



Improving the cost-of-living measure for older populations: some recommendations

By Anya Stockburger

On June 16, 2020, the Government Accountability Office (GAO) released a report titled “Retirement Security: BLS Should Explore Ways to Improve the Accuracy, Timeliness, and Relevance of Its Cost-of-Living Measurements.” The report was prepared in response to a request from the House of Representatives Committee on Education and Labor to “review U.S. and international efforts to measure the cost of living for older populations.” The report’s authors recommended that the Bureau of Labor Statistics (BLS) explore the use of National Accounts data to improve the calculation of the Consumer Price Index (CPI) and assess the data sources used to calculate the CPI for older populations. This Beyond the Numbers article summarizes GAO findings and BLS responses.

CPI background

The CPI measures the change in the cost of the set of goods and services purchased by consumers, which is called the market basket, from one time period to the next. A cost-of-living index, alternatively, would measure the change in the cost of attaining a certain standard of living between two time periods. It is not possible to directly measure the standard of living of consumers, so the market basket approach is the best feasible proxy of a cost-of-living index.

The CPI market basket is updated every 2 years based on consumer spending information captured in the Consumer Expenditure Surveys (CE). Every month, the Census Bureau (on behalf of BLS) collects detailed expenditure information from consumers in the cities that are selected to represent the U.S. urban population. The design of the CE fully supports the needs of BLS to produce statistics on consumer spending and to construct weights for CPI calculation.¹ Every year the CE Interview Survey generates about 20,000 interviews and the CE Diary Survey generates about 10,000 diaries.² BLS gathers 2 years of CE Interview and Diary Survey data to ensure that the CPI market basket is constructed with an adequate sample size for each of the more than 7,000 groupings of goods and services in selected cities used in the calculation of the CPI, such as bananas in Boston, MA, and car repair services in San Francisco, CA.

There is a lag between the time when participants in the CE make a purchase, and when the market basket formed on those expenditures is used in the calculation of the CPI. As shown in exhibit 1, this lag between the consumer spending and the index reference periods can be as little as 14 months to as long as 5 years. On average, the lag is 3 years. If consumers change their spending behavior during the 3-year lag period, then the market basket used to measure price change may not be as relevant as it would be with a current market basket. The COVID-19 pandemic provides many good examples, such as consumers eating at home more and at restaurants less in 2020 than they did in 2017. Even in nonpandemic times, consumers may shift their spending habits, for example, by purchasing more online streaming services and less cable and satellite television services.

Exhibit 1. A snapshot of the CPI timeline: the lag between consumer spending and market basket formation, 2017–21.

CE respondents make purchases (expenditure reference period). Data collection and processing begins.		Data collection continues for the first few months of 2019. Data processing continues through the end of the year.		CPI measures price change using 2017–18 market basket (index reference period).	
2017	2018	2019		2020	2021
Source: U.S. Bureau of Labor Statistics, Consumer Price Index.					

As exhibit 1 shows, about half of the lag is a result of using 2 years of CE data to form the market basket. Some goods and services are infrequently purchased, such as new vehicles or funeral services. Compiling data over 2 years is necessary to ensure there is an adequate sample of expenditures to assemble an accurate market basket for the CPI. A smaller sample of expenditures could improve the timeliness of the market basket, but potentially decreases its reliability and accuracy.

Exhibit 1 also shows that the other half of the lag results from BLS using the market basket in index calculation for 2 years. Each time the market basket is updated, it creates an opportunity for spurious changes to be introduced into the index. For example, imagine updating the market basket every month for fresh fruits and

vegetables. When strawberries are in season and plentiful, their prices are generally lower, and consumers buy more. When strawberries are out of season and more scarce, their prices generally rise, and consumers buy fewer. In this example, strawberries have a greater importance in the market basket during months when the price is declining and less importance in the market basket during months when the price is increasing. Even if spending and prices return to the same level, this frequent market basket update would lead to a long-term measure of price change that is not reflective of the true rate of price change.³ This is referred to in the price index literature as chain-link bias and is another example of the tradeoff between relevancy of the market basket and accurate measures of price change.

GAO recommendation: use national accounts data

The GAO recommended exploring the use of national accounts data in order to improve the relevancy of the CPI market basket. The National Income and Product Accounts are produced by the Bureau of Economic Analysis (BEA) and include Personal Consumption Expenditures (PCE), a measure of consumer spending. Rather than collecting data from consumers directly, the PCE collects data from businesses. These establishments provide information about spending by consumers and spending by other entities on behalf of consumers. For example, the data include employer-provided healthcare benefits, which is a key difference in scope between the PCE and CE.

