

GAO

Report to the Ranking Minority Member,
Committee on Banking and Financial
Services, House of Representatives

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CONSUMER PRICE INDEX

More Frequent Updating of Market Basket Expenditure Weights Is Needed



General Government Division

B-275450

October 9, 1997

The Honorable Henry B. Gonzalez
Ranking Minority Member
Committee on Banking and Financial Services
House of Representatives

Dear Mr. Gonzalez:

The principal source of information on trends in consumer prices and inflation in the United States is the Consumer Price Index (CPI), according to the Bureau of Labor Statistics (BLS), which publishes the index.¹ In fiscal year 1996, about \$656 billion of federal tax receipts and \$458 billion in federal spending were automatically linked to price changes measured by the CPI. The CPI tracks prices for a fixed “market basket” of goods and services that people buy for day-to-day living. Since 1940, BLS has made major revisions to the market basket about once a decade to reflect changes in what consumers buy.²

This report responds to your request that we examine certain questions surrounding the issue of revising the market basket more often. As agreed with your office, rather than evaluating possible alternatives to the CPI’s basic formula or examining the whole process of making major revisions to the CPI,³ we focused on the market basket’s expenditure weights and whether they could be updated between major revisions to the CPI.⁴ Historically, the expenditure weights have been changed only during major CPI revisions. Unlike in a major revision, the principal task in an update would be to change—make more current—the expenditure weights that had been determined during the last major revision. In a revision, BLS has usually changed (1) the CPI’s geographic areas and housing samples, which reflect where consumers live and buy goods and services; (2) the computer systems for processing these data; and (3) the

¹BLS is a part of the U.S. Department of Labor.

²There has not been a uniform number of years between major revisions to the CPI’s market basket. Although a revision was made each decade, the number of years between revisions ranged from 9 years to 14 years for the four revisions that occurred since 1940.

³A commission chartered by the U.S. Senate has proposed an alternative formula that is intended to make the CPI more reflective of the cost of living. We present information later in this report about the alternative, which is referred to as a superlative index.

⁴Weights allow BLS to specify the importance of the items included in the CPI market basket and provide appropriate emphasis to the price changes associated with those items. For example, if ground beef were assigned a weight representing about one-third of 1 percent of the expenditures of the typical urban consumer and if sirloin steak were assigned a smaller weight representing less than one-tenth of 1 percent, then the price changes of ground beef would have about 3 times as much impact on the overall CPI as similar price changes for sirloin steak.

expenditure weights of the market basket items. (App. II provides additional information on how the CPI is constructed and on how weights are calculated.)

As agreed more specifically, we focused on the market basket's expenditure weights by (1) obtaining the views of individuals who were knowledgeable of the CPI on updating the weights between major revisions to the CPI and the practices followed by other industrialized countries in updating their consumer price indexes, (2) estimating the additional cost to BLS to update the weights on a 5-year cycle,⁵ (3) estimating the dollar effect on the federal budget if the weights were updated on a 5-year cycle, and (4) identifying and assessing BLS' reasons as to why updates of the weights have only occurred during major revisions to the CPI, which have been about every 10 years.

Results in Brief

The weight of professional opinion supported updating the market basket's expenditure weights more frequently than major revisions to the CPI have been made. We spoke with 10 individuals who were knowledgeable about the CPI, and they were unanimous in believing that 10 years between updates was too long to reflect "current" consumer spending. Two of the 10 individuals were former BLS officials, and the 8 others had conducted research on the CPI, including 4 who were members of the Advisory Commission to Study the Consumer Price Index (hereafter called the Boskin commission).⁶ There was less agreement among the 10 individuals, however, on exactly how often updates should occur. Five of them, including the four Boskin commission members with whom we spoke, said more frequent updating of expenditure weights was less important than other ways of making the CPI more reflective of current consumer spending.

Other major industrial countries update their consumer price indexes more often than the United States, according to information provided by BLS and contained in international publications. Of the six industrial countries that together with the United States have made up the Group of

⁵The Price Statistics Review Committee suggested, in 1961, that the more volatile categories of the market basket's expenditure weights be updated at 5-year intervals. This committee was formed under a contract between the Bureau of the Budget—the predecessor of the Office of Management and Budget—and the National Bureau of Economic Research. Although more than 35 years have passed, the committee's work is still recognized as an important study of the CPI.

⁶The Advisory Commission to Study the Consumer Price Index was chartered by the U.S. Senate. The five-member advisory commission issued a report, in December 1996, to the Senate Committee on Finance titled *Toward a More Accurate Measure of the Cost of Living*. The advisory commission was chaired by Michael J. Boskin, and it was referred to as the Boskin commission.

Seven countries (G-7),⁷ two updated the weights of their consumer price indexes annually, and the other four did so approximately every 5 years. However, BLS officials noted that some of these countries based their updates on national data that are not comparable to data used by the United States; for example, some countries have not collected expenditure data directly from consumers.

The cost of updating the expenditure weights is significantly less than the cost of a major revision. For the purposes of estimating costs in this report, we assumed that an update to the expenditure weights would occur in 2003, which would be 5 years after the planned revision in 1998. BLS estimated that the cost to update the weights in 2003 would be about \$3.1 million. In comparison, BLS estimates that it will spend about \$66 million on the upcoming 1998 revision.

Because federal tax brackets and federal payments, such as those to Social Security beneficiaries, are adjusted for inflation, a CPI that more accurately measures inflation could affect the federal budget. BLS estimated the range of change in the CPI, if the expenditure weights were updated on a 5-year cycle, from 0 (zero)—no change—to a decrease of 0.2 percentage point. We asked the Congressional Budget Office (CBO) to use the midpoint of BLS' range (0.1 percentage point) to estimate the effect on the federal budget. CBO estimated that, assuming no other changes in policy or economic assumptions, if updating the weights in 2003 (5 years after the planned 1998 revision) reduced CPI growth by 0.1 percentage point annually, the projected budget surplus would be increased by a cumulative total of \$10.8 billion over the 4-year period of 2004 through 2007.

BLS cited several reasons for not updating the expenditure weights between major CPI revisions. The foremost reasons, according to BLS, were a lack of empirical evidence to support more frequent updates and a void of theoretical guidance on how often to do them. BLS' other reasons were difficulties in obtaining funds to bring about change to the CPI and concern with what would be the best approach to improve the CPI. In the past, data availability was also cited as a reason, but data collection improvements have since addressed this problem.

Although theoretical guidance is not available on all facets of updating expenditure weights, such as exactly how often updates should occur, the preponderance of the data we reviewed supports the need for updating

⁷The United States, Japan, Italy, Germany, France, Canada, and the United Kingdom have made up the G-7 countries that have met to coordinate economic and monetary policy.

expenditure weights more frequently than about every 10 years. Recognizing that the data are not perfect and do not isolate the effects of using outdated expenditure weights, comparisons of price indexes with old and new weights that go back to those made for the first revision in 1940 indicate that price indexes computed with more current weights were always different from indexes computed with older weights. In addition, these comparisons and more recent research conducted by BLS tend to show lower rates of inflation with indexes using newer weights.

BLS' concerns about updating the expenditure weights between major revisions were indicated in June 1997, when BLS officials said that BLS has the technical ability to update the expenditure weights, but it must work through the challenging issues that now surround the CPI program. In August 1997, the BLS Commissioner said, in commenting on a draft of this report, that she supports updating the expenditure weights more frequently and that BLS was in the process of developing a new updating policy. As part of the process of developing this policy, the Commissioner said BLS was studying a number of related practical questions and would seek the advice of its advisory councils.

Background

The CPI measures the change in prices of a fixed market basket of goods and services purchased directly by urban consumers. These purchases are for food, clothing, shelter, fuels, transportation, medical care, entertainment, and other goods and services that people buy for day-to-day living. Only expenditures made by consumers are captured in the CPI.

The CPI is used by the federal government, businesses, labor organizations, and private citizens. According to BLS, the CPI is used as an economic indicator of inflation; an escalator for wages, income payments, and tax brackets; and a deflator of selected economic statistical series. For example, through collective bargaining contract negotiations in 1996, 1.7 million workers had their wages raised on the basis of changes in the CPI. As a result of changes in prices as reported in the CPI in 1996, 43.5 million Social Security beneficiaries⁸ and 25.8 million food stamp recipients had their benefits increased for inflation in 1996.

According to BLS, to construct the CPI, the prices of more than 94,000 items are collected each month (e.g., margarine sold in tubs, sticks, or squeeze

⁸Automatic adjustments of Social Security benefits, which are based on increases in the CPI, began in 1975 (42 U.S.C. 415(i)).

bottles) and aggregated into 206 “item strata” (e.g., fats and oils). In making the monthly calculations, according to BLS, weights are used to give proportionate emphasis for price changes of one item in relation to other items in the CPI.

According to BLS, two sets of weights are computed from different sources of information. BLS computes one set of weights from the Consumer Expenditure Survey (CEX) data. These weights, which are the focus of this report, are used to aggregate the 206 item strata into the overall index number for the CPI. In this report, we refer to this first set of weights as “expenditure weights.”

The second set of weights is derived primarily from information taken from the Point-of-Purchase Survey (POPS).⁹ These weights, which we term “point-of-purchase weights” in this report, are used to combine the prices of the 94,000 items into the 206 item strata. In other words, the point-of-purchase weights are used to aggregate the prices of the individual items into the 206 item strata and provide the base to which the expenditure weights are applied to calculate the CPI.

The two sets of weights are updated at different time intervals. BLS began to publish the CPI regularly in 1921 and has changed expenditure weights only when making major revisions to the CPI. These major CPI revisions occurred in 1940, 1953, 1964, 1978, and 1987; another revision is scheduled for 1998.¹⁰ BLS instituted the POPS in 1978. All of the point-of-purchase weights are scheduled to be updated over a 5-year period, according to BLS.

The CPI is often referred to as a cost-of-living index and is used to reflect the cost of living to adjust, for example, federal income tax brackets and some federal payments. Although some elements of the CPI reflect cost-of-living concepts, the CPI was not designed to be a cost-of-living index. As usually defined, a cost-of-living index would be broader in coverage than an index that is based on consumer expenditures. BLS has said through the years that the CPI is not a cost-of-living index. To date, the

⁹The CEX is used to gather data from consumers to ascertain what goods and services they are purchasing; the POPS is used to gather data from consumers to find out where they shop for goods and services. According to BLS, it constructs weights and selects outlet samples from sources other than the POPS for a relatively small number of item categories.

¹⁰The 1987 revision was based on CEX data collected in 1982 through 1984. The planned 1998 revision will be based on CEX data collected in 1993 through 1995. In this report, we refer to the year of the introduction of the change of expenditure weights (e.g., 1987) rather than to the base years used to establish the weights (e.g., 1982-84). We are using the year of introduction as the reference point when we refer to a 5-year update (e.g., 1992 update).

federal government has not developed a comprehensive cost-of-living index.¹¹

In 1961, the Price Statistics Review Committee (hereafter called the Stigler committee for its chairman, George Stigler) recommended that the conceptual framework of the CPI be modified to represent a cost-of-living index. It also supported comprehensive revision of CPI weights at least once every decade and suggested that the more volatile categories of CPI weights be updated at least once every 5 years. The BLS Commissioner in 1961 agreed that the CPI should be revised every 10 years. Although the Commissioner agreed with the suggestion to update CPI weights more often, he cited some obstacles that he thought, at the time, would preclude BLS from doing so. We discuss these obstacles later in this report in the section on BLS' reasons for not updating expenditure weights more often.

In reporting to Congress in December 1996, the Boskin commission said its overarching recommendation was that BLS establish a cost-of-living index as its objective in measuring consumer prices. The Boskin commission concluded that the CPI overstates inflation because of four sources of bias: substitution bias,¹² new products bias, quality change bias, and new outlets bias.¹³ The commission further subdivided substitution bias into what it termed lower-level bias and upper-level bias. The lower-level bias concerns the aggregation of the prices of the individual items,¹⁴ and the upper-level bias concerns the 206 item strata, which are the subject of this report.

To address upper-level substitution bias, the Boskin commission recommended that the fixed market basket CPI be abandoned and replaced with two new formulas that would enable the CPI to more closely reflect

¹¹For additional information about how the CPI measures the cost of living, see our report, Consumer Price Index: Cost-of-Living Concepts and the Housing and Medical Care Components (GAO/GGD-96-166, Aug. 26, 1996).

¹²Relative to a cost-of-living index, substitution bias gives increasing importance to items in the CPI with higher-than-average price increases. For example, this bias occurs when consumers purchase cheaper chicken for beef when the price of beef rises. In this illustration, the CPI overstates inflation because it continues to track the price of beef, which consumers would have no longer purchased, rather than the price of chicken, which consumers would have substituted for beef. A downward bias can also occur when consumers are driven to purchase more expensive substitutes, which can occur, for example, during wars and mandatory price controls.

¹³The Boskin commission estimated that the CPI overstated inflation by 1.1 percentage point. The commission attributed 0.4 percentage point to substitution bias, 0.6 to new products and quality change biases, and 0.1 to new outlets bias.

¹⁴In April 1997, BLS began publishing an experimental CPI that addresses the lower-level substitution bias by using a different formula to aggregate the 94,000 individual items into the 206 item strata.

the cost of living. One formula, according to the commission Chairman, would be a true superlative index; the other formula would be a modified superlative index.¹⁵ A superlative index, by definition, would continually change the market basket to reflect current consumer spending.¹⁶ BLS has requested funding for fiscal year 1998 to continue the fixed market basket CPI and to publish a CPI with a superlative index formula in 2002. Since the fixed market basket CPI would continue to be published, the discussion on how frequently to update the expenditure weights is pertinent.

Scope and Methodology

To obtain opinions on updating the CPI expenditure weights more often, we asked two former BLS officials and eight others who were knowledgeable about the CPI how often the weights should be updated. The eight other individuals had conducted research in connection with the CPI: four of the eight individuals were members of the Boskin commission, two were academicians, one was employed by a major economic research institution, and one was a member of the Stigler committee. (App. I describes how we selected these eight individuals.) To obtain information on the practices followed by other industrialized countries in updating their consumer price indexes, which also addresses our first objective, we obtained information from BLS and from publications of the Organization for Economic Cooperation and Development and the Canadian government on how often G-7 countries update their CPIS.

To estimate the cost to BLS of updating the expenditure weights for the CPI on a 5-year cycle, we asked BLS to provide us with certain actual and estimated cost data. We asked BLS to provide us with the costs associated with the 1987 revision and the projected costs for the 1998 revision. In addition, we asked BLS for its estimate of what the costs would have been to update the CPI in 1992 and its estimate of what the cost might be to update the CPI in 2003. We did not specify to BLS what assumptions to make or what items to include or exclude in estimating the costs for 1992, 1998, and 2003. We also did not evaluate the reasonableness of BLS' assumptions or estimates. BLS provided us with costs for the 1987 revision and estimated costs for the 1998 revision and a 2003 update of the CPI. BLS suggested that the cost for a 1992 update could be derived by deflating the

¹⁵The Boskin commission's report did not use the term "modified" superlative index. However, in our discussion with the Chairman, he agreed that one formula was not a true superlative and could be referred to as a modified superlative index. We use this term throughout this report.

