



Focus on Prices and Spending



Consumer Price Index: First Quarter 2011

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Current Price Topics

Differences between the Consumer Price Index and the Personal Consumption Expenditures Price Index

In the United States, there are two primary measures of the prices paid by consumers for goods and services. One is the Consumer Price Index (CPI), which is produced by the Bureau of Labor Statistics (BLS); the other is the Personal Consumption Expenditures (PCE) price index, prepared by the Bureau of Economic Analysis (BEA). These two indexes are constructed differently and tend to behave differently over time. For example, in the fourth quarter of 2010, the CPI rose at a 2.6-percent annualized rate, while the PCE price index rose at a 1.7-percent annualized rate, a difference of 0.9 percentage point.¹

Categorizing the Differences

The differences between the CPI and PCE measures of inflation can be summarized into four categories or effects. The following sections quantify the magnitude of these effects over two distinct periods.

Formula effect. The CPI and the PCE index are constructed from different index-number formulas. The CPI index is an average based on a Laspeyres formula, whereas the PCE index is based on a Fisher-Ideal formula. A Fisher-Ideal index is considered a “superlative” index in that it reflects consumer substitution

among detailed items as relative prices change. In practice, superlative indexes are difficult to implement in real time because such indexes require expenditure data for the period that is current, and such data are not available. For example, data on household consumer expenditures that are used to estimate the CPI are not available for the current period. For the Consumer Price Index for Urban Consumers (CPI-U), a Laspeyres index provides an alternative to the Fisher-Ideal index.²

To estimate a “formula effect,” or the differences in the rates of growth between the CPI and PCE caused by the differences in formula, the detailed price and quantity data used to estimate the PCE index can be reaggregated with the use of a Laspeyres price-index formula.

Weight effect. The relative weights assigned to each of the CPI and PCE categories of items are based on different data sources. The relative weights used in the CPI are based primarily on the Consumer Expenditure Survey, a household survey conducted for the BLS by the Census Bureau. The relative weights used in the PCE index are derived from business surveys—for example, the Census Bureau’s annual and monthly retail trade surveys, the Service Annual Survey, and the Quarterly Services Survey.

In order to estimate a “weight effect,” or the effect of using different weight sources on CPI

and PCE index changes, CPI relative weights for comparable item categories can be used to estimate the PCE fixed-weight price index.

Scope effects. The CPI measures the change in the out-of-pocket expenditures of all urban households and the PCE index measures the change in goods and services consumed by all households, and nonprofit institutions serving households. This conceptual difference means that some items and expenditures in the PCE index are outside the scope of the CPI. For example, the expenditure weights for medical care services in the CPI are derived only from out-of-pocket expenses paid for by consumers. By contrast, medical care services in the PCE index include those services purchased out of pocket by consumers and those services paid for on behalf of consumers—for example, medical care services paid for by employers through employer-provided health insurance, as well as medical care services paid for by governments through programs such as

Medicare and Medicaid. These differences can also be isolated and measured, and can be referred to as “scope effects.”

Other effects. A variety of remaining differences consisting of seasonal-adjustment differences, price differences, and residual differences must be taken into account for a complete understanding of the differences between the CPI and the PCE index. For example, the PCE index for airline fares is based on passenger revenues and the number of miles traveled by passengers. The CPI, however, is based on prices charged for air travel for sampled routes.

Reconciliation

Using this methodology, McCully, Moyer, and Stewart³ reconciled the CPI and the PCE price index for 2002 through the first half of 2007. A summary of their reconciliation, as well as an updated reconciliation for the fourth quarter of 2010, is presented in table 1.