BLS and BEA staff have extensively studied the differences in expenditure estimates between the two data sources.⁴ The differences are useful to examine issues of underreporting in CE, such as when estimates of consumer spending on cigarettes and alcohol are lower when reported by consumers versus retailers. The differences can also be useful to assess the performance of the many assumptions and methods used to arrive at PCE estimates. Additional information on the many data comparisons conducted by BLS since 1990 is available on the [CE expenditures to the Personal Consumption Expenditures \(PCE\) webpage](#).

The research comparing CE and PCE estimates of consumer expenditure data is beneficial to both BLS and BEA, but it is not clear that one source of data is a more accurate measure of all consumer goods and services. Each estimate is designed to measure consumer spending from a different perspective. Moreover, each has sources of measurement and sampling error. BLS concludes that using PCE data would not clearly improve estimates of CPI market basket shares without introducing other errors.

The GAO findings also imply that using the PCE in place of the CE could improve the relevance of the CPI market basket by reducing the lag time between the expenditure and index reference periods. Again, the gains in relevance must be weighed against issues of accuracy. Also, it is not necessary to change the source of market basket data in order to reduce the difference between reference periods. It is possible to reduce the reference period lag without switching sources simply by using less CE data or updating CPI market baskets more frequently. However these changes would reduce the CE sample size, which could sacrifice accuracy and increase the opportunities for spurious index movements. Finally, using national accounts data in place of the CE would run counter to international guidance and best practices as outlined by the International Labor Organization's manual on CPI calculation.⁵ The manual recommends using national accounts data when household survey data are not available in a continuous and timely manner, which the CE data are.

GAO recommendation: evaluate data sources for subpopulations

GAO also recommended BLS evaluate the data sources used to measure price change for subsets of the population because these data sources were not designed for this use. BLS produces a CPI that reflects the spending patterns of urban consumers. This index is called the CPI-U. BLS also calculates subpopulation indexes based on subsets of the urban population, such as households with members older than 62 years of age (CPI-E) and households working full time in certain wage-earning or clerical occupations (CPI-W). Except for the market basket shares, the data used as inputs in calculating subpopulation indexes are the same as those used in calculation of the CPI-U index. The prices that are tracked over time by the CPI are for a representative sample of goods and services for each component of the market basket. For example, women's clothing accounts for approximately 1 percent of the total market basket. In each of the 75 cities sampled to represent the urban population, there is a sample of stores selling items such as dresses, shirts, or other products within the category of women's clothing. At each store, a specific article of clothing is selected and tracked over time.

All of the sampling steps (selecting cities, stores, specific items, and the price at which that item is sold) are performed for the urban population. If the goal of a subpopulation index is to measure the price change faced by a subset of the population (e.g., older Americans), then the cities, stores, and items chosen during these sampling steps may not be representative of the purchasing patterns of the subpopulation. For example, cities with relatively older populations would have a greater chance to be included in a CPI-E sample than they would in a CPI-U sample. There could also be differences in the types of stores at which older Americans shop, relative to the stores patronized by other generations. Once in those stores, the older population might purchase systematically different items or pay different prices for those items.

The wage earner (CPI-W) population was the target population of the CPI before BLS made a revision in 1978. When the urban population was introduced that year as the new population target, BLS maintained a separate sample of stores, items, and prices for the CPI-W and CPI-U populations. A few years later, BLS eliminated the separate samples for the CPI-W population because of a budget cut. It was also noted at the time that there was little difference between the two samples.

We, at BLS, have been limited in our ability to assess the impact of these drawbacks on the measurement of price change for subpopulations. However, one issue that we have studied, to some extent, is whether different age groups shop at different stores. The list of stores BLS compiles for a sample also contains demographic information, and we explored overlap in stores reported by different demographic groups. BLS found nearly complete overlap in the top 50 stores reported by comparison groups across race, age, and ethnicity. The age comparison group was focused on the younger cohort (less than 35 years old) rather than the older population, but the results suggest that there is little variation in the stores frequented by different segments of the population within a city.⁶

As for the other drawbacks, BLS does not have data to assess the measurement error associated with using the same sample of unique items and the same set of prices for all categories. The GAO report suggests there may be data sources available that could be used to answer this question for certain categories of items. As data sources are identified and become available, BLS will use them to investigate these questions. However, without a broad investigation, BLS would likely retain the research status for the subpopulation indexes.