¹⁶A superlative index formula is described in appendix IV. The CPI is constructed with another formula, which holds the market basket of goods and services constant until a revision or update of the expenditure weights. That formula is described as well in appendix IV.

cost of the 2003 update, which we did with the Gross Domestic Product (GDP) price index.¹⁷

To estimate the dollar effect on the federal budget if the expenditure weights for the CPI were updated on a 5-year cycle, we obtained assistance from BLS and CBO, which analyzes budget-related issues and provides cost estimates for legislative proposals to Congress. We asked BLS to provide a range—an upper percentage point and a lower percentage point—of the possible change that would occur to the CPI with a 5-year update.

We asked CBO to estimate the effect that a 5-year update of the CPI would have on the federal budget, assuming no other changes in tax or spending levels and no other changes in the economy. To do this, we asked CBO to use BLS' lower and upper estimates of change and the midpoint of these estimates. To illustrate the effect of a 5-year update that would begin in 2003, we asked CBO to make projections for the years 2003 through 2007 as it normally would and then to do a reestimation after adjusting for the effects of a 5-year update.¹⁸

CBO's policy is to provide projections for current and future years, but not to provide estimates for past years. For that reason, we estimated how the federal budget might have been affected if the expenditure weights had been updated in 1992, which was 5 years after the 1987 major revision. In making our estimates, we used CBO's estimates for 1998 through 2007 to backcast to 1992. In doing so, we assumed that the trend that was used for the years 1998 through 2007 could be reasonably applied to the years 1993 through 1998. We discussed the methodology we used in making the estimates with CBO officials, and they said that the methodology we used and the results we obtained were reasonable.

In connection with impact on the federal budget, as requested by your office, we asked the Chief Actuary of the Social Security Administration (SSA) to estimate the effect a change in the CPI would have on the average benefit paid to retired workers. To make the estimate, we asked SSA to use the midpoint of BLS' range of possible change that would occur to the CPI with a 5-year update. Using that midpoint percentage point and economic assumptions used in the President's Fiscal Year 1998 Budget, SSA estimated

¹⁷The GDP price index, which is determined by the Bureau of Economic Analysis of the Department of Commerce, can be used to adjust dollar amounts into inflation-adjusted dollars.

¹⁸CBO made projections for 1998 through 2007, which is a 10-year period. CBO does not make projections beyond a 10-year time frame. In estimating the effects of a CPI update on the federal budget, CBO reduced its projected rate of inflation, as measured by the CPI, by the lower and upper estimates provided by BLS and by the midpoint of that range.

the change in the average monthly benefit check for retired workers, beginning with December 2003, which would be payable in January 2004, and continued through December 2007.

To identify and assess why updates to the CPI weights have been spaced 10 years or so apart since 1940, we talked with present and past officials of BLS and obtained their views on the reasons for this spacing. We also reviewed the 1961 congressional testimony of a BLS Commissioner in which he addressed the subject of BLS' timetable for revising the CPI. In our assessment, we (1) collected and analyzed information on past comparisons between indexes that applied old and new expenditure weights, (2) obtained information on how BLS collects its source data for the CPI, (3) reviewed BLS budget information to ascertain BLS' plans for future changes in its indexes, and (4) compared the estimated costs and benefits of a 5-year update to place an update in practical perspective.

In our assessment, most of the comparisons between indexes with old weights and indexes with new weights probably reflected differences that were not due to changes in the expenditure weights alone. Some of the indexes we used were produced by BLS for "overlap" periods. When major revisions to the CPI were made, BLS calculated two indexes for several months. One index used the weights that had been in effect before the revision, and the second index used the new weights that were created for the revision. However, during a revision, many factors can and do change. For example, the geographic locations where data are collected are changed to some extent as are the items of goods and services in the market basket. Therefore, the differences that may result from comparing the two indexes may be due to several factors, and the effects of changes to the expenditure weights cannot be isolated from the effects of other changes to the index data.

With this knowledge, we treat the differences as indicators of the effects of an update of the expenditure weights because an update of the weights is unlikely to occur in isolation from the other factors that are associated with revisions. For example, a 1992 update would have most likely incorporated a market basket that was based on different geographic areas than the areas that were used in the 1987 revision because, in 1986, changes were made in the geographic locations where expenditure data were collected. Such geographic changes are associated with major revisions.

In addition to overlap studies, we examined the effect of the age of weights with indexes that were calculated with alternative base-year periods. For example, comparisons were made of the official CPI's 3-year base of 1982 through 1984 with alternative 3-year base periods (i.e., 1987 through 1989). In these and other comparisons, we applied an economic concept that is based upon economic literature that suggests that an index is more accurate if the expenditure weights used to compute it represent, as much as practical, current consumer spending.¹⁹ However, in our review of economic literature, we did not identify any theoretical guidance on how often (e.g., 5 years as compared with 10 years) expenditure weights should be updated. (See app. I for more information about our objectives, scope, and methodology.)

As previously reported in this section, this report includes, and often relies on, estimates and comparisons prepared by BLS, CBO, or SSA.²⁰ We did not verify the computerized data that the agencies used in producing these estimates and comparisons. Verification, in our opinion, would have been impractical because it would have been costly and time consuming. In addition, the estimates and comparisons were within the scope of activities that BLS, CBO, and SSA normally perform. Therefore, we used their estimates and comparisons.

The results we obtained are intended to contribute to the discussion of how often the CPI should be updated, but they are not intended to represent all future effects of shortening the updating cycle. Neither is our work intended to evaluate a change in the basic formula that could address substitution bias in the CPI. The point of shortening the updating cycle would be to have the CPI reflect, as closely as practical, the current spending patterns of consumers, regardless of whether the index is pushed upward or downward.

We did our work in Washington, D.C., between November 1996 and July 1997 in accordance with generally accepted government auditing

¹⁹For example, see Jack E. Triplett, "Economic Theory and BEA's Alternative Quantity and Price Indexes," *Survey of Current Business*, Vol. 72 (Apr. 1992), pp. 49-52; Ralph Turvey, *Consumer Price Indexes: An ILO Manual* (Geneva: International Labor Office, 1989), p. 38; and Price Statistics Review Committee, *The Price Statistics of the Federal Government: Review, Appraisal, and Recommendations*, A Report to the Office of Statistical Standards, Bureau of the Budget (New York: National Bureau of Economic Research, 1961), p. 31.

²⁰BLS estimated (1) the cost to update the expenditure weights and (2) the range of percentage effect on the CPI if the expenditure weights were updated at 5-year intervals. BLS also provided us with its past comparisons of old-weighted and new-weighted indexes. CBO estimated the dollar effect on the federal budget if CPI growth were lowered 0.1 percentage point or 0.2 percentage point annually. SSA estimated the impact on Social Security payments if the CPI were reduced annually by 0.1 percentage point.

standards. We requested comments on a draft of this report from the Secretary of Labor, the Chair of the Council of Economic Advisers (CEA), the Director of the Office of Management and Budget (OMB), and the Chair of the Board of Governors of the Federal Reserve System or their designees. Comments by BLS, CEA, OMB, and the Federal Reserve are discussed near the end of this letter and are reproduced in appendixes V through VIII.

More Frequent Updating Is Deemed Desirable by Individuals Knowledgeable of the CPI That We Contacted

We spoke with 10 individuals who were former officials of BLS or who had otherwise studied the CPI, and they were unanimous in stating that 10 years between updates of the expenditure weights was too long. However, there was less agreement among the individuals on exactly how often the updating should occur. According to information obtained from BLS and international publications, seven major industrial countries have consumer price indexes but, among them, only the United States updates its CPI as infrequently as once a decade.

Professional Opinions on Updating

Two former BLS officials told us that updating the weights about every 5 years was about right. One official told us that the POPS should be rotated more frequently, which would affect point-of-purchase weights. He also advocated a different method of aggregating CEX data to develop the expenditure weights for the 206 item strata. The other former official, a previous BLS Commissioner, noted that doing an update more frequently than every 5 years would be too often.

We also spoke with a former member of the Stigler committee and four members of the Boskin commission. The former Stigler committee member said that updating the CPI only every 10 years was entirely too infrequent. However, he gave low priority to updating the expenditure weights more often because he believed that getting new consumer items into the CPI and accounting for product improvement were more important. The four members of the Boskin commission also said that the expenditure weights for the market basket should be updated more frequently than every 10 years. However, the members regarded more frequent updating as only one step to improving the CPI. The Boskin commission recommended abandoning the fixed market basket aspect of the CPI and adopting a true superlative index formula and a modified superlative index formula to account for changing market baskets.

The spirit of the Boskin commission's recommendations, according to its Chairman, was for the CPI to be more current in order to reflect what is occurring in the economy. He said that if there were no change in existing products or no new products in the economy, then updating the expenditure weights would be the only step that would need to be taken. However, the economy is changing, with new products and product improvements occurring constantly. Therefore, more frequent updating was only a step toward what should be done to improve the CPI. He said BLS should be in a permanent revision mode. Because different aspects of the CPI interact with each other, a change in the expenditure weights would complement other steps that could be taken, such as changing the POPS sample more often than every 5 years, increasing the size of the CEX, and using estimation methods to adjust for changes in the quality of items in the CPI.

Two of the three remaining members of the Boskin commission with whom we spoke told us that the expenditure weights should be updated more frequently than every 5 years. The other member, citing concern about resource constraints faced by BLS, gave preference to providing financial support to implement the Boskin commission's recommendations to improve the CPI, rather than funding a more frequent update of the market basket.

The remaining three individuals we spoke with also supported a more frequent update than about every 10 years as a more accurate way to track inflation. One of them said that doing so would not necessarily lead to lower measures of inflation.

In addition, although we did not interview the Chairman of the Board of Governors of the Federal Reserve System, we noted that he stated in a speech, in March 1997, that there was a bias problem in the CPI given the failure to change the expenditure weights more often than about every 10 years. However, a representative of the Federal Reserve, in commenting on a draft of this report, said that although the Federal Reserve Chairman has said that out-of-date weights are a source of bias in the CPI, the Chairman does not endorse merely updating them more frequently.²¹ He said that the Chairman has testified before Congress in support of changes recommended by the Boskin commission, and that the payoff of departing from a fixed-weight structure of the CPI is likely to be much more

²¹These comments were made by the Assistant Director and Chief, Economic Activity Section, Division of Research and Statistics, the Federal Reserve System. His comments are reprinted in appendix VIII.

important in improving the accuracy of the CPI than more frequent updating of expenditure weights alone.

Practices of Other Industrial Countries

As previously mentioned, the United States is one of the seven leading industrial countries—the G-7—that have met to coordinate economic and monetary policy. In addition to the United States, the other six G-7 countries also track consumer prices through a market basket of goods and services and weight the prices of the items in the market basket. According to a BLS official and published information, Japan and Italy update expenditure weights every 5 years; Germany updates, on average, about every 5 years; Canada updates every 4 years—except for the last update (6 years), when it reengineered its index; and France and the United Kingdom update every year.

However, BLS officials noted that some of these countries base their updates on national data that are not comparable to the U.S. continuing CEX. Some of the countries do not use expenditure data collected directly from consumers; others use consumer expenditure data that require respondents to recall 12 months of expenditure data. BLS officials said the system used in the U.S. CPI for maintaining current and representative samples of items to price is more advanced than in most other countries.

We are not endorsing the practices in any other country over BLS' practices. We provide this information for comparative purposes to show the priority other countries place on keeping their market baskets current.

Cost to Update the Expenditure Weights Is Estimated to Be Relatively Small

The estimated cost of updating expenditure weights is relatively small in comparison to the cost of major revisions. For the purposes of estimating costs, we assumed in this report that updates of expenditure weights would occur in 1992 and 2003, which is 5 years after major revisions. On the basis of data supplied by BLS, the estimated cost to have updated the weights in 1992 would have been \$2.4 million spread over 3 years. According to BLS, the estimated cost to update the expenditure weights in 2003 would be \$3.1 million over a 3-year budget period. BLS reported that the 1987 major revision cost \$47 million over 5 years. According to BLS, the cost for the planned 1998 revision is expected to be about \$66 million over 6 years.

BLS noted that the estimated cost of an update excluded many activities that were included in the costs for revisions to the CPI. These excluded

activities include using recent decennial census data to reselect geographic areas and housing samples used in the CPI's surveys; evaluating, replacing, and updating CPI data processing systems; and recategorizing the items in the CPI market basket. The activities that BLS included in its estimated cost to update the expenditure weights included changing the weights of the items in the market basket, redefining the item strata in a limited way, and including any new items as a result of the limited redefinition of the item strata. For example, the costs of an update might include those associated with adding an item stratum for cellular telephone services.²²

More Frequent Updates Could Affect the Federal Budget

Because the CPI is used to index federal income tax brackets and certain federal spending, changes in the CPI can affect the federal budget. BLS, at our request, estimated the impact on the CPI if the expenditure weights were updated on a 5-year cycle, and, with the help of CBO, we used those estimates and their midpoint to illustrate the effect that updating might have on the federal budget. In making these estimates, both we and CBO assumed that there were no other changes in tax or spending levels and no other changes in the economy during the periods under review.

BLS said the historical evidence suggests that shifting to a 5-year update of the market basket weights could reduce the annual rate of growth of the CPI by between 0 (zero) and 0.2 percentage point. Although CBO does not backcast, using a method discussed with it, we estimated that an update in 1992 would have reduced the federal budget deficit between \$0 and \$32.4 billion over the 6-year period until the implementation of the upcoming 1998 revision. According to CBO, an update in 2003 could increase the projected budget surplus between \$0 and \$20.2 billion over a 4-year period.

Using estimates provided by CBO for an annual 0.1 percentage point reduction in CPI growth and assuming no other changes in policy or the economy, we estimated that the federal deficit would have been reduced by a cumulative total of \$16.2 billion over the 6 years following an update in 1992. According to CBO, an update in 2003 in which CPI growth would be reduced annually by 0.1 percentage point and assuming that nothing else changed, the projected federal budget surplus would be increased by a

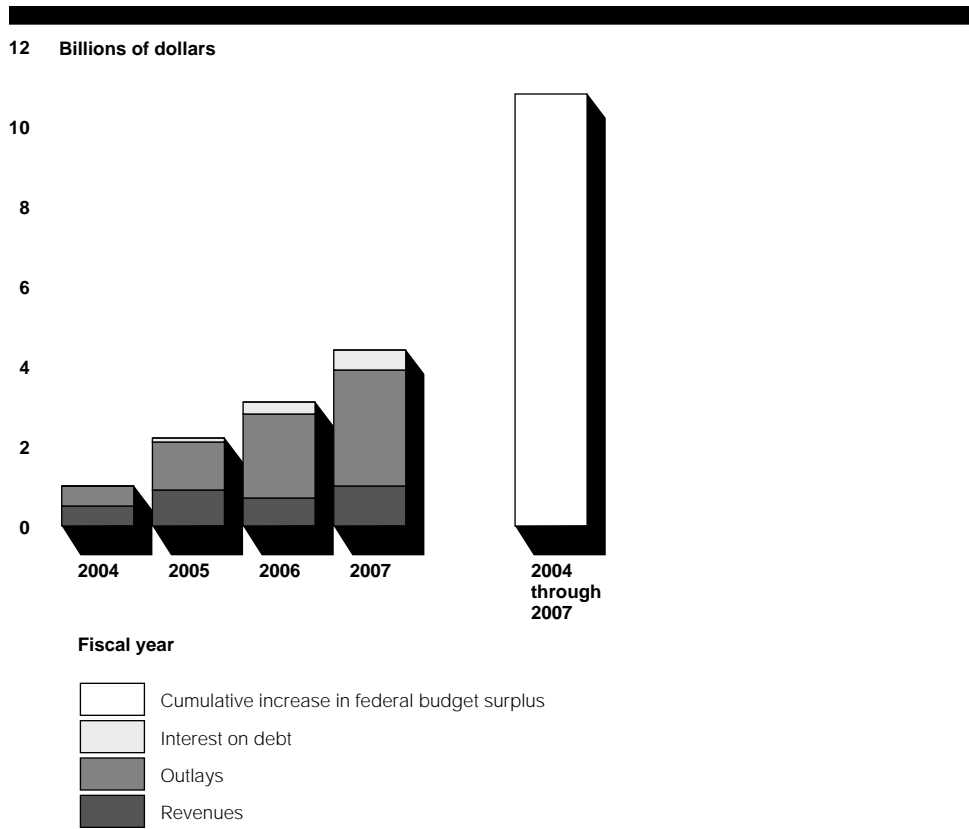
²²BLS officials told us that they plan to add this stratum in the upcoming 1998 revision.

cumulative total of \$10.8 billion over the 4 years following the update.²³ As shown in figure 1, most of the impact of such a reduction in the CPI would be on federal outlays—such as reduced payments to Social Security beneficiaries, which account for most of the outlays—and most of the impact would occur in the later years. For example, according to estimates by SSA’s actuaries, the average monthly benefit check for retired workers in 2004 would be reduced by \$0.91, from \$939.94 to \$939.03, with an annual 0.1 percentage point reduction in CPI growth; by the fourth year (2007), the average monthly check would be reduced by \$3.83, from \$1,032.56 to \$1,028.73.²⁴

²³To compare the midpoint estimates, we converted them to 1997 constant dollars. The 1997 constant-dollar estimate of the effect of a 1992 update on the federal budget would have been a cumulative decrease in the federal deficit of \$16.4 billion over 6 years. For a 2003 update, the effect of a 0.1 percentage point reduction in the CPI was estimated by CBO to be an increase in the projected surplus of \$8.6 billion in 1997 constant dollars over the following 4 years. A constant-dollar value is measured in terms of prices of a base period to remove the influence of inflation. The resulting constant-dollar value is the value that would exist if prices had remained the same as those in the base period (e.g., 1997).