Table 1. Summary of differences between the CPI and PCE price index for the first quarter of 2002 through the second quarter of 2007 and for the fourth quarter of 2010

Effect and price change	2002 through first half of 2007	Fourth quarter, 2010
PCE chain-type price index (average annual percent change)	2.5	1.7
Plus formula effect (percentage points)	0.17	0.11
Equals PCE fixed-weight price index (average annual percent change)	2.7	1.83
Plus weight effect (percentage points)	0.66	0.61
Plus scope effect (percentage points)	-0.53	-0.11
Plus other effects (percentage points)	0.04	0.3
Equals CPI (average annual percent change)	2.9	2.6

Source: More detailed, updated monthly and quarterly reconciliations of the CPI and the PCE price index appear each month in table 9.0U at http://www.bea.gov/national/nipaweb/nipa_underlying/SelectTable.asp#S9 (visited April 26, 2011).

During both periods shown in table 1, the CPI rose more than the published PCE chain-type index. As expected, the formula effect was positive, reflecting differences between the Fisher-Ideal formula used in the PCE chain-type price index and the Laspeyres fixed-weight price index used in the CPI.

In the earlier (2002–07) reconciliation, the majority of the weight effect was due to shelter costs. Shelter has a significantly higher relative weight in the CPI than the PCE, and shelter inflation generally outpaced overall inflation from 2002–2007. With lower shelter inflation in 2010, the impact of different shelter weights between the CPI and the PCE price index has fallen. Instead, increases in gasoline prices, coupled with the larger relative weight for gasoline in the CPI, contributed most to the weight effect in the fourth quarter of 2010.

The scope effect in 2002–07 was a negative 0.53 percentage point, meaning that it was a category which had the effect of increasing the PCE index faster than the CPI. Again, the effect in 2002–07 was due primarily to how changes in medical care costs are measured in the CPI and PCE. For the CPI, medical care expenditures include only those directly purchased by consumers. For the PCE index, medical care costs include those purchased directly by consumers as well as those paid for on behalf of consumers (e.g., through employer-provided health insurance and through Medicare and Medicaid). In effect, the relative weight of medical care

is significantly higher in the PCE index. This difference in the concept of medical care services accounted for a large portion of the 2002–07 scope effect, as medical care costs outpaced overall inflation during that period. The scope effect in the fourth quarter of 2010 (–0.11 percentage point), however, was much smaller than in 2002–07, because medical care inflation in late 2010 was more modest.

Finally, “other effects” during 2002–07 were negligible. In the fourth quarter of 2010, the 0.3-percentage-point effect was caused primarily by differences between BLS and BEA in the treatment for estimating, and the timing for revising, seasonally adjusted data.

As the preceding discussion shows, the CPI and the PCE chain-type price index provide a measure of the change in prices paid by consumers for goods and services. Differences in formulas, weights, scope, and other methods can cause the two indexes to behave differently over time.

