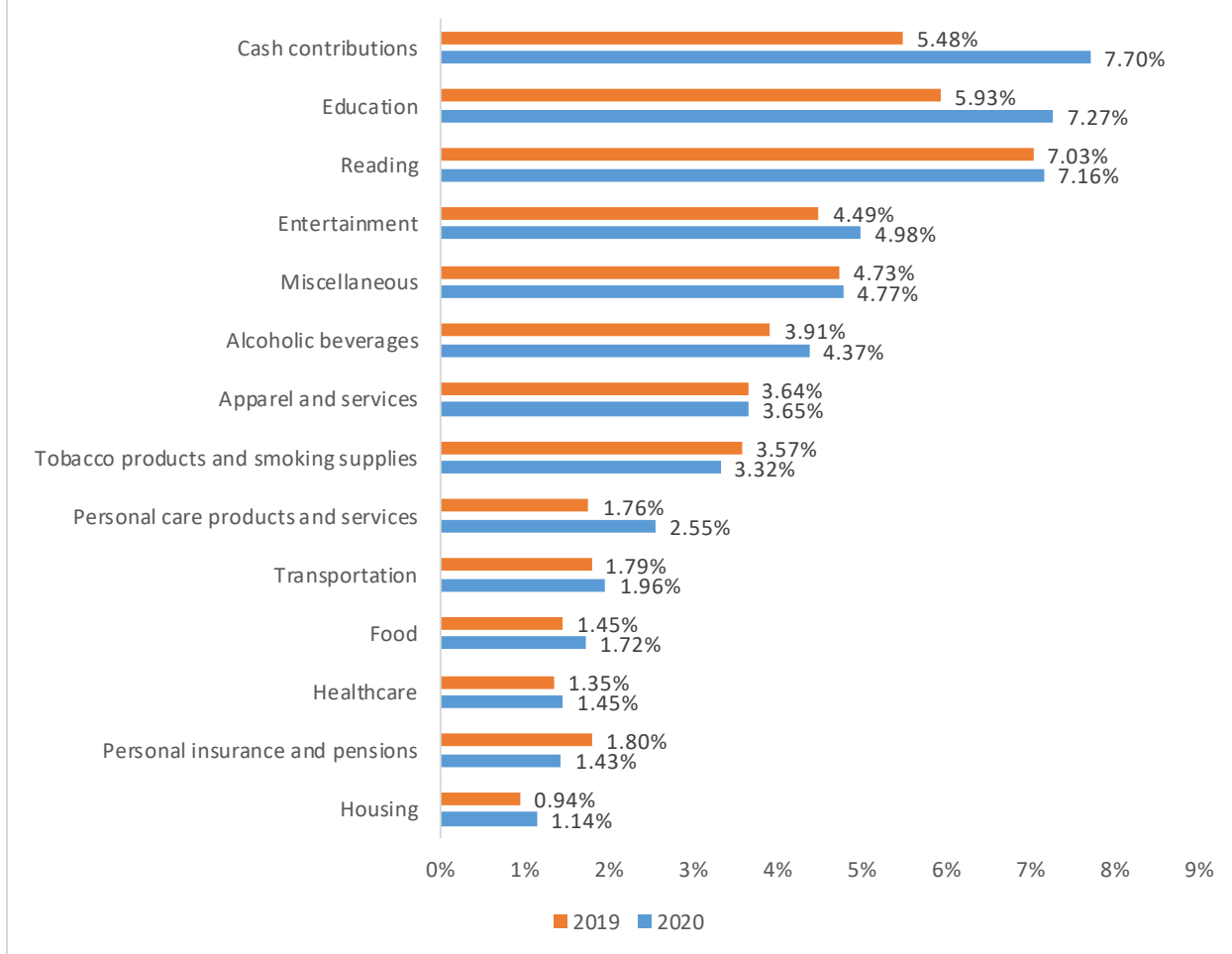
As noted in the [2020 Annual News Release](#), the CE program observed several notable changes in the major expenditure categories. Of the 14 major spending categories, only five showed an increase over the previous year's estimate, leaving nine categories that showed declines over the same period. Chart 4 below depicts the average annual means for 2020 and highlights those expenditures that saw declines when compared to 2019. The decreases in 2020 for food and alcoholic beverages in the annual estimates were still primarily associated with away from home purchases for these two categories. Food away from home experienced a reduction in expenditures of nearly 33 percent. For alcoholic beverages, the away from home spending dropped 44 percent.

Chart 4: Average annual expenditures, Consumer Expenditure Surveys, 2019 & 2020



The CE staff also looked at the year-over-year change in variance in the CE data for 2020 and compared those estimates with the previous year's results. By looking at the annual relative standard error of the mean (RSE) specifically, defined as the ratio of the standard error of an expenditure to its mean, one can establish if estimates were associated with a larger degree of sampling error. As seen in Chart 5 below, of the 14 major spending categories, only two, education and cash contributions, showed an increase in RSE greater than one percentage point in 2020. Users should continue to be mindful of the variance measures associated with each underlying expenditure as some expenditures, particularly those with low percent reporting, are more susceptible to larger variance. For more information on how to interpret the various measurements of variance provided in the CE tables, please see [How does the variability of Consumer Expenditure data impact your analysis?](#)

Chart 5: Relative standard errors, Consumer Expenditure Surveys, 2019 & 2020



Conclusion:

Much like other surveys that depend on in-person data collection, the effect of the pandemic on the CE program resonates throughout all aspects of development, from data collection and processing to estimation and dissemination. Respondent sentiment paired with changes in contact methods attributed to declines in response and ultimately sample during this period, and while introducing alternatives to in-person data collection and expanding the sample did fuel some recovery, neither fully recouped the sample to pre-2020 levels. As a result, estimate reliability was negatively impacted as indicated by the variance measures noted above. These factors should be considered by users as there is a greater potential for measurement error associated with the 2020 data and products provided by the CE program. Users interested in gaining more knowledge surrounding the data quality for 2020, can reference the [2020 Data Quality Profile](#).

While the effects of these changes in data collection can be seen in survey response, sample size, and estimate reliability, the quick actions among BLS and U.S. Census Bureau staff to quickly react and adjust

procedures allowed for the uninterrupted continuation of data collection, enabling the study of consumer spending behavior during such a unique and important time in history.

Experiences from this pandemic have helped shape contingency plans to combat collection and data quality issues in the event such a situation presents itself again. Collaboration between the BLS and the U.S. Census Bureau has helped frame best practices regarding collection and processing.

The CE program will continue to analyze the impact of COVID-19 on the [\(public use microdata files \(PUMD\) and tables](#). For further information, contact the Consumer Expenditure Surveys, Office of Prices and Living Conditions at (202) 691-6900, or by email at cexinfo@bls.gov. CE program staff are available Monday through Friday to respond to inquiries. To be notified when new products are available, please [sign up for updates](#) by creating an account and selecting Consumer Expenditure Survey Update within the list under Notifications.