²⁴According to SSA, by the fifth year (2008), the average monthly benefit check for retirees would be reduced by \$4.86, from \$1,065.98 to \$1,061.12.

Figure 1: Estimated Increase in Annual and Cumulative Federal Budget Surplus If CPI Growth Were to Be Reduced Annually by 0.1 Percentage Point Over a 4-Year Period After a 2003 Update



Note: The estimates assume no other changes in tax or spending levels and no other changes in the economy.

Source: CBO.

Evidence Suggests More Frequent Updates Would Be Beneficial

BLS has taken actions to respond to the 1961 Stigler committee study, and the current BLS Commissioner told us one response in particular enabled BLS to markedly improve the representativeness of consumer items and prices in the CPI. However, BLS had not acted on the Stigler committee’s suggestion to update the more volatile categories of weights at least once every 5 years, and BLS officials cited several reasons for not doing so. The most important reason, they said, was a lack of empirical evidence to support more frequent updates and a void of theoretical guidance on how often to do them. The officials said that another reason was previous difficulties in obtaining funds for major revisions of and improvements to the CPI. They also said that, in the past, certain data necessary to update

expenditure weights were unavailable between major revisions, but that situation has changed. In addition, BLS cited its concern with what would be the best approach to improve the CPI to make it more reflective of current consumer spending.

We examined the information surrounding these reasons, and, aside from the issue of funding, which is unpredictable at this point, we concluded that the evidence suggests that more frequent updates would be beneficial. As of August 1997, BLS was studying how often to update the expenditure weights.

BLS Has Acted on Many Aspects of the Stigler Committee Study

The current BLS Commissioner said BLS has implemented many of the Stigler committee's recommendations. In her view, the most important Stigler committee recommendation concerned the selection for price tracking of individual items of goods and services. She said that in response to the recommendation, BLS developed and began using the POPS in 1978 to identify sales outlets, which has allowed BLS to incorporate new items into the CPI that otherwise would not have been incorporated until a major revision.²⁵ She said that under the methodology used with the POPS, 20 percent of the outlets and items tracked are newly selected each year, which changes the entire sample within 5 years. Thus, according to the Commissioner, a large part of the reason for wanting to update weights more frequently—maintaining the representativeness of the item and outlet samples—is already accomplished on a 5-year rotation.

Evaluating BLS' response to every Stigler committee recommendation was not the purpose of this review. But, regarding the Commissioner's statement of making the CPI more current through the use of the new POPS methodology, we believe that changing the procedures used to select retail outlets and items does make the CPI somewhat more representative of what consumers are purchasing. However, implementation of the POPS still does not address the expenditure weights for the 206 item strata that remain fixed until the entire market basket is revised. A 5-year rotation in the POPS does improve the CPI in terms of keeping item samples current and introducing new goods, which also updates the point-of-purchase

²⁵Before 1978, BLS field representatives used the same item specifications throughout the country in an attempt to price an item meeting the detailed description. Since the introduction of new sampling techniques in 1978, the field representatives use a store's sales information to select a unique item within the specified categories for pricing. However, once an item is selected, the field representative is to continue to price it in that store. For more detailed information, see appendix II.

weights every 5 years.²⁶ Even though BLS has applied a current-is-better approach to point-of-purchase weights, it has not applied that same approach to the expenditure weights. Consequently, the items in the market basket are still aggregated into the CPI with expenditure weights that reflect outdated consumer purchases.

BLS' Reasons for Not Updating Expenditure Weights More Often

We spoke with the current BLS Commissioner and other current BLS officials about the timing of major revisions and about the obstacles to updating the weights. We discussed the timing of major revisions because expenditure weights only have been updated during these revisions. The Commissioner said she intuitively agreed that a 10-year period is long, but she was not sure what time frame was best. She provided several reasons for the length of time between major revisions to the CPI and reasons why BLS was uncertain about undertaking a weight update independent of a major revision. As previously mentioned, we also obtained the comments of two former BLS commissioners. The reasons given by these three BLS commissioners are presented in the following subsections along with, as appropriate, our related evaluation.

Lack of Empirical Evidence and Theoretical Guidance

More frequent updating of the CPI weights has not been at the top of BLS' priority list, according to the current Commissioner, who also said that only recently has there been any systematic evidence that inflation, as measured by the CPI, is affected by the age of expenditure weights.²⁷ She also said that even this evidence is limited and weak. In addition, according to the Commissioner, there is neither a theoretically "best" frequency for updating the weights, nor any theoretical reason why more recent weights are "better." Therefore, she said, the decision on how often to update must be made on commonsense and cost-benefit terms.

BLS' view that there is insufficient evidence to support more frequent updates is long-standing. In 1961, the then BLS Commissioner testified before a congressional committee that there was no evidence to support more frequent weight updates, and he cited a need for additional research.²⁸

²⁶Although the methodology does provide improvement, five of the individuals with whom we spoke said that even the POPS could be made more current with more frequent rotations than every 5 years.

²⁷John S. Greenlees, "Expenditure Weight Updates and Measured Inflation" Bureau of Labor Statistics, February 27, 1997.

²⁸The Commissioner made these comments to the Subcommittee on Economic Statistics of the Joint Economic Committee of Congress, which was holding hearings on the recommendations of the Stigler committee.

The preponderance of the data we reviewed does not support BLS' statement, as stated currently or in 1961, that there is insufficient empirical evidence to support the need for more frequent updating of expenditure weights. In his 1961 testimony, the then Commissioner cited three studies on which he based his conclusion, and each study covered a different group of years between 1925 and 1939. For the first two periods, the old weights produced less of a decline in prices than the new weights. For the last period, the old weights produced more of an increase in prices than the new weights. The differences between the indexes produced by the old and new weights were 0.1 percentage point, 1.2 percentage point, and 0.1 percentage point, respectively.

In 1953, BLS revised the CPI and updated the expenditure weights. It applied the new weights to January through June 1953 consumer price data. In response to a presidential request, BLS also applied the weights used in the 1940 revision to the January through June 1953 price data. The index with the old weights showed an annual understatement of inflation of 0.5 percentage point in comparison with the index using the new weights. In his 1961 testimony, the BLS Commissioner explained that the 1953 comparisons were different from those previously described for 1925 through 1939. The differences that were found in the studies for the earlier years basically reflected changes in expenditure weights. He noted that the comparisons for the 1953 revision reflected factors, such as changes in cities in the CPI, in addition to expenditure weight changes.

As shown and analyzed in appendix III, additional empirical evidence has become available since 1961 that also indicates that the measurement of inflation is affected by the age of the expenditure weights. For example, BLS estimates that when the upcoming 1998 revision is introduced, CPI growth will be lowered by 0.1 or 0.2 percentage point. In addition, we reviewed historical data from overlap studies in which BLS continued calculating the CPI with both the old and new weights for 6 months following a major revision. Although it is impossible to identify exactly to what extent other factors contributed to the differences, indexes produced by the old weights overstated inflation in comparison to those indexes produced by the new weights in the 1964 and 1987 overlap comparisons. The reverse was true in 1978, but that difference may have been due to a fundamental change in BLS procedures associated with the implementation of the POPS.

Additional BLS studies of indexes that examine the effects of the age of expenditure weights include comparisons of indexes that were calculated

with alternative 3-year base periods in which BLS compared the official CPI's 3-year base period of 1982 through 1984 with alternative 3-year periods since then. For example, the analysis for an update with a 1987 through 1989 base²⁹ averaged 0.11 percentage point lower over a 5-year period than an index with the 1982 through 1984 base years. As a result of our examination of these and other BLS studies, we concluded that the best available evidence indicates that indexes with newer weights reduce the growth of the CPI by about 0.1 percentage point per year.

Although theoretical guidance is not available on all facets of updating expenditure weights, such as exactly when to update, economic literature suggests that an index is more accurate if the expenditure weights used to compute it represent, as much as practical, current consumer spending. In addition, the Stigler committee in 1961 provided a commonsense principle on when to revise the weights: a revision is necessary when the weight base has changed appreciably. On the basis of the statements of individuals with whom we talked (see discussion of these views on pp. 11 to 13) and the CPI weight comparisons we reviewed (previously presented in this subsection and in greater detail in app. III), there is sufficient reason to believe that the weight base had changed appreciably before major revisions to the CPI.

The BLS Commissioner pointed to using common sense and a cost-benefit analysis to provide guidance on how often to update the weights. At the time of the Stigler committee's report in 1961 and until the early 1970s, the CPI was used in a very limited way in the federal sector to index federal programs for the effects of inflation; the first large income program to be adjusted with the CPI was civil service retirement payments in 1962. Therefore, changes in the CPI had relatively little effect on federal expenditures and had no direct impact on federal receipts. In the 1990s, however, the federal government uses the CPI to index a much broader set of programs, including federal income tax brackets and certain federal payments, that directly affect a larger share of the population and a much larger volume of federal receipts and expenditures. These uses, in our view, provide a commonsense basis for making the index a more accurate reflection of what consumers are buying in a rapidly changing economy.

Updating the expenditure weights more often appears to be supported from a cost-benefit standpoint as well. BLS estimated that it would cost \$3.1 million over 3 years to update the expenditure weights in 2003. If the

²⁹According to BLS, these are the base years that would have been used if the CPI had been revised in 1992.

growth in the CPI decreased by 0.1 percentage point per year, CBO estimates show that this would lead to a cumulative total of a \$10.8 billion increase in the projected budget surplus over the 4 years after the update.³⁰ However, regardless of the effect on the budget, the point of doing an update outside of a major revision would be the increased value of having the CPI reflect, as closely as practical, the current spending patterns of consumers.

Funding Difficulties

Funding for past major revisions has not always been easy to obtain. The 1987 revision was delayed 1 year because of funding limits. Similarly, the scheduled 1998 revision's start was delayed 1 year, until 1995, because of funding limits. A former BLS Commissioner with whom we spoke also identified funding as a problem. She said that funding for past major revisions was held up either within the Department of Labor, by OMB, or in the appropriations process.

Even before the tenure of this former Commissioner, obtaining funds to revise the CPI was apparently a problem. In 1961, the then BLS Commissioner, in testifying before a congressional committee, explained that under the then present practice, revisions to the CPI were undertaken only when BLS was successful in convincing the Bureau of the Budget—now OMB—and Congress that there was an urgent need to bring the CPI up to date.

BLS also has had difficulty in obtaining funds, apart from a major revision for improvements to the CPI in the early 1990s. BLS officials told us that they had requested \$450,000 for the CPI to improve quality adjustment procedures in consumer electronics, shelter, and apparel, but it did not receive these funds from Congress.³¹

Data Availability

BLS officials said CEX data and decennial census data are essential to establishing the CPI expenditure weights. CEX data are obtained from consumers and identify the items of goods and services that consumers have been purchasing. Among their uses in the CPI, decennial census data are used in selecting the geographic locations from which samples of consumers are surveyed for CEX purposes.

³⁰Under current budget rules, these could not offset each other. However, the estimates do give an indication of the overall impact on spending and revenues.

³¹This information was obtained in connection with a report we issued in 1995. See *Economic Statistics: Status Report on the Initiative to Improve Economic Statistics* (GAO/GGD-95-98, July 7, 1995).

The BLS Commissioner said, in 1961, that more frequent updates required a continuing CEX, which did not exist at that time.³² The current Commissioner said that, until the institution of the continuing CEX that allowed BLS to decrease the number of units surveyed and to make the CEX an ongoing program, an update of the weights every 5 years would have been costly because it would have required a special CEX. However, a continuing CEX program has been established, and, from a practical perspective, the first possible 5-year update of the weights using CEX data would have been in 1992, which is 5 years after the first CPI revision (1987) that used the continuing CEX data.

The need to have the CPI reflect geographic movement of the population as measured by the decennial census was cited by BLS officials as a reason to make a major revision every 10 years. However, BLS officials said that they do not have to wait for new decennial census data before updating expenditure weights.

BLS Is Deciding How Often to Update the Expenditure Weights

Updating the market basket expenditure weights is not the only way in which BLS could make the CPI more representative of current consumer spending. The Boskin commission recommended another way, which was through the concept of superlative index formulas. Although BLS plans to publish a superlative index, BLS does not see it as a replacement for the fixed market basket CPI. As long as BLS publishes the fixed market basket CPI, updating the weights more often than once a decade would remain important. BLS has the technical ability now to update the expenditure weights and, in commenting on a draft of this report, the BLS Commissioner said BLS was developing a new updating policy. To develop this policy, according to the Commissioner, BLS was studying what frequency will yield the most accurate CPI and best support the CPI's many uses.

Planned Publication of Superlative Indexes

According to the BLS Commissioner, the use of superlative indexes, such as those BLS is producing on an experimental basis, is the appropriate way to address what the Stigler committee sought in its recommendation for more frequent updating of weights. That is, a superlative index reflects changes in consumer spending in response to changes in relative prices, and, under certain assumptions, a superlative index is free of upper-level

³²Data for the CEX were collected only when funding was provided for a CPI revision, and the Commissioner was correct in saying that a continuing CEX was not available in 1961. Since 1979, CEX data have been collected continuously, whereby respondents in the interview portion of the CEX are interviewed every 3 months over 5 calendar quarters. In each quarter, one-fifth of the respondents are deleted and replaced by new respondents.

substitution bias. In commenting on a draft of this report, the BLS Commissioner said that since superlative indexes can be published only with a representational lag because of the lack of current-period expenditure as well as price data, their use in the CPI is precluded. The CPI, she said, is produced monthly and revised only in unusual circumstances.