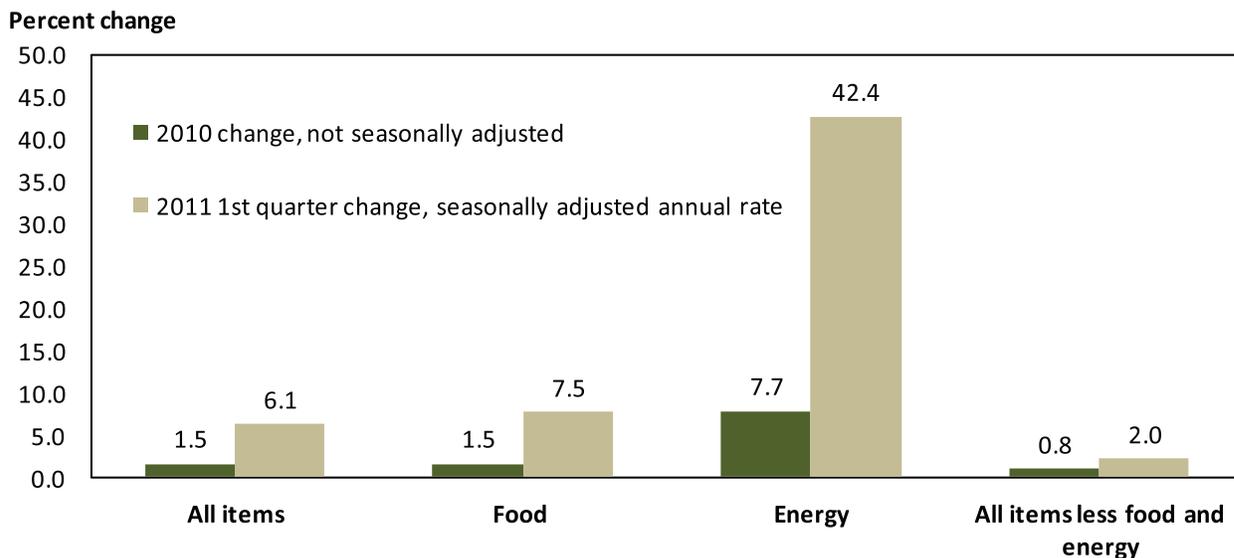
Current Price Trends

Inflation in the First Quarter of 2011 Was Caused Primarily by Higher Food and Gasoline Prices

All Items

The all-items Consumer Price Index for All Urban Consumers (CPI-U) rose at a 6.1-percent seasonally adjusted annual rate during the first quarter of 2011. (See chart 1.) This rise follows increases of 2.9 percent and 3.3

Chart 1. **CPI-U percent changes: all items, food, energy, and all items less food and energy for 2010, and first quarter 2011**



SOURCE: U.S. Bureau of Labor Statistics

percent in the third and fourth quarters of 2010, respectively.

The all-items index was up 2.7 percent, from March 2010 to March 2011. In 2010, this index increased 1.5 percent.

Energy

Energy prices rose at a seasonally adjusted annual rate of 42.4 percent in the first quarter of 2011, almost double the rate in the last half of 2010. Energy prices declined in the first half of 2010 before turning up in the second half and ending the year about 8 percent above the December 2009 level. The sharp increase in the first quarter of 2011 contributed to more than half the increase in the all-items index.

The rise in the energy index in the first quarter of 2011 was led by increases in gasoline and fuel oil. Gasoline prices were up at an annualized 71.2 percent in the first quarter, while the fuel oil index more than doubled on an annualized basis. Electricity and natural gas prices increased 2.7 and 3.3 percent, respectively, in the first quarter of 2011.

Crude oil prices—and, subsequently, retail gasoline and fuel oil prices—have been quite volatile over the past few years. From July 2007 to July 2008, gasoline prices rose sharply, increasing 37.9 percent (not seasonally adjusted); crude oil prices peaked in July 2008 at more than \$134 a barrel. During the last 5 months of 2008, crude oil prices collapsed to

less than \$32 a barrel, and as a consequence, retail gasoline prices fell by more than 50 percent. In 2009, pump prices turned sharply higher again, increasing more than 50 percent as crude oil prices rebounded to around \$70 a barrel by the end of 2009. Retail gasoline prices rose 13.8 percent in 2010, with crude oil up to around \$90 a barrel by the end of the year. As of March 2011, crude oil prices had again topped \$110 a barrel.⁴

Food

Food prices rose at a 7.5-percent annual rate in the first quarter of 2011, with grocery store prices increasing at an 11.2-percent rate. The increase in grocery store prices outpaced a 2.8-percent increase in the prices of food away from home.

Double-digit increases were seen in 3 of the 6 major grocery store food groups in the first quarter. The largest rate of increase was in the index for fruits and vegetables, which increased at a 23.3-percent annual rate. Meats, poultry, fish, and eggs increased at a 13.5-percent rate; nonalcoholic beverages and beverage materials rose at a 10.4-percent annual rate.