Improving the relevancy of the market basket and subpopulation index methodology

Based on research conducted since the 1990s, BLS does not agree with the GAO recommendation to explore the use of national accounts data in order to improve the relevancy of the CPI market basket. Instead, BLS is focusing on changes that will decrease the lag between the time when participants in the CE make a purchase, and when the market basket formed on those expenditures is used in the calculation of the CPI. Research is currently underway to investigate whether updating the market basket every year would improve the accuracy of the CPI. BLS is also investigating efficiencies that could reduce the time needed to process CE data. These improvements retain the CE as the optimal and most relevant data source to calculate the CPI market basket.

BLS agrees with the GAO recommendation to evaluate the data sources used to measure price change for subsets of the population because the data sources were not designed for this use. Although BLS does not have the data necessary to fully conduct this evaluation, BLS has contracted with the Committee on National Statistics (CNSTAT) who may be able to assist in identifying new data sources. CNSTAT is conducting a [consensus panel study](#) on improving cost-of-living indexes and consumer inflation statistics in the digital age. This study is expected to be completed in 2021. As part of its tasks, the panel will assess the prospects for creating new inflation products that would present information about prices paid and spending for goods and services by subsets of the population.

To calculate a better measure of the inflation experience for subgroup populations, BLS is researching two improvements to the methodology used to calculate market basket shares: a payments approach versus the traditional rental equivalence for owner-occupied housing, and a different way to average price change across households. Both improvements have been prioritized in the international federal statistical community.⁷ The payments approach reflects homeownership expenses of subgroup populations better than the rental equivalence approach. Averaging price change across households prevents high-income households from contributing more to a resulting index than low-income households. This research is expected to conclude in 2021, at which point, BLS will assess whether to implement changes in the future.

BLS will continue to improve the accuracy, timeliness, and relevancy of consumer inflation measures for the target urban population, as well as subgroup populations. BLS will monitor CE data quality, including making comparisons to national accounts data, explore new data sources as they become available, and continue researching new methodologies to improve price change measurement within existing data constraints.

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NOTES

¹ Since BLS cannot observe all consumer transactions in the economy, it relies on surveys to gather data necessary to measure price change. For example, BLS methods may select 50 different pairs of men's pants in Washington D.C. that are sampled to represent all men's pants in the city. The CE estimates how much consumers spend on men's pants in Washington D.C. The CPI uses estimates of consumer spending to calculate weights. BLS calculates a total measure of price change in the United States by calculating a weighted average of price change of men's pants in Washington D.C. with other consumer goods and services across the country.

² The CE Interview and Diary surveys are household surveys where Census employees visit respondents in their home or via telephone to obtain information. Respondents answer a series of questions in the Interview survey designed to capture larger expenses over the prior 3 months. Respondents fill out a daily diary of purchases in the Diary survey designed to capture smaller expenses.

³ Greg Kurtzon suggests imagining the prices of two goods with equal expenditure shares "bouncing" between two periods, with the price of each good either \$1 or \$2 in every period, generating a price relative of 2 or 1/2. In this situation, there is no long-term inflation, but, as Kurtzon states, "this index relative would give an inflation rate of $1/2(2 + 1/2) = 1.25$, or 25% inflation every period." Greg Kurtzon, "How Much Does Formula vs. Chaining Matter for a Cost-of-living Index? The CPI-U vs. the C-CPI-U," 2017, <https://www.bls.gov/osmr/research-papers/2017/ec170060.htm>.

⁴ For example, see Clinton P. McCully, Brian C. Moyer, and Kenneth J. Stewart, "A Reconciliation between the Consumer Price Index and the Personal Consumption Expenditures Price Index," September 2007, <https://www.bea.gov/system/files/papers/P2007-4.pdf>.

⁵ ILO/IMF/OECD/UNECE/Eurostat/The World Bank, "Consumer price index manual: Theory and practice," Geneva, International Labour Office, 2004, https://www.ilo.org/wcmsp5/groups/public/---dgreports/---stat/documents/presentation/wcms_331153.pdf Paragraph 1.194, page 23.

⁶ Office of Information and Regulatory Affairs, General Services Administration, "Attachment F Nonresponse Bias Analysis," 2013, https://www.reginfo.gov/public/do/PRAViewDocument?ref_nbr=201308-1220-004.

⁷ For example, the Office of National Statistics (ONS) in the United Kingdom recently developed a set of Household Cost Indices (HCI), designed to supplement its primary measure of consumer price inflation. The HCI is another index product that has a number of methodological changes relative to their other indexes. <https://www.ons.gov.uk/economy/inflationandpriceindices/methodologies/householdcostsindicesmethodology>.

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