Although BLS plans to begin publication of a superlative formula index in 2002, BLS officials stated that they also plan to continue to publish the fixed market basket CPIS.³³ Therefore, those who use the CPI for escalation purposes would have to choose among the published CPIS, including the fixed market basket CPI.

In addition, the federal government's use of the CPI is legislatively tied to the fixed market basket concept in some instances. For example, the U.S. tax code specifically identifies the use of the CPI-U for automatic inflation adjustments of federal income tax brackets and deductions for personal exemptions.³⁴ Therefore, unless otherwise changed by legislation or unless BLS named its superlative index the CPI-U, the fixed market basket CPI would be used in these programs.

The Boskin commission recommended that BLS replace the fixed market basket CPI with two new index formulas as follows: (1) an index that would be updated annually and revised historically to incorporate measurement improvements and (2) a monthly index that would be based on a "trailing" 2- or 3-year average of CEX data. According to the Chairman of the Boskin commission, the annual index would use a true superlative index formula, whereas the monthly index would use a modified superlative index formula. He said the spirit behind the commission's recommendation was for BLS to move as close as practical to creating a CPI that would be reflective of the cost of living.

Although BLS plans to publish a superlative index in 2002, it has not decided how this index will be constructed. The Commissioner said that true superlative indexes cannot be produced in "real time," or monthly, because they require current expenditure data, which are impossible to collect and process on a monthly basis. In July 1997, another BLS official told us that the superlative index that BLS plans to publish in 2002 may be

³³Publishing variations of a consumer price index would not be unusual. Originally, when BLS announced that it would begin publishing the CPI-U, which represents all urban consumers, it planned to discontinue the older CPI-W, which represents urban wage and clerical workers. Since users, such as labor unions, supported publication of the CPI-W, BLS changed its plans to drop the CPI-W and now publishes both indexes.

³⁴26 U.S.C. 1(f).

(1) an annual number with a 2-year lag that, for example, would reflect inflation for the year 2000 or (2) a current measure that would be subject to revision as more current expenditure data become available. According to the BLS official, this second measure would not be considered a true superlative index until the more current expenditure information was incorporated.

Although BLS has not decided on the construction of a superlative index, one approach or index formula it is considering is referred to as a Fisher Ideal superlative index. As explained in appendix IV, two different index values are combined to produce a Fisher Ideal superlative index. One of the two index values is based on the Laspeyres index formula, which is the formula used to produce the official CPI. In other words, values from the CPI's fixed market basket would be inputs to the Fisher Ideal index. The other index value used in this superlative computation is based on a Paasche formula, which, unlike the Laspeyres formula, incorporates current expenditure weights. In general terms, the Fisher Ideal superlative index reaches the middle ground between the Laspeyres and Paasche formulas.

BLS Has Technical Ability to Update and Plans to Consult With Advisory Groups

According to BLS officials, BLS has the technical ability to update the expenditure weights more frequently. However, as of June 1997, BLS was undecided as to whether it would update the weights outside of major revisions to the CPI. The Deputy BLS Commissioner said BLS was still considering the matter and, as a first step, needed to make a decision within BLS about updating the expenditure weights at times other than major revisions. In August 1997, in commenting on a draft of this report, the BLS Commissioner said BLS was developing a new updating policy. To develop this policy and before making a final determination, BLS plans to study a number of practical questions and the Commissioner said that BLS will seek the advice of its advisory councils, all with the intent of determining the best frequency for updating the CPI weights.

Conclusions

As the principal source of information on consumer prices and inflation in the United States, the CPI should reflect current consumer expenditures as much as practical. That clearly was the view of the Stigler committee in 1961 and of the Boskin commission in 1996.

One step that BLS could take to advance that concept is to update the expenditure weights of the CPI more often than only during major revisions to the CPI. The current practice of updating weights only as part of a

revision means that it is 10 years or more between updates of the expenditure weights; this appears too long to achieve a reasonable representation of current consumer spending. The BLS Commissioner said that she intuitively believed that 10 years between updates was too long. The two former BLS managers and eight CPI researchers with whom we spoke all believed that, conceptually, the weights should be updated more often than every 10 years. According to a BLS official and published information, other G-7 countries update expenditure weights more often than every 10 years.

However, BLS has held for some time that, although 10 years between updates may seem inappropriate, there is no strong empirical evidence that suggests a connection between the age of the weights and the measurement of inflation. Our examination of BLS data, however, showed that the age of expenditure weights affects the measure of inflation. Although the data are not perfect and do not isolate the effects of using outdated expenditure weights, comparisons of price indexes employing BLS data with old and new weights indicate that price indexes computed with more current weights were always different than indexes computed with older weights. This result has been the case going back to comparisons made for the first revision in 1940. In addition, comparisons generally tend to show lower rates of inflation with indexes using newer weights.

There are also reasons for making certain that the expenditure weights are, as much as practical, reflective of current consumer spending. Since 1962, the CPI has been legislatively connected to adjusting some benefit payments for inflation and more recently to adjusting federal tax brackets. As a result, any overstatement or understatement of inflation by the CPI can have a major impact on the federal budget. For example, if, beginning in 2003, CPI growth were annually reduced by 0.1 percentage point and all policies and the economy remained unchanged, CBO estimates that the federal budget surplus over the 4 years following 2003 would be cumulatively \$10.8 billion higher.

We recognize that gaining financial support for revising or improving the CPI has been a problem at times. We cannot predict the ease or difficulty BLS might have in getting funds to update the weights more often (e.g., \$3.1 million over 3 years that BLS estimated it would need for an update in 2003).

We also recognize that adjusting the weights more often does not have the highest priority among all commentators on the CPI. For example, the Boskin commission would rather see BLS replace the fixed market basket CPI with various types of superlative indexes. However, even if BLS published a superlative index, which it plans to do, the updating of the weights more often would remain significant because BLS does not view superlative indexes as replacements for the fixed market basket CPI. It plans to continue to publish the long-standing fixed market basket CPI. In addition, since BLS is still trying to address basic conceptual issues in designing the superlative-type index that it plans to publish in 2002, the uncertainty surrounding this planned index suggests to us that making the fixed market basket index as current and accurate as possible should be done.

Recommendation

We recommend that, as long as a fixed market basket CPI is published, the Commissioner of BLS should update the expenditure weights of the CPI's market basket of goods and services more frequently than every 10 years to make it more timely in its representation of consumer expenditures.

Agency Comments and Our Evaluation

We sent a draft of this report to the Secretary of Labor, the Chair of CEA, the Director of OMB, and the Chairman of the Board of Governors of the Federal Reserve System and requested comments from them or their designees. The Commissioner of BLS provided comments for the Department of Labor, and said she supports more frequent updates of the expenditure weights. However, the Commissioner said neither economic theory nor empirical evidence demonstrates the superiority of any particular update interval. She said that BLS needs to consider carefully what frequency will yield the most accurate CPI and best support the many uses of the index. There are, she said, a number of practical questions related to developing a new updating policy that BLS must address. BLS is currently studying these questions but, she said, the ultimate decision rests largely on commonsense judgment. Finally, the Commissioner emphasized that BLS will not evaluate potential changes to calculating the CPI on whether they raise or lower the measured rate of price change. Rather, BLS will evaluate potential changes on whether they produce a more accurate index. We agree with the Commissioner's statement that potential changes to the CPI should be predicated on whether they produce a more accurate index. The Commissioner was silent as to whether the new policy would direct an expenditure weight update between major revisions, which have been every 10 years or so. Although we cannot say exactly

how often the expenditure weights should be updated, the evidence we reviewed suggested that updating only once every 10 years or so was insufficient. The Commissioner's August 8, 1997, letter is reprinted at appendix V. BLS provided technical comments on the draft report by separate communication, and we incorporated them as appropriate.

By a letter dated August 8, 1997 (see app. VI), CEA's Director of Macroeconomic Forecasting said more frequent updating would be a small improvement and ought to be considered. However, the Director hoped that readers of this report do not confuse more frequent updating with the adoption of a true cost-of-living index.

In an August 12, 1997, letter (see app. VII), OMB's Associate Director for Economic Policy said that frequent updating of expenditure weights is one important option. However, OMB believed that BLS should consider more frequent updating in context with other potential improvements. The Associate Director pointed out that substitution bias would remain in a Laspeyres-type index even with more frequent updating of expenditure weights. The CPI is a Laspeyres-type index.

The Federal Reserve's designee, the Assistant Director and Chief of the Economic Activity Section, Division of Research and Statistics, said in a July 31, 1997, letter (see app. VIII) that the draft report addressed a very important public policy issue. He said that more frequent updating of the expenditure weights would be desirable absent other actions to improve the CPI's accuracy. However, other changes to the CPI, such as those recommended by the Boskin commission, may do more to improve the CPI's accuracy. He said our recommendation for more frequent updating seemed to be only a "second-best" solution, which the Federal Reserve did not endorse. The "first-best" solution, he said, is for BLS to depart from the fixed-weight structure of the CPI.

The comments from CEA, OMB, and the Federal Reserve all convey a similar message that the CPI should be a true or ideal cost-of-living index, which has been discussed in terms of changing the CPI's construction from a Laspeyres index formula to a superlative index formula. As we stated in the sections of this report on our objectives and methodology, it was not our intent to evaluate a change in the basic formula used to construct the CPI. However, the BLS Commissioner in her comments on the draft report said, in part, the following:

“Economic theory provides an elegant rationale for the use of superlative index formulas . . . to provide approximations to a cost-of-living index. . . . The unfortunate limitation of superlative formulas is that their calculation requires current-period expenditure as well as price data, so superlative indexes can be published only with a lag. This precludes their use in the CPI”

As we previously discussed in this report and as the Commissioner mentioned in her comments, the administration has asked Congress for funds to produce a BLS superlative index beginning in 2002. BLS also plans to continue to publish the Laspeyres fixed market basket CPI. While we agree with those who commented that updating the expenditure weights is not a fix for turning the CPI into a true cost-of-living index, we believe that such updating makes sense for the fixed market basket CPI as long as BLS continues to publish it.

The Federal Reserve and CEA designees also expressed concern as to whether we overstated the effect of more frequent updating on the CPI. Both cited one estimate (0.04 percentage point reduction) from a February 1997 research paper written by a BLS official to support their concern.³⁵ We believe we have not overstated the potential effect. We report that a 5-year update of the expenditure weights could reduce the CPI’s rate of growth by between 0 (zero) and 0.2 percentage point per year. This range was estimated by BLS on the basis of historical evidence, which was provided in this February 1997 research paper. BLS has raised no second thoughts to us about the reasonableness of this range. For example, BLS did not question the range in commenting on our draft report. As we report in appendix III, the BLS research paper provided a number of different point estimates that are based on regression analyses, overlap comparisons, and other studies. The regression analysis from which the 0.04 percentage point estimate was derived found evidence of a small effect—rather than no effect—on measured inflation. In addition, the 0.04 percentage point estimate was within the lower end of the range of estimates that BLS provided to us.

CEA, OMB, and the Federal Reserve each made additional comments, which are addressed as appropriate in appendixes VI, VII, and VIII.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after its issue date. At that time, we will send copies of this report to the Chairman

³⁵Greenlees, *op. cit.*

of this Committee; the Chairmen and Ranking Minority Members of other interested congressional committees; the Secretary of Labor and the Commissioner of BLS; the Director and the Chief Statistician of OMB; the Chair of the Council of Economic Advisers; and the Chairman of the Board of Governors of the Federal Reserve System. We will also make copies available to others on request.

Major contributors to this report are listed in appendix IX. If you have any questions about this report, please call either of us. Bernard Ungar can be reached on (202) 512-8676, and James Bothwell can be reached on (202) 512-6209.

Sincerely yours,



Bernard L. Ungar
Associate Director
Federal Management and
Workforce Issues



James L. Bothwell
Chief Economist

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Abbreviations

BEA	Bureau of Economic Analysis
BLS	Bureau of Labor Statistics
CBO	Congressional Budget Office
CEA	Council of Economic Advisers
CEX	Consumer Expenditure Survey
CPI	consumer price index
CPI-U	consumer price index representing all urban consumers
CPI-W	consumer price index representing all urban wage and clerical workers
GDP	gross domestic product
OMB	Office of Management and Budget
PCE	Personal Consumption Expenditures
POPS	Point-of-Purchase Survey
SSA	Social Security Administration

Objectives, Scope, and Methodology

To obtain views on updating the Consumer Price Index's (CPI) expenditure weights more often than every 10 years, which addressed our first objective, we asked two former Bureau of Labor Statistics (BLS) officials and eight individuals who have studied the CPI for their views on how often the CPI should be updated. Of these eight individuals, one was a member of the Stigler committee; four were members of the Boskin commission; one had developed a superlative index theory that BLS was considering in connection with the CPI; and two had studied the Boskin commission's report. These latter three researchers were recommended to us by the Boskin commission members we interviewed or others because their views were neutral or differed from the Boskin commission's position on the amount of bias in the CPI. We also reviewed public statements made by the Chairman of the Board of Governors of the Federal Reserve System concerning the frequency of updating the CPI. To obtain information on the practices followed by other industrialized countries in updating their consumer price indexes, which also addresses our first objective, we obtained information from BLS and from publications of the Organization for Economic Cooperation and Development and the Canadian government on how often the G-7 countries update their CPIs.

To estimate the cost to BLS of updating the CPI on a 5-year cycle, our second objective, we asked BLS to provide us with certain actual and estimated cost data. We asked BLS to provide us with the costs associated with the last major revision of the CPI, which took place in 1987, and the projected costs for the 1998 revision. In addition, we asked BLS for its estimate of what the costs would have been to update the CPI in 1992 and its estimate of what the cost might be to update the CPI in 2003. In other words, we asked BLS to provide cost data for a prior revision (1987), a planned revision (1998), and two updates (1992 and 2003). The interval between 1992 and 1998 is 6 years rather than 5 years, but that difference was unavoidable given that a major revision is scheduled for 1998. We did not specify to BLS what assumptions to make or what items to include or exclude in estimating costs for 1992, 1998, and 2003. We did not evaluate the reasonableness of BLS' assumptions or estimates.

BLS provided cost data for the 1987 revision, the upcoming 1998 revision, and a 2003 update. BLS suggested that the cost for a 1992 update could be derived by deflating the cost of the 2003 update. For this conversion, we compared the Object Class 11 index published by the Office of Management and Budget (OMB), which is used to adjust pay categories, and the Gross Domestic Product (GDP) price index as determined by the Department of Commerce's Bureau of Economic Analysis, which is used

to adjust all other budget categories. We found minor differences between using the two deflators and chose to use the GDP price index, which, in comparison to the Object Class 11 deflator, led to a slight overstatement of the cost and, in reference to our cost-benefit comparison, provided a conservative estimate.

To address our third objective—estimate the dollar effect on the federal budget if the CPI weights were updated on a 5-year cycle—we obtained assistance from BLS and the Congressional Budget Office (CBO). We asked BLS to estimate whether the CPI would go up or down as the result of a 5-year update. More specifically, we asked BLS to provide a range—an upper percentage point and a lower percentage point—of the possible change that could occur to the CPI with a 5-year update.

To gauge the reasonableness of estimates that BLS provided, we compared them with the results of BLS' overlap studies of old and new weights during the first 6 months of major revisions and other BLS studies that examined the impact of more frequent updates.¹ The results of these comparisons are reported in appendix III.