The jump in prices of fruits and vegetables was led by a 28.6-percent increase in the prices of fresh fruits and vegetables, with fresh vegetables increasing at a 69.3-percent rate because of bad weather in many areas. Fresh fruit prices decreased at a 3.2-percent rate, caused primarily by an 18.2-percent drop in the prices of oranges. The increase in fresh

vegetable prices was caused by substantial increases of 147.1 percent and 227.8 percent in the prices of lettuce and tomatoes, respectively.

The 13.5-percent jump in prices for meats, poultry, fish, and eggs was led by a 20.0-percent increase in meat prices. The four major food items within the beef and veal index posted double-digit price increases. The same was true for all major food items within the pork index. The index for other meats saw a relatively more moderate increase of 6.5 percent. Poultry prices were up 3.3 percent, fish and seafood 9.5 percent. Bucking the trend was the price of eggs—down 7.7 percent for the quarter, following an increase of 6.1 percent in 2010.

Prices of the remaining grocery store food groups also increased—dairy and related products at an 8.4-percent annual clip, followed by other food at home and cereals and bakery products at 7.1 percent and 5.7 percent, respectively. The increase in the prices of dairy and related products was led by increases of 19.0 percent and 15.8 percent in the prices of fresh whole milk and fresh nonwhole milk, respectively. The increase in the index for other food at home can be attributed in part to the 25.8-percent jump in the index for fats and oils, including 44.4-percent and 46.4-percent increases in the prices of butter and margarine, respectively. Finally, within cereals and bakery products, double-digit price increases were registered for cereals and cereal products, flour and

prepared flour mixes, and fresh biscuits, rolls, and muffins. The price of bread increased at a relatively modest 3.1-percent rate.

The acceleration in grocery store price changes in the last half of 2010 and the first quarter of 2011 follows a drop in these prices in 2009 and modest inflation in the first half of 2010. Grocery store price inflation was relatively high during most of 2008 but then fell sharply in 2009, decreasing 2.9 percent, year over year, from November 2008 to November 2009, the sharpest annual drop in grocery store prices since June 1959.

All items less food and energy

The index for all items less food and energy rose at a 2.0-percent annual rate in the first quarter of 2011 after rising 0.8 percent in the previous two quarters. Shelter, the largest component of this category, increased at a rate of 1.3 percent in the first quarter. Within transportation, the index for airline fares increased 28.0 percent in the first quarter after increasing 23.7 percent in the fourth quarter of 2010. The latter increase followed a 3.9-percent decline in the third quarter of 2010. In addition to airline fares, prices for new vehicles increased 6.4 percent in the first quarter of 2011 after declining 1.7 percent in the fourth quarter of 2010. Similarly, the used cars and trucks index increased 2.5 percent after declining 2.3 percent in the fourth quarter of 2010.

In other areas, medical care prices rose 2.9 percent in the first quarter of 2011, following similarly modest increases in the last three

quarters of 2010. Within medical care, prices for prescription drugs were up 5.3 percent. The recreation index was up 1.8 percent in the quarter, with most items increasing; a notable exception was a 12.4-percent decline in the price of television sets. The index for education and communication also increased 1.8 percent. Postage and delivery services posted a 17.0-percent increase, driven by increases of 15.9 percent and 37.1 percent in the postage and delivery services, respectively. Finally, the index for other goods and services registered a 0.6-percent increase in the first quarter.

The apparel index fell at a 1.5-percent seasonally adjusted annual rate in the first quarter. Men's and boys' apparel declined 2.3 percent, driven by a drop of 4.0 percent in men's apparel. Within men's apparel, men's suits, sports coats, and outerwear fell 12.4 percent, men's furnishings dropped 9.0 percent, and men's shirts and sweaters fell 8.3 percent. The exception in men's apparel was men's pants and shorts, rising 6.8 percent during the quarter. Boys' apparel increased 5.9 percent over the quarter. Women's and girls' apparel exhibited a 2.3-percent decline, with price declines across the board except for women's dresses, which increased 32.7 percent. Footwear was up 1.0 percent in the quarter, and infants' and toddlers' apparel decreased 12.7 percent. Prices for watches and jewelry were up 13.4 percent and 7.2 percent, respectively, during the quarter.