We then asked CBO to estimate the effects that a 5-year update of the CPI in 2003 would have on federal outlays, revenues, debt service, and the overall budget, assuming no other changes in tax or spending levels and no other changes in the economy. To do this, we asked CBO to use BLS' lower and upper estimates and the midpoint of these estimates of change in the CPI that would result from a 5-year update. To illustrate the effect of a 5-year update that would begin in 2003, we asked CBO first to apply its standard projections for the years 2004 through 2007;² the results represented CBO's baseline. CBO then made additional projections for the years 2004 to 2007 to account for changes in the CPI as estimated by BLS for a 5-year update, and we compared these projections against CBO's baseline. To adjust the CPI for the effects of a 5-year update of the expenditure weights, CBO reduced its estimated CPI by 0.2 percentage point, which BLS had estimated could be the upper estimate of change in the CPI from a 5-year update. The difference between the baseline and the adjusted CPI estimates was

¹Mary Lynn Schmidt, "Comparison of the Revised and the Old CPI," *Monthly Labor Review*, Vol. 110 (Nov. 1987), pp. 3-6. Mary Lynn Schmidt, "Effects of Updating the CPI Market Basket," *Monthly Labor Review*, Vol. 116 (Dec. 1993), pp. 59-62. *Government Price Statistics: Hearings Before the Subcommittee on Economic Statistics of the Joint Economic Committee of the Congress of the United States*. 79th Cong., 1st Sess., pp. 582-585, (1961), (statement by Ewan Clague, Commissioner of Labor Statistics). John S. Greenlees, "Expenditure Weight Updates and Measured Inflation," Bureau of Labor Statistics, February 27, 1997.

²Because CBO's projections do not go beyond 10 years, CBO did not make a projection for 2008, which would be the fifth year of our illustrative 5-year span. The first year of CBO's projections was 1998.

reported by us as the upper estimate of the dollar effect of a 5-year update on the federal budget. Similar estimates and calculations were made with the midpoint—0.1 percentage point—of BLS' estimate. No further estimates and calculations from the baseline were necessary to account for BLS' lower estimate of change, which was 0 (zero).

We also reported these estimates in footnote 23 of this report in 1997 constant dollars by applying the GDP price index. We calculated the 1997 constant-dollar amounts using the GDP price index. Dollar amounts for years other than the base year (1997) were adjusted for the effect of inflation with the GDP price index. These adjustments had the effect of increasing the amounts for the years before 1997 and of decreasing the amounts for the years after 1997.

CBO would provide projections for current and future years but not provide estimates for past years. Therefore, after discussion with CBO, we estimated how the federal budget deficit might have been affected if the expenditure weights were updated in 1992. In making our estimates, we assumed that there were no other changes in tax or spending levels and no other changes in the economy for 1992 through 2007. We also assumed that the economic trend that was found for the years 1998 through 2007 could be reasonably applied to the years 1993 through 1998.

We first replicated CBO's estimates for outlays and revenues that are affected by the CPI for 1998 through 2007 from projections for the relevant categories published in CBO's *Economic and Budget Outlook* in January 1997.³ We then asked CBO to follow the previously described methodology and to make estimates of a 0.1 percentage point reduction in the CPI beginning in 1997 and 2002. We also replicated CBO's estimates of a 1.0 percentage point change in the CPI on the federal deficit that was published in January 1997 and adjusted the estimates to represent a 0.1 percentage point reduction.⁴ We then compared the effects of these two estimates on revenues and outlays and found significant differences in the revenue estimates that were due to rounding rules for tax revenues. We chose to use CBO's published 1.0 percentage point estimates that were adjusted to represent a 0.1 percentage point reduction rather than those that were calculated for us by CBO because the published 1.0 percentage

³See *The Economic and Budget Outlook: Fiscal Years 1998-2007*, CBO (Washington, D.C.: 1997), pp. 24 and 36. The relevant category for revenues is individual income taxes. Spending programs affected by changes in the CPI include Supplemental Security Income, veterans' compensation and pensions, Social Security, and federal civilian and military retirement.

⁴See *The Economic and Budget Outlook: Fiscal Years 1998-2007*, p. 41.

point estimates that were adjusted to represent a 0.1 reduction provided a more conservative estimate, as well as a smooth trend. The effects from the adjusted 1.0 percentage point reduction were then applied to the outlay and revenue totals that are affected by changes in the CPI in each year from 1993 to 1998.⁵ Debt service costs were calculated from the year-to-year change in CBO's baseline debt, less the saving from changes in outlays and revenues. The current-dollar estimates derived from these calculations were adjusted with the GDP price index to 1997 constant dollars. The estimates for the 0.1 percentage point reduction were doubled to obtain estimates for a 0.2 percentage point reduction in the CPI. We met with CBO to discuss our approach, and CBO staff stated that the method and results appeared reasonable.

In connection with the effect on the federal budget, we asked the Chief Actuary of the Social Security Administration (SSA) to estimate the effect a change in the CPI would have on the average benefit paid to retired workers. Your office had requested that we obtain this information to illustrate how a federal revenue or payment program that is adjusted periodically because of changes in the CPI might be indirectly affected by more frequent updating of the expenditure weights. To make the estimate, we asked SSA to use the midpoint of BLS' range of possible change that would occur to the CPI with a 5-year update. Using that midpoint percentage point and the President's Fiscal Year 1998 Budget assumptions, SSA estimated the change in the average monthly benefit, beginning with December 2003, which would be payable in January 2004, and continued through December 2007.

Our fourth objective had the following two elements: (1) identify the reasons for the 10 years or so between revisions and (2) assess those reasons. For the first element, we interviewed present and past officials of BLS and obtained their views on why major updates to the CPI have been spaced about 10 years apart. Among the officials we interviewed were the present Commissioner of BLS and a former Commissioner of BLS. We also reviewed the 1961 congressional testimony of another BLS Commissioner in which he addressed the subject of BLS' timetable for revising the CPI. In our assessment of BLS' reasons, we (1) collected and analyzed information on past comparisons between indexes that applied old and new expenditure weights, which were also used to address the reasonableness of BLS' estimates under our third objective; (2) obtained information on how BLS collects its source data for the CPI; (3) obtained BLS fiscal year 1998 budget information to ascertain BLS' plans for future changes in its

⁵Actual amounts were used for 1992 through 1995; CBO estimates were used for 1997 and 1998.

indexes; and (4) compared the estimated costs and benefits of a 5-year CPI update cycle obtained under our second and third objectives.

In our assessment of past comparisons between indexes that applied old and new weights, we noted that the indexes reflect differences in addition to those directly related to changes in expenditure weights, such as conceptual changes in the structure of the market basket. These differences are a result of data limitations in that the overlap periods incorporate many factors that can be changed in a revision. With this knowledge, we treated the differences as indicators of the effect of an update of the expenditure weights because an update of the weights is unlikely to occur in isolation from the other factors that are associated with revisions. For example, a 1992 update would have incorporated a market basket that would have been based on different geographic areas because changes were made in 1986 in the geographic locations where expenditure data were collected. Such geographic changes are associated with major revisions.

In addition to reviewing overlap studies, we examined the effect of the age of weights with indexes that were calculated with alternative base periods. For example, comparisons were made of the official CPI's 3-year base of 1982 through 1984 with alternative 3-year base periods (i.e., 1987 through 1989). In these and other comparisons, we applied an economic concept that is based upon economic literature that suggests that an index is more accurate if the expenditure weights used to compute it represent, as much as practical, current consumer spending.

As previously reported, this report includes, and often relies on, estimates and comparisons prepared by BLS, CBO, or SSA.⁶ We did not verify the computerized data that the agencies used in producing these estimates and comparisons. Verification, in our opinion, would have been impractical because it would have been costly and time consuming. In addition, the estimates and comparisons were within the scope of activities that BLS, CBO, and SSA normally perform. Therefore, we used their estimates and comparisons.

⁶BLS estimated (1) the cost to update the expenditure weights and (2) the range of percentage effect on the CPI if the expenditure weights were updated at 5-year intervals. BLS also provided us with its past comparisons of old-weighted and new-weighted indexes. CBO estimated the dollar effect on the federal budget if CPI growth were lowered 0.1 percentage point or 0.2 percentage point annually. SSA estimated the impact on Social Security payments if the CPI were reduced annually by 0.1 percentage point.

Appendix I
Objectives, Scope, and Methodology

Our work was designed to examine the importance of updating the CPI sooner than about once every 10 years. The results we obtained are intended to contribute to the discussion of how often the CPI should be updated but are not intended to represent all future effects of shortening the updating cycle. The point of shortening the updating cycle is to have the CPI reflect, as close as practical, the current spending patterns of consumers, regardless of whether the index is pushed upward or downward. Our work is also not intended to evaluate a change in the basic formula that could address substitution bias in the CPI.

Background Information on the Consumer Price Index

BLS produces the CPI by measuring the average change over time in the prices paid by urban consumers for a fixed market basket of consumer goods and services. The market basket is determined from detailed records of purchases made by thousands of individuals and families. The items selected for the market basket, such as potatoes, are to be priced each month at retail outlets, such as grocery stores, in urban areas throughout the country. According to BLS, in 1995, field representatives visited approximately 30,000 retail establishments and housing units each month, with prices collected for 94,000 items.

The CPI is used as a measure of price changes to make economic decisions in the private and public sectors. According to BLS, the CPI has three major uses as follows:

- Economic indicator of inflation. The administration, Congress, and the Federal Reserve use trends in the CPI as an aid to formulating fiscal and monetary policies. Business and labor leaders, as well as private citizens, use the CPI as a guide to making economic decisions.
- Escalator for wages, benefit payments, and tax brackets. In 1996, the CPI was used by collective bargaining units to adjust the wages of 1.7 million workers. It is used to adjust some federal benefit payments for inflation. For example, in September 1996, as a result of changes in the CPI, 43.5 million Social Security beneficiaries; 6.6 million Supplemental Security Income recipients; 6.4 million railroad, military, and federal civilian retirees and survivors; and 25.8 million food stamp recipients had their benefits adjusted for inflation. The CPI is also used to adjust the federal individual income tax structure to prevent bracket creep (i.e., increases in real tax rates due solely to inflation). Some benefit payments, such as those for Social Security recipients; tax deductions for personal exemptions; and tax brackets are adjusted automatically by the CPI, rather than on the basis of discretionary policy decisions.
- Deflator of selected economic statistical data series. The CPI is used to adjust selected economic statistical series for price changes and to translate these series into inflation-free dollars. Examples of data series that are adjusted by the CPI include retail sales, hourly and weekly earnings, and components of the National Income and Product Accounts.

The CPI was initiated during World War I, when rapid increases in the prices of goods and services, particularly in shipbuilding centers, made such an index essential for calculating cost-of-living adjustments in wages. In 1921, BLS began regular publication of an index representing the expenditures of urban wage and clerical workers, which was then called

the Cost-of-Living Index. The name of the index was changed to the CPI following controversy during World War II over the index's validity as a measure of the cost of living. According to BLS, the CPI has always been a measure of the changes in prices for goods and services purchased for family living.

Major revisions were made to the CPI about every 10 years to update the fixed market basket; the next major revision is scheduled to be released in January 1998. Because consumers' buying habits changed, new studies were made of what goods and services consumers were purchasing, and major revisions to the CPI were made in 1940, 1953, 1964, 1978, and 1987. In the 1978 major revision, several changes were made, including the publication of a new index for all urban consumers—the CPI-U. According to BLS, the CPI-U, which represents the expenditures of about 80 percent of the population, takes into account the buying patterns of professional employees, part-time workers, the self-employed, the unemployed, and retired people, as well as those previously covered in the CPI. BLS has continued publication of the older index, the CPI-W, which represents the expenditures of urban wage and clerical workers, or about 32 percent of the population.

Construction of the CPI

Construction of the CPI begins by selecting a collection of goods and services that is usually bought by the reference population in the index. The collection of goods and services, called items, is known as the market basket. The CPI market basket is developed from detailed expenditure information that is provided by families and individuals who participate in the Consumer Expenditure Survey (CEX). Altogether, about 29,000 individuals and families provide expenditure information for use in determining the importance, or weight, of each item in the index structure. These data are also used to select the categories of items from which specific, unique commodity and service items are selected to be priced for the CPI.

BLS measures price changes each month by checking the prices of the items in the market basket and then comparing the aggregate costs of the market basket with those for the previous month. BLS field representatives obtain prices for most of the items through personal visits to approximately 30,000 retail establishments and housing units.

Components

BLS classified all CEX expenditure items into 206 item strata, which are arranged into 7 major components: (1) food and beverages; (2) housing; (3) apparel and upkeep; (4) transportation; (5) medical care; (6) entertainment; and (7) other goods and services, such as haircuts, college tuition, and bank fees. Taxes that are directly associated with the prices of specific goods and services, such as sales and excise taxes, are also included.¹

Expenditure Weights

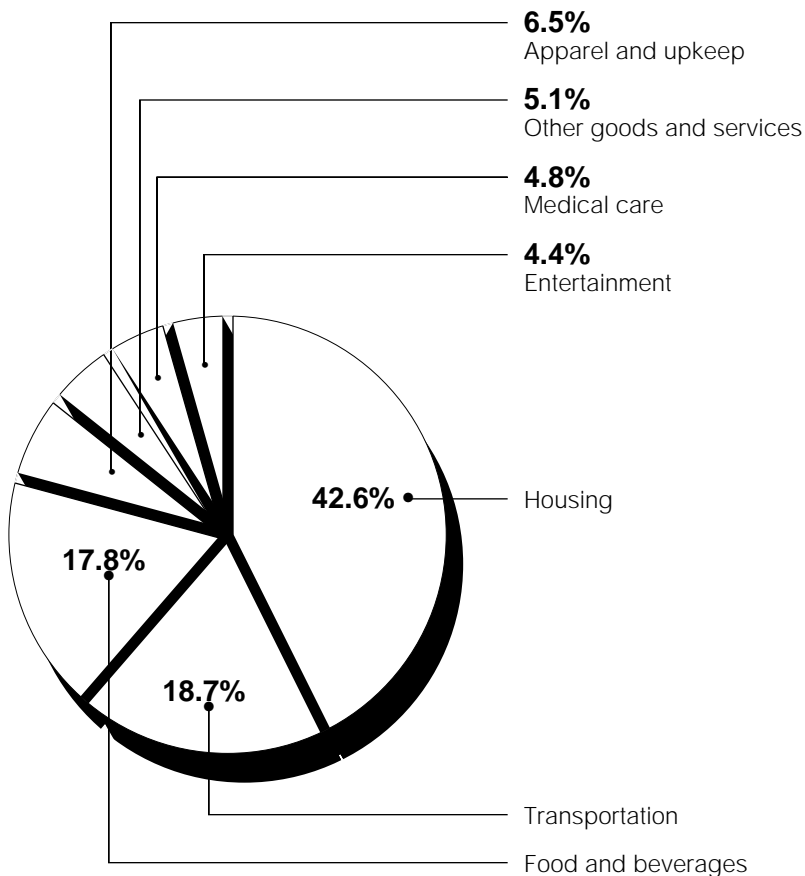
Expenditure weights are used to give proportionate emphasis for price changes of one item in relation to other items in the CPI. Expenditure weights allow the CPI to distinguish between items that have a major impact on consumers and to provide appropriate emphases to price changes associated with these items.

The weight of an item in the CPI market basket is derived from consumers' expenditures as reported in the CEX. To compute the weight, BLS first totals the amount spent on an item stratum, such as white bread, by CEX respondents during the base weighting period. BLS then divides that total by the number of CEX responding units, which results in an average expenditure per unit. Next, the average expenditures per unit are weighted with data from the decennial census to represent the U.S. urban population. To do so, the average expenditure amounts are multiplied by certain factors to represent the geographic dispersion of the urban population. Finally, these nationwide urban expenditures on the market basket items are totaled into an aggregate amount. The 206 expenditure weights are the percentages of this aggregate amount that are spent on each of the 206 item strata (e.g., white bread).

On the basis of average expenditures during the reference period, expenditure weights remain fixed, or constant, until the next major revision of the CPI and serve as a benchmark from which price comparisons are calculated. The weights of the components for the last major revision in 1987 are those as derived from the 1982 through 1984 CEX (see fig. II.1).

¹The CPI excludes taxes not directly associated with the purchase of consumer goods and services, such as income and Social Security taxes. The CPI does not include investment items, such as stocks, bonds, real estate, and life insurance, because they relate to savings, not daily living expenses.

**Figure II.1: Expenditure Weights Used
for the 1987 CPI Revision**



Note: Percentages do not total to 100 percent because of rounding.

Source: BLS.

Pricing of Market Basket Items

Each month, BLS field representatives visit or call thousands of retail stores, service establishments, rental units, and doctors' offices all over the United States. For the entire month, they record the prices of about 94,000 items. To determine which retail outlets its representatives should visit to obtain its monthly price quotations, BLS sponsors the Point-of-Purchase Survey (POPS), which is conducted by the Bureau of the

Appendix II
Background Information on the Consumer
Price Index

Census.² The survey respondents are asked, by item categories such as doctors, whether they made specific purchases and, if so, the names and locations of all places of purchases and the expenditure amounts. BLS uses the results from the survey to select outlets for pricing. This survey is conducted in approximately 20 percent of a sample of urban areas each year; as a result, the entire nonshelter sample is updated every 5 years.

BLS field representatives visit each selected outlet to initially select items that will be priced either monthly or bimonthly. For each outlet, categories of items are selected for pricing. Using probability selection methods that are based on revenues and volume information that is provided by the retail outlet, BLS field representatives use a table of random numbers to select for pricing a unique item within the specified categories. The monthly price changes for the same item (e.g., cigarettes) that are collected by BLS field representatives in urban areas throughout the United States are averaged, weighted, and published. Because the concepts BLS uses to measure medical care and shelter costs are different than those used for the items previously described, the pricing of these items is approached in a different manner.

²The POPS also is used to establish the point-of-purchase weights, which are used to combine the prices of the 94,000 items into the 206 item strata.

Analysis of Price Indexes With Alternative Expenditure Weights

BLS reported that historical evidence suggests that a 5-year update of the market basket could reduce the rate of growth of the CPI by between 0 (zero) and 0.2 percentage point per year. Regarding the effect of a 1991 update to the CPI, BLS cited one specific source of evidence that shows the rate of growth would be lower by 0.11 percentage point. In addition, BLS states that the effect of updating the expenditure weights in 1998 will likely be a reduction of 0.1 or 0.2 percentage point. As a result of this and other information, we chose 0.1 percentage point, the midpoint of BLS' range, for the purposes of our calculations.

Evidence on the possible impact of more frequent updates of expenditure weights on the rate of growth of the CPI includes overlap studies performed by BLS at the time of major revisions and other CPI index comparisons using specialized databases. BLS has been performing overlap studies for more than 50 years, and these studies consistently have shown a difference between indexes computed with old and new weights. In most of these cases, indexes computed with the old weights show a higher rate of growth than indexes computed with the new expenditure weights. Other evidence includes alternative CPI index series, which were computed using databases that allow comparisons between old and new weights. Indexes computed with new expenditure weights almost always produce different results than indexes with old weights. These same data also suggest that indexes relying on older expenditure weights typically show a higher rate of growth than indexes computed with newer expenditure weights. An upward bias in indexes computed with older expenditure weights is consistent with economic theory and other evidence. In our analysis, we applied an economic concept that an index was more accurate if the expenditure weights used to compute it represented, as much as practical, current consumer spending.

BLS Overlap Studies Consistently Show Differences Between Indexes Calculated With Old and New Weights

BLS began performing overlap studies for its work on the first revision of the CPI in 1940. In these overlap studies, BLS computed two indexes for the same period. One index was calculated with the original weights, and one was computed with more recent weights. As a result, these overlap indexes provide evidence on the effects of updating weights over a long period and under different economic conditions.

In those cases where there were no important changes in other procedures or other anomalies, the difference between these two indexes can be attributed to the change in weights. However, BLS has often instituted new procedures and improvements as a part of the revisions, along with the

**Appendix III
Analysis of Price Indexes With Alternative
Expenditure Weights**

updates to the expenditure weights. These improvements could include changes in geographic coverage, adoption of probability sampling methods, and other changes. Those changes and any unusual economic conditions at the time of the revision limit the applicability of the overlap findings to current questions regarding the likely effects of updating expenditure weights.

In all of the overlap comparisons, differences were found between indexes calculated with the new weights and indexes calculated with the old weights. In five of the seven comparisons, the indexes with the new weights recorded a lower rate of inflation than those with the old weights. In the two instances where the new weights resulted in higher rates of growth, changes in price collection methodology and the aftermath of the wartime economy might have had an effect on those results.

**Studies for the 1940
Revision**

As a part of the first revision of the CPI in 1940, BLS conducted three comparisons that used expenditure weights that were derived from 1917 through 1919 Consumer Expenditure Survey (CEX) data (old weights) and weights from 1934 through 1936 CEX data (new weights). Comparisons were conducted for three different periods using the old and the new weights: 1925 through 1929, June 1930 through March 1935, and March 1935 through December 1939. Differences were reported for all three comparisons, and, in each case, the CPI with the old weights had a higher rate of growth than the index computed with new weights. In the periods beginning 1925 and 1935, the difference between the two indexes was small, but the difference between the overlapping indexes for the period beginning in 1930 was more than 1 percent (see table III.1).

**Table III.1: Results From 1940 CPI
Revision Overlap Tests**

Numbers in percent			
Calculation period	Rate of growth with new weights	Rate of growth with old weights	Difference
1925 - 1929 ^a	-3.7	-3.6	-0.1
June 1930 - March 1935 ^a	-18.7	-17.5	-1.2
March 1935 - December 1939	1.8	1.9	-0.1

^aDuring periods of deflation, the indexes computed with the old weights showed less deflation than indexes computed with the new weights.

Source: BLS.

**Overlap Studies for 1953
Through 1987 Revisions**

In response to a presidential request, BLS also conducted an overlap study related to the 1953 revision. In this case, BLS applied the weights used in the 1940 CPI revision to January 1953 through June 1953 price data, the first months following the implementation of the 1953 revision. A comparison of the indexes computed with these two sets of weights showed that, unlike the previous 1940 revision studies where the old weights produced a higher rate of growth than the new weights, the index with the old weights showed growth of 0.5 percentage point less than the index using the new weights (see table III.2).¹ These results may be an anomaly related to the use of the 1947 through 1949 CEX data as the base period for the 1953 revision. Consumption in those years reflected the purchases of consumers following World War II, and the change may reflect unusual changes in consumer preferences or changes in the availability of various goods and services.

Table III.2: Estimates of Difference in Annual Rates of Growth Between Old and New Weights, by Major Revision

Numbers in percent	
Revision year	Difference
1953 ^a	-0.5
1964	0.4
1978	-0.2
1987	0.8
1998 ^b	0.1/0.2

Note: A negative number indicates that the price index using old weights was lower than the index using new weights.

^aThe months of comparison were January through June 1953.

^bBLS forecast.

Source: BLS.

In the more recent series of overlap studies, BLS calculated the CPI with both the old and new weights for 6 months following a major revision.² In the 1964 and the 1987 revisions, indexes computed with the old weights produced higher growth rates than indexes computed with the new weights. Overlap indexes computed for the 1978 revision showed the

¹The 1940 revision expenditure weights are considered the old weights in this section; whereas the 1953 revision weights are considered the new weights. In each of the following discussions, the old weights are those that were used through December before the introduction of the revision under discussion; the new weights are those that were introduced in January of the revision year under discussion.

²The results from these studies are reported in a research paper written by a BLS official (Greenlees, op. cit.).

reverse (see table III.2). BLS suggested, however, that the lower rates of inflation produced by the older weights may have been due to a 1978 change in methods used to select items for monthly pricing (see app. II). According to BLS, an upward bias could have been reflected in the index calculated with the new weights, and could have caused the higher rates of inflation using the new weights. In addition, BLS estimated that, for the upcoming 1998 revision, measured inflation will likely be reduced by 0.1 or 0.2 percentage point.

Alternative CPI Series Computed With Old and New Weights Also Show Differences

Additional evidence on the effect of more frequent updates of expenditure weights is available from comparisons of index series computed with old and new weights. These calculations are performed on databases that have been constructed to allow comparisons of various index weights and methodologies. Although these databases are not available for the historical periods covered by the overlap indexes, they make it possible to compare a number of alternative CPI series that are based on various combinations of 1- and 3-year weights for 1982 through 1995. For example, one database has been used to compare the actual CPI, which is based on 1982 through 1984 weights, with indexes that were computed with 3-year weights from the following periods: 1987 through 1989, 1988 through 1990, 1989 through 1991, and 1990 through 1992. Other databases have been used to compare CPI rates of growth that are based on various combinations of 1-year weights.

Evidence from these databases suggests that changing the weights used in the computation of the CPI will usually change the rate of growth of the CPI. These rate of growth differences vary according to the database, the years used for the older and newer weights, and the specific time frame and methodology used for computing the index. As in the case of the overlap studies, most of the evidence suggests that older weights typically produce a higher rate of growth in the CPI than indexes computed with newer weights. For example, a comparison of indexes computed with the 1982 through 1984 base period and the indexes computed with weights that were based on the 1987 through 1989 periods indicated that the older weights overstated inflation by approximately 0.1 percentage point per year over a 5-year period. BLS cited this and other evidence to support its statement that a 5-year update would reduce the measured rate of inflation by between 0 and 0.2 percentage point per year.³

³Greenlees, op. cit.

As in the case of the overlap studies, BLS noted that the difference between the two indexes cannot be attributed only to changes in the weights. In those instances when there are important changes in procedures or anomalies in the data, the differences may not be an accurate reflection of the changes in the weights. BLS also noted that the differences may be affected by the overall rates of inflation, in that differences may be larger during periods when the overall inflation rates are higher.

Alternative Indexes With
3-Year Base Periods

BLS research that compared the 1982 through 1984 expenditure-based CPI (official) with alternative 3-year expenditure base periods indicated that the official CPI rose slightly faster, on average, than the alternative indexes with more current weights. For example, comparisons of the actual CPI with indexes computed with 3-year base periods starting with 1987 through 1989 and ending with 1990 through 1992 showed that the increases in the official CPI were often higher than the alternative indexes with more recent base periods, but there was no consistent finding across all of the 3-year combinations. In fact, price changes for 1994 for two of the more recent base-period indexes (1987 through 1989 and 1989 through 1991) were larger than the official CPI for that year.

Alternative Indexes With
1-Year Base Periods

Two separate databases were also created that allowed additional comparisons to be made between the CPI rates of growth, using a number of alternative index calculation methods and 1-year base periods. The following different expenditure base periods were available in those databases: (1) 1986 through 1995 and (2) 1982 through 1995. These two databases allow a variety of comparisons to be made of indexes, using different base-period expenditure weights.

BLS used a regression analysis to summarize the effect that the age of the weights has on price indexes.⁴ The analysis that was based on the first database provided no evidence that a price index calculated with more current weights will produce a lower rate of inflation than an index calculated with older weights. However, BLS' regression analysis with the second database found evidence that more current base weights yield smaller estimates of price change.⁵ In other words, indexes based on older

⁴In many of these regressions, BLS also estimated the difference between a chained Fisher index and a 1-year Laspeyres index estimate.

⁵BLS suggested that the incorporation of the 1980 census-based geographic samples into the CEX in 1986 could explain the difference between their two regression analyses. BLS also looked at spending distributions during the period before the change in samples and found that no particular market basket item (such as energy or high-tech consumer goods) contributed to the differences.

**Appendix III
Analysis of Price Indexes With Alternative
Expenditure Weights**

expenditure weights tended to show a higher rate of inflation than indexes with more recent weights.

These data were also used to more directly address the question of the impact of a 5-year update on the rate of measured inflation. For this purpose, BLS compared inflation estimates obtained with the 1982 through 1984 weights with the inflation rates that would have been produced by 1987 through 1989 weights (see table III.3). This comparison indicated that, on average, inflation was lower by 0.11 percentage point with the 1987 through 1989 average than with the 1982 through 1984 average (i.e., a 5-year update would have reduced inflation by an average of about 0.11 percentage point per year). BLS noted, however, that the difference varied widely from year to year.

Table III.3: Estimates of Difference in Annual Rates of Growth Between 1982 Through 1984 Weights and 1987 Through 1989 Weights

Numbers in percent			
Revision year	Average rate of growth with 1982-84 weights	Average rate of growth with 1987-89 weights	Difference
1991	4.23	4.04	0.20
1992	3.02	2.95	0.07
1993	2.94	2.82	0.13
1994	2.64	2.59	0.05
1995	2.84	2.73	0.11
Average	3.13	3.02	0.11

Source: BLS.

Price Index Formulas

A consumer price index may be computed with one of several index formulas. The purpose of this appendix is to illustrate several of those formulas.

BLS constructs the CPI with a modified Laspeyres index formula.¹ According to the economist George Stigler, a Laspeyres index formula produces an “upper” bound of the cost of living; whereas, the Paasche index formula produces a “lower” bound of the cost of living.² A superlative index, such as the Fisher Ideal index formula, is regarded by economists as providing a good approximation to a cost-of-living index.

To illustrate the three basic index formulas, we use information from hypothetical weekly grocery bills of a single woman who eats breakfasts and five dinners at home; the rest of her meals are eaten away from home (see table IV.1). In the first and second weeks, she purchased the same identical items, with price increases occurring in the second week for some items. In the third week, the prices of some items increased, and she altered her market basket by purchasing a different fruit. In all three weeks, we assumed that she attained the same level of satisfaction from the consumption of these food items.


¹Price index formulas are named for the persons who developed them. The index formulas and the theoretical discussions about them can be found in W.E. Diewert, “The Theory of the Cost-of-Living Index and the Measurement of Welfare Change” *Price Level Measurement*, ed. W.E. Diewert (New York: North Holland, 1990), pp. 79-147.

²This description is true as long as consumer preferences for goods and services are homothetic (i.e., expenditure shares among goods and services stay constant when income changes). If preferences are not homothetic, there are different cost-of-living indexes corresponding to different income and price situations, and the Laspeyres and Paasche indexes do not serve as upper and lower bounds on the same cost-of-living index.

**Appendix IV
Price Index Formulas**

Table IV.1: Hypothetical Shopper's Grocery Bills Over a 3-Week Period

Grocery item	Week 1			Week 2			Week 3		
	Quantity	Price per item	Weekly cost	Quantity	Price per item	Weekly cost	Quantity	Price per item	Weekly cost
Bananas	5	\$0.20	\$1.00	5	\$0.20	\$1.00	0	\$0.20	\$0
Blueberries	0	1.99	0	0	1.99	0	1 box	1.49	1.49
Cereal	1 box	3.89	3.89	1 box	3.89	3.89	1 box	4.19	4.19
Milk	1 quart	.99	.99	1 quart	1.05	1.05	1 quart	1.05	1.05
Orange juice, frozen	2 small cans	.95	1.90	2 small cans	.95	1.90	2 small cans	.99	1.98
Peas, frozen	1 bag	1.29	1.29	1 bag	1.35	1.35	1 bag	1.35	1.35
Prepared dinner, frozen	1	2.49	2.49	1	2.49	2.49	1	2.49	2.49
Dinner rolls	1 package	1.49	1.49	1 package	1.50	1.50	1 package	1.50	1.50
Leaf lettuce	1 head	.69	.69	1 head	.69	.69	1 head	.69	.69
Tomato	1	.89	.89	1	.89	.89	1	.99	.99
Chicken breasts	1 package	3.59	3.59	1 package	3.59	3.59	1 package	3.59	3.59
Hamburger	1 pound	1.59	1.59	1 pound	1.59	1.59	1 pound	1.59	1.59
Potatoes	2	.25	.50	2	.25	.50	2	.25	.50
Rice, flavored	1 package	1.79	1.79	1 package	1.89	1.89	1 package	1.89	1.89
Total	19 items	n/a	\$22.10	19 items	n/a	\$22.33	15 items	n/a	\$23.30

 Price change or change in item purchased from previous week.

Legend: n/a = Not applicable

Source: Hypothetical example developed by GAO.

The values for three price index formulas—Laspeyres, Paasche, and Fisher Ideal—that would be derived for our hypothetical illustration are provided in table IV.2.

Table IV.2: Laspeyres, Paasche, and Fisher Ideal Formulas Index Values for Hypothetical Illustration

Week	Index values using three basic formulas		
	Laspeyres	Paasche	Fisher Ideal
1	100.0	100.0	100.0
2	101.0	101.0	101.0
3	103.2	100.9	102.0

Source: GAO.

The following descriptions are simplified to show how the indexes differ conceptually. Although the basic concepts presented are accurate, the actual calculations would be substantially more complex.

Laspeyres Index Formula

An index calculated with a Laspeyres index formula measures price changes in relation to the base period's market basket and thereby "fixes" the market basket by holding the items in it constant. It calculates what that market basket would cost in later periods, even if some of the items were no longer purchased.

For our hypothetical shopper, the Laspeyres index formula uses what she purchased in the first week as the base of the calculation—the fixed market basket. All comparisons are made with respect to the quantities of items she purchased and the prices she paid for them in the first week. Since she purchased the same items in the second week, a Laspeyres index would divide her grocery bill for the second week by the first week's bill and obtain an index value of 101.0, as shown in table IV.2.

Since the shopper bought blueberries instead of bananas in the third week, the third week's grocery bill cannot be simply divided by the first week's bill. An adjustment must be made to reconstruct the first week's fixed market basket by subtracting the cost of the blueberries and adding the cost of the bananas as if she had purchased bananas in the third week. This is done to make the third week's market basket identical to the first week's market basket. A Laspeyres index value of 103.2 is obtained by dividing the adjusted third week's grocery bill by the first week's bill.

Paasche Index Formula

An index calculated with a Paasche index formula measures price changes for a market basket containing what consumers are currently purchasing, rather than what they purchased in a previous period. This index assumes that consumers' tastes and preferences change to maintain a constant level of satisfaction and compares the cost of the consumers' current market basket with what it would have cost to buy this basket of goods and services in an earlier period.

As shown in table IV.2 for the hypothetical illustration, the Paasche index value (101.0) is the same as the value obtained with the Laspeyres index formula (101.0) in the first 2 weeks because our hypothetical shopper purchased the same items. However, the difference between the Paasche and the Laspeyres formulas is evident in the third week when the shopper

purchased blueberries in place of bananas. Instead of pricing bananas as was done in the Laspeyres calculation, blueberries remain in the market basket for the Paasche calculation and are priced as if they had been purchased in the first week. A Paasche index value of 100.9 is obtained by dividing the third week's grocery bill by an amount that reflects the third week's market basket priced with prices charged during the first week.

Because the items, quantities, and prices changed between the second and third weeks, the Paasche index value for the third week cannot be compared with the Paasche value for the second week. The difference between these 2 weeks cannot be referred to as a price change because the shopper changed the type and quantity of fruit she purchased. The index numbers for the third week, calculated with a Paasche index formula, can be compared only with the base period—the first week. (Also, the index number for the second week can be compared only with the base period.)

Fisher Ideal Index Formula

The Fisher Ideal index formula uses the Laspeyres and Paasche index values and, therefore, does not allow comparisons between adjacent periods. To allow comparisons of index values between adjacent periods, an adjustment—chaining—can be made to the Fisher Ideal index values. In this section, we first describe a Fisher Ideal index with the illustration of our shopper, and we then describe chaining with the Fisher Ideal index. Both the Fisher Ideal index and its chain are superlative price indexes.

A Fisher Ideal index number is the square root of the product of the Laspeyres index number multiplied by the Paasche index number. For example, in the third week of our illustration, the Fisher Ideal index number of 102.0 is the square root of the product of 103.2 (Laspeyres) and 100.9 (Paasche). The result of the Fisher Ideal index is a geometric mean, which differs from an arithmetic mean, or average. For example, the third week's arithmetic mean of 102.1 is 103.2 (Laspeyres) plus 100.9 (Paasche) divided by 2.³

Because the Fisher Ideal index incorporates the Paasche index value in its calculation, the limitations of the Paasche also transfer to the Fisher. For example, the comparison of the values for the third week with the values of the second week cannot be interpreted as a price change because the shopper purchased blueberries instead of bananas. As with the Paasche,

³A geometric mean treats price increases and decreases symmetrically, whereas an arithmetic mean, as used in a Laspeyres index, gives price increases more influence, thereby showing a faster rate of price change.

the index numbers for the second and third weeks can only be compared with the base period—the first week—and not to each other.

The chained Fisher Ideal index is the square root of the product of the chained Laspeyres index number multiplied by the chained Paasche index number. A chained index “chains” period-to-period indexes back to the reference period (i.e., week 1 in the hypothetical illustration). Because they are chained to each other, comparisons can be made between any sets of index number values.

The Laspeyres and Paasche chained indexes are calculated similarly—the previous chained index value is multiplied by a price relative, which is a ratio of the previous and current unchained index values. For example, to chain the Laspeyres index numbers between the first and second weeks in our hypothetical illustration, the chained Laspeyres index number for the first week (100.0), which is also the base, is multiplied by the price relative of 1.01, which is the ratio between the Laspeyres index numbers for the first and second weeks (101.0 divided by 100.0). To calculate the chained value for the third week, the chained value for the second week (101.0) is multiplied by the price relative for the third week (1.02). These same procedures are followed to obtain the chained Paasche index values. Then, to obtain the chained Fisher Ideal index formula values, the square root of the product of the chained Laspeyres index number is multiplied by the chained Paasche index number. For example, the third week’s chained Fisher Ideal index number of 102.0 is the square root of the product of 103.2 (chained Laspeyres) and 100.9 (chained Paasche).

Observations

The index value derived from the Laspeyres index formula attained the highest value of the three index values by the third week, supporting economists’ views that it provides an upper bound for estimating the cost of living. As shown in table IV.2, the Paasche index value was the lowest in the third week in comparison with the first week. Assuming that the shopper was equally satisfied with either fruit selection, the value as derived from the Paasche suggests that it provides a lower bound for estimating the cost of living.

The superlative index values, as represented in our hypothetical illustration by the Fisher Ideal index, indicate that by using the geometric mean of the corresponding Laspeyres and Paasche indexes, one obtains an index value that resides between them.

Comments From the Bureau of Labor Statistics

U. S. Department of Labor

Commissioner for
Bureau of Labor Statistics
Washington, D.C. 20212



AUG 8 1997

Mr. Bernard L. Ungar
Associate Director
Federal Management and
Workforce Issues
General Accounting Office
Washington, D.C. 20548

Dear Mr. Ungar:

Thank you for the opportunity to comment on your draft report, "Consumer Price Index: More Frequent Updating of Market Basket Expenditure Weights is Needed."

The report recommends that the Bureau of Labor Statistics (BLS) update the expenditure weights associated with the components of the Consumer Price Index (CPI) more frequently than after the traditional interval of approximately 10 years. No specific alternative interval is recommended. As noted in the report, I agree that a more frequent update schedule would be preferable. My comments, therefore, will highlight the considerations that affect the design of a specific policy on weight updates.

The cost-of-living index (COLI) is the measurement objective underlying the CPI. The CPI's fixed-weight Laspeyres formula tends to yield a higher estimate of inflation than a COLI with comparable scope, and the difference is referred to as "substitution bias." Economic theory provides an elegant rationale for the use of superlative index formulas, like the Fisher Ideal or the Tornquist, to provide approximations to a COLI. As noted in the General Accounting Office (GAO) report, the President's Fiscal Year 1998 budget, now before Congress, includes a request for funds to produce a BLS superlative index beginning in 2002. The unfortunate limitation of superlative formulas is that their calculation requires current-period expenditure as well as price data, so superlative indexes can be published only with a lag. This precludes their use in the CPI, which is produced monthly and revised only in unusual circumstances. Consequently, the issue addressed by the GAO report is whether retaining the Laspeyres formula, but with a shorter interval between weight updates, would result in a measured rate of inflation that is closer to the movement in a COLI.

Appendix V
Comments From the Bureau of Labor
Statistics

Mr. Bernard L. Ungar--2

AUG 8 1997

In theoretical terms, the issue of update frequency corresponds to the comparison between a fixed-base and a chained Laspeyres index (i.e., a Laspeyres index in which the expenditure base period is updated each period). One cannot, however, measure substitution bias in a fixed-base index by comparing it to its chained counterpart. As noted above, this can only be done by comparing the fixed-base index formula to a corresponding COLI, usually represented by a superlative formula. Since, in theory, neither the chained nor fixed-base version of a given index is "more correct," theory cannot guide the choice of an update interval for the CPI.

It is often assumed that chaining a Laspeyres index (or reducing the interval between weight updates) will reduce the measured inflation rate. Since both are subject to upward substitution bias, it would therefore follow that the chained version would be closer to a COLI. The issue is an empirical one, however, and the evidence is weak. The Greenlees paper cited in the GAO report concludes in part that "One cannot say with certainty that substitution bias increases over time with the age of the market basket, or predict with confidence that more frequent market basket updates would reduce the rate of growth of the CPI." In some situations, in fact, the construction of a chained index can lead to a problem known as "chain drift," which could cause the chained index to rise faster than its fixed-base counterpart. This can occur when there are systematic variations in relative prices and quantities demanded by consumers, because the chained index lacks the theoretical property known as transitivity. That is, if prices and quantities change between period t and period $t+1$, and then return to their original levels in period $t+2$, then the index levels in periods t and $t+2$ need not be equal. For example, if the price of gasoline rises in period $t+1$, but quantity demanded falls, and then the price declines in period $t+2$, a chained Laspeyres index will give a greater weight to the price increase than to the subsequent price decrease. The importance of the drift effect depends primarily on whether relative prices tend to oscillate or diverge over time.

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Comments From the Bureau of Labor
Statistics

Mr. Bernard L. Ungar--3

AUG 8 1997

Neither economic theory nor empirical evidence, therefore, demonstrates the superiority of any particular update interval. Although I support more frequent updates, the Bureau needs to consider carefully what frequency will yield the most accurate CPI and best support the many uses of the index. Furthermore, the development of a concrete proposal for a new updating policy involves a number of related practical questions, such as the length of the base period and the implications of overlapping base periods (such as would occur under annual updating of 2- or 3-year base periods). The BLS is currently studying these questions, although we recognize that the ultimate decision must be based largely on common-sense judgment. We will, of course, make any results from our investigations as widely known as possible. We also will seek the advice of our advisory councils prior to making a final determination.

It should be noted that the BLS budget initiative mentioned above also provides for an expansion in the sample size of the Consumer Expenditure Survey, along with enhancements in the computer systems used to introduce new weights into the CPI. These improvements will reduce the average age of expenditure weights at the time of their introduction, implying that the CPI market basket would be more current regardless of the particular update interval chosen.

Finally, I want to emphasize strongly that the BLS determination of the frequency of CPI weight updates will be based on considerations of technical merit. Potential changes in how the CPI is calculated will continue to be evaluated on the basis of whether they produce a more accurate index and not on whether the changes can be expected to raise or lower the measured rate of price change.

Sincerely yours,



KATHARINE G. ABRAHAM
Commissioner

Comments From the Council of Economic Advisers

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL OF ECONOMIC ADVISERS
WASHINGTON, D.C. 20500
August 8, 1997

MEMORANDUM FOR: The General Accounting Office

FROM : Steven Braun *SMB*

SUBJECT : Comments on the GAO's Report to, "More Frequent Updating of Market Basket Expenditure Weights is Needed"

Background: Representative Henry Gonzalez (the ranking minority member, Committee on Banking and Financial Services, House of Representatives) requested the GAO to examine certain questions surrounding the issue of revising the market basket more often.

Summary of GAO paper: The GAO argues that updating the upper-level CPI weights every 5 years (rather than every 10 or so years) would--during the second 5-year interval--make the CPI more accurate, lower the measured CPI by 0.1 percentage point per year, and reduce the Federal deficit by a cumulative \$11 billion while costing only \$3 million per update.

Summary of CEA response: More frequent updating would be a small improvement and ought to be considered. But we wonder whether the GAO may have overstated the effects of more-frequent updating. We hope that readers do not confuse more-frequent updating with the adoption of a true cost-of-living index.

Further Comments

First, more frequent updating does *not* fix the bias arising from the fixed-market basket structure of the CPI. It simply replaces one out-of-date set of weights with another one that is less out-of-date. Without strong assumptions, theoretical propositions do not support the view that more frequent updating improves the accuracy of the CPI, and so the issue is an empirical matter.

Second, some readers may confuse the recommendation to update more frequently with the issue of whether to publish a superlative index (as recommended by the Boskin Commission). --an issue that the GAO report does not address. Although this distinction is considered on page 38, we suggest making this distinction in the "results in brief" section.

See comment 1.

See p. 28.
See p. 1.

See comment 2.

Now on pp. 22-24.
See p. 1.

**Appendix VI
Comments From the Council of Economic
Advisers**

See comment 3.

Third, the opinion of the GAO differs from the that of John Greenlees at the BLS on the effect of 5-year updating (rather than 10-year updating).¹ Although it is natural that different observers reach different assessments, we recommend acknowledging this disagreement--especially as the raw statistics are identical between the two papers. In a conclusion that was not repeated in the GAO paper, Greenlees writes (page 6),

“There is no definitive evidence that substitution bias increases over time with the age of the market basket. Moreover, among Laspeyres indexes using base periods later than 1985, there is little evidence of a relationship between market basket age and measured inflation in any given year.”

See p. 28.

Although the GAO paper estimates the effect of more frequent updating at 0.1 percentage point on the CPI (for the second of two five-year intervals within a ten-year interval), Greenlees obtains a smaller estimate from the same evidence .

“A five-year update would have about a 0.04 percentage point effect--that is, as compared to updating the market basket every ten years, updating every five years would reduce estimated inflation by 0.04 percentage point in each of the sixth through the tenth year of each cycle.”

¹ John S. Greenlees (February 1997), “Expenditure Weight Updates and Measured Inflation.” Greenlees also cites data tabulated by Mary Lynn Schmidt, “Comparing Market Basket Changes and the CPI,” *Proceedings of the Social Statistics Section, American Statistical Association*, 1995, pp. 121-126.

The following are GAO's comments on the Council of Economic Advisers' (CEA) letter dated August 8, 1997.

GAO Comments

1. To prevent any misunderstanding, we want to clarify that we are recommending that the expenditure weights be updated more frequently than every 10 years or so. We are not recommending a specific time interval (i.e., 5 years) as CEA suggested.

2. We agree that more frequent updating does not fix the bias arising from the fixed market basket structure of the CPI. However, the broad array of economic literature that we reviewed supported the proposition that the CPI would be improved by more frequent updating of expenditure weights. But economic theory is not available to guide the choice of a specific update interval for the CPI. We have added a statement explaining that we did not identify any theoretical guidance on how often expenditure weights should be updated.

3. In our draft report, we did not acknowledge that we disagree with the conclusion of the Greenlees paper because, for the purposes of this report, BLS indicated that there was a relationship between market basket age and measured inflation. BLS estimated that the growth in the CPI could be reduced annually anywhere from 0 to 0.2 percentage point if the expenditure weights were updated on a 5-year basis. In reaching this position, BLS took into account the information and conclusions drawn in the Greenlees paper.

Comments From the Office of Management and Budget

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF MANAGEMENT AND BUDGET
WASHINGTON, D.C. 20503

August 12, 1997

Mr. Bernard L. Ungar
Associate Director
Federal Management and Workforce Issues
U.S. General Accounting Office
Washington, DC 20548

Dear Mr. Ungar:

This letter conveys OMB's comments on the draft GAO report, "Consumer Price Index: More Frequent Updating of Market Basket Weights Needed." Thank you for providing the report for our comment.

We agree with GAO that the nation needs the most accurate CPI possible. The draft report recommends more frequent updating of the expenditure weights used in calculating the CPI. While this is certainly one important option, OMB believes that more frequent updating should be considered by BLS in context with other potential improvements.

We suggest that the report should clarify the standard against which it evaluates the current CPI. Is the current CPI being compared against the ideal cost-of-living measure that was recommended in 1961 by the Stigler Commission and again last year by the Boskin Commission? (Whether or not they agree with the commissions' recommendations, many analysts have used the ideal measure as a standard.) If, by contrast, the report uses another standard for comparison, what is it and why was it chosen?

One reason for thus laying out the basis for comparison is the report's discussion of "substitution bias." Ideal cost-of-living indexes eliminate substitution bias (caused by changes in relative prices) because they reflect both past and current consumption levels. ("Current consumption levels" include the response to price changes.) On the other hand, because the current CPI and other Laspeyres-type indexes include weights from only a base or reference period (not the current period), making that base or reference period more recent would never reflect the response to later price changes. (However, other phenomena, such as simple demand shifts, might be reflected in the revised weights.) As a result, substitution bias would remain in a Laspeyres-type index even with more frequent updating. This, we believe, is a point worth making.

Other comments and suggestions follow:

- Important in itself, the CPI and its component data are also important in the calculation of other economic indexes, such as the national income and product accounts. To consider the consequences of the report's recommendation, we urge that the authors talk with the Bureau of Economic Analysis, for example, to learn their views on more recent CPI expenditure weights.

See pp. 27 and 28.

See comment 1.

**Appendix VII
Comments From the Office of Management
and Budget**

See comment 2.

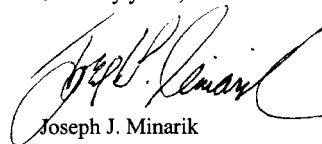
- A sentence on page 5 should be revised to read "CBO estimated that, assuming no other changes in policy or economic assumptions, if updating the weights in 2003 (5 years after the planned 1998 revision) reduced [the] CPI **growth** by 0.1 percentage point **annually**, the deficit would be **lower by a cumulative total of \$10.8 billion** [lower] over the 4-year period of 2004 through 2007." The text should be revised elsewhere as well to clarify differences between growth in the CPI and its level, and also to clarify that the 0.1 percentage point effect is an annual one.

See comment 3.

- The GAO/CBO method for calculating the revenue effect of updated weights may cause misunderstanding because of the rounding rules for income-tax brackets, which can make the year-to-year changes in tax-bracket boundaries somewhat erratic even if change in the CPI is smooth and continuous. For example, in figure 1, the revenue gain from the recommended change actually shrinks from 2004 to 2005; but this is solely because of the rounding rules. Rounding tax brackets seven years hence seems inadvertently to weaken the point of the report's analysis. We suggest that GAO should ask CBO to provide estimates before rounding, which also will help the analysis withstand the inevitable revision of CBO baselines.

Thank you, again, for allowing us to comment on the draft report. Let us commend the GAO for its contribution to the important process of improving the CPI.

Sincerely yours,



Joseph J. Minarik
Associate Director for
Economic Policy

The following are GAO's comments on the Office of Management and Budget's (OMB) letter dated August 12, 1997.

GAO Comments

1. As suggested by OMB, we obtained the views of Bureau of Economic Analysis (BEA) officials on the potential consequences for BEA's work if the CPI expenditure weights were updated more often. The BEA Director stated that the content of Personal Consumption Expenditures (PCE) and the sources of information used to construct it make the potential effect unclear. BEA primarily uses CPI data to adjust the dollar amounts of many items in the PCE. The Director said that the goods and services in the PCE do not all correspond to those in the CPI on a one-to-one basis¹ and that, in adjusting items in the PCE, BEA uses many different price indexes in addition to the CPI.

The BEA Director said he was more concerned with the potential effect of an experimental CPI that BLS began publishing in April 1997. To address lower-level substitution bias, BLS is using a different formula on an experimental basis to aggregate the 94,000 items for which prices are collected each month into the 206 item strata. (See footnote 14 in the background section of this report.) This experimental index does not involve the subject of this report—weighting the 206 item strata for aggregation. The Director said that if and when BLS introduces this change on a permanent basis, changing the aggregation of items at the lower level is more likely to affect BEA's work than changing the frequency of expenditure weights of the CPI.

2. We agree with the clarifications that OMB suggested and have made them throughout the report. The changes make clear that the 0.1 percentage point and the 0.2 percentage point are each an annual reduction in the growth of the CPI, and that the estimates of the effect of such reductions on the federal budget are cumulative totals.

3. The dollar estimates that CBO provided to us and that were included in our draft report factored in the rounding rules for income tax brackets. As suggested by OMB, we discussed with CBO whether it should provide additional estimates without these rounding rules. In essence, the CBO staff with whom we spoke said that setting aside the rounding rules would not produce estimates that differed much from the estimates in the draft.

¹We described the differences in a 1996 letter to Senator Daniel Patrick Moynihan. See *Alternative Poverty Measures* (GAO/GGD-96-183R, Sept. 10, 1996). See enclosure I to the letter that compares the source data used to construct the PCE and the CEX, which is used to develop the expenditure weights in the CPI.

Appendix VII
Comments From the Office of Management
and Budget

According to the staff, the rounding rules would affect which year departed from the trend over the number of years studied, but the cumulative dollars over those years would not change. For that reason, we did not ask CBO to produce additional estimates; therefore, the estimates that appeared in the draft report also appear in this report.

Comments From the Board of Governors of the Federal Reserve System

Note: GAO comments supplementing those in the report text appear at the end of this appendix.



BOARD OF GOVERNORS
OF THE
FEDERAL RESERVE SYSTEM
WASHINGTON, D. C. 20551

DIVISION OF RESEARCH AND STATISTICS

July 31, 1997

Dr. Kathleen K. Scholl
Senior Economist
General Accounting Office
Washington, D.C. 20548

Dear Dr. Scholl:

This letter responds to your request for comments from the Federal Reserve Board staff on the draft GAO report *CONSUMER PRICE INDEX: More Frequent Updating of Market Basket Expenditures is Needed* (GAO job code 410072). The report addresses a very important public policy issue. Chairman Greenspan has testified before Congress on this topic, and Board staff members have written several important research papers that have contributed to the professional discussion of this issue. We are happy to provide you with our thoughts on your draft report.

In assessing the overall conclusions of your report, we find ourselves very much in agreement with the members of the Boskin Commission that you cite in the document. In the absence of other actions to improve the accuracy of the CPI, more frequent updating of the expenditure weights would be desirable. However, other changes to the CPI may do more to improve its accuracy, and we are concerned that your recommendation would not be the most cost-effective use of taxpayer funds; it seems to us to be only a "second-best" solution to this problem.

Like the Boskin Commission, our view is that a "first-best" solution would involve departing from the fixed-weight structure of the CPI. To quote from Chairman Greenspan's testimony of March 4, 1997, "First, we should move away from the concept of a fixed marketbasket at the upper level of aggregation, and move toward an aggregation formula that takes into account the tendency of consumers to alter the composition of their purchases in response to changes in relative prices. Second, we should selectively move away from the current aggregation formula at the lower level of aggregation." The BLS already has an annual version of the CPI that is calculated using superlative index numbers, and we would like to see at least an approximation to superlative index numbers extended to the monthly estimates as well. Longer-term research efforts to improve BLS's quality adjustment procedures—one of the most difficult problems in constructing an accurate measure of the cost of living—also would be valuable as would improved methods to bring new items into the item strata more quickly and the development of new data sources (such as scanner data). We think that the payoff from changes of this type are likely to be much more important in improving the accuracy of the CPI than more frequent updating of expenditure weights alone.

See p. 27.

**Appendix VIII
Comments From the Board of Governors of
the Federal Reserve System**

- 2 -

Now pp. 12 and 13.

Turning now to more specific comments on elements of the report, we believe that your reference (on page 20) to Chairman Greenspan's March 1997 testimony is misleading. Chairman Greenspan did say that out-of-date weights are a source of bias in the CPI. But he did not endorse the specific recommendation of your report. Indeed, as indicated in the quote above, that same testimony called for a more comprehensive approach than more frequent updating of expenditure weights. As a result, we feel this reference should either be eliminated or rewritten to accurately portray his March 1997 testimony.

See pp. 12 and 13.

See p. 28.

We also are concerned that your report overstates the case that more frequent updating of the expenditure weights will reduce the rate of increase in the CPI. The research at the BLS on this subject (by John Greenlees) does not support this conclusion. There is solid evidence that next year's update to the weights will reduce the rate of increase in the CPI by 0.1 to 0.2 percentage point, but this appears to reflect the particulars of the 1982-84 weights. As Greenlees noted, "Indexes using expenditure weights from the years 1982 through 1984 or 1985 generally yield distinctively high inflation estimates." Given this research, we were somewhat surprised to read (on page 5) that the BLS had concluded that more frequent updates would reduce the growth rate of the CPI from 0 to 0.2 percentage point. We suggest that you may want to touch base again with BLS to confirm that this indeed is their official position. We also should note that the most recent paper by Shapiro and Wilcox ("Alternative Strategies for Aggregating Prices in the CPI") supports the Greenlees conclusion that more frequent updating of expenditure weights will not reduce upper-level substitution bias.

See comment 1.

See comment 2.

One omission in the report is a discussion of the methodology and revision history of BEA's PCE chain price index. Until this week's annual revision, the PCE chain-price index had a "Laspeyres tail" in which fixed weights were used for the recent quarters. The revision history of these recent quarters when the Laspeyres tail was shifted forward (in July 1996) or eliminated (in July 1997) and aggregation was performed using the Fisher formula should yield alternative ballpark estimates of how much the routine updating of weights might matter.

We hope these comments will be useful to you. If you have any further questions, please do not hesitate to contact me at (202) 452-3090.

Sincerely yours,



Charles S. Struckmeyer
Assistant Director and Chief, Economic Activity Section
Division of Research and Statistics

The following are GAO's comments on the Federal Reserve's letter dated July 31, 1997.

GAO Comments

1. We agree with the Federal Reserve's comment that the recent paper by Shapiro and Wilcox¹ supported the conclusion in the Greenlees paper that more frequent updating of expenditure weights will not reduce upper-level substitution bias. However, there was a certain data limitation identified in the Greenlees paper, which is probably applicable to the Shapiro and Wilcox paper. This data limitation raised questions in our minds about the conclusions Greenlees and Shapiro and Wilcox drew from their comparisons derived from these data. Each paper compared a price index that was based on 1982 through 1984 expenditure data with a price index that was based on 1986 and later expenditure data. We believe that what Greenlees identified as a potential explanation for the contrasts between the two price indexes—the incorporation of the 1980 census-based geographic samples into the CEX in 1986—could have also affected the Shapiro and Wilcox results, which was a factor their paper did not consider. We should also point out as well that BLS, for purposes of this report, estimated that the growth in the CPI could be reduced from 0 to 0.2 percentage point per year with a 5-year update of expenditure weights. In addition, Shapiro and Wilcox indicated that the trends they found in their research study were not the trends they expected. Referring to these as “elusive empirical puzzles,” they called for additional research in this area of bias in the CPI.

2. We talked with BEA's Director and its Chief Statistician about the Federal Reserve's comment concerning the revision history of its chained price index. We specifically asked about BEA's use of the “Laspeyres tail” in its chained price index and if BEA had any estimates that are based on its experience with this methodology that would indicate how much routine updating of expenditure weights might matter. (Since the index with the Laspeyres tail used fixed weights and the revised chained price index used a Fisher Ideal formula, which is more reflective of current consumer spending, the amount of difference between the two price indexes could indicate the level of effect that would occur with a more frequent updating of expenditure weights.)

The Chief Statistician said that he had looked at the difference between the two price indexes and that using the Laspeyres tail appeared to have a

¹Matthew D. Shapiro and David W. Wilcox. “Alternative Strategies for Aggregating Prices in the CPI,” February 10, 1997.

Appendix VIII
Comments From the Board of Governors of
the Federal Reserve System

very small effect, but he had not calculated the size of its effect apart from other factors that were also changed when the index was revised. He believed these other factors probably had made a greater contribution to the difference between the two indexes than changing the price index formula.

Major Contributors to This Report

Kathleen K. Scholl, Senior Economist
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Appendix IX
Major Contributors to This Report

Related GAO Products

Consumer Price Index: Cost-of-Living Concepts and the Housing and Medical Care Components ([GAO/GGD-96-166](#), Aug. 26, 1996).

Economic Statistics: Status Report on the Initiative to Improve Economic Statistics ([GAO/GGD-95-98](#), July 7, 1995).

Economic Statistics: Measurement Problems Can Affect the Budget and Economic Policymaking ([GAO/GGD-95-99](#), May 2, 1995).

Prescription Drug Prices: Official Index Overstates Producer Price Inflation ([GAO/HEHS-95-90](#), Apr. 28, 1995).

Developing a Consumer Price Index for the Elderly ([GAO/T-GGD-87-22](#), June 29, 1987).

Stabilizing Social Security—Which Wage Measure Would Best Align Benefit Increases With Revenue Increases? ([GAO/IMTEC-85-13](#), Aug. 27, 1985).

Funds Needed to Develop CPI Quality Control System ([GAO/GGD-83-32](#), Apr. 1, 1983).

A CPI for Retirees Is Not Needed Now But Could Be in the Future ([GAO/GGD-82-41](#), June 1, 1982).

A Consumer Price Index for Retirees and Alternatives for Controlling Indexing (Testimony, Apr. 20, 1982).

Measurement of Homeownership Costs in the Consumer Price Index Should Be Changed ([GAO/PAD-81-12](#), Apr. 16, 1981).

Alternatives for Modifying the Indexation of Federal Programs (Testimony, Mar. 10, 1981).

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