In sum, while food and energy inflation has accelerated recently, inflation for all items

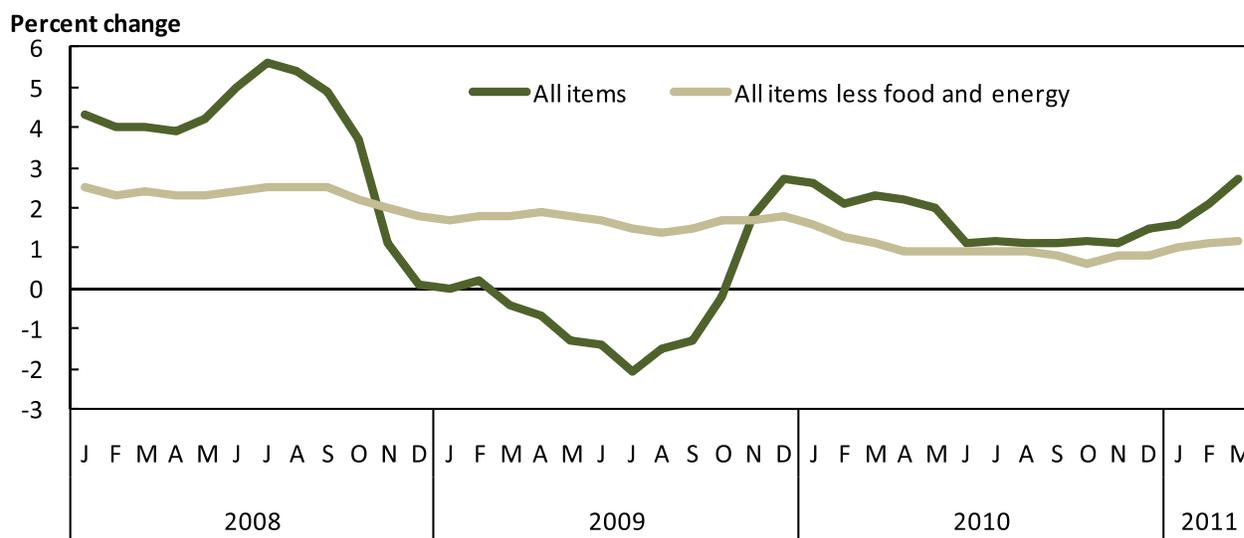
less food and energy remains fairly modest. (See chart 2.)

Price movements described in this text reflect data as released on April 15, 2011. All 12-month and longer percent changes reflect data that are not seasonally adjusted. Percent changes covering less than a year are based

on seasonally adjusted annual rates, unless otherwise noted. Seasonally adjusted CPIs and percent changes are subject to annual revision.

Additional information is available from the CPI information and Analysis section, at cpi_info@bls.gov or (202) 691-7000.

Chart 2. **Twelve-month percent change, all items and all items less food and energy, January 2008–March 2011**



SOURCE: U.S. Bureau of Labor Statistics

Notes

¹ This article is, in large part, a summary of a much more detailed description, which can be found in Clinton P. McCully, Brian C. Moyer, and Kenneth J. Stewart, “Comparing the Consumer Price Index and the Personal Consumption Expenditures Price Index,” *Survey of Current Business*, November 2007, pp. 26–33. The more detailed article can be found online at http://www.bea.gov/papers/pdf/cpi_pce.pdf (visited April 26, 2011).

² Of note, BLS does publish the Chained Consumer Price Index for All Urban Consumers (C-CPI-U), which, like the PCE index, is based on a superlative index-number formula that better reflects consumer substitution among item categories of items. This superlative CPI, which is based on a Törnqvist formula, is not included in the analysis presented here. Because both the C-CPI-U and the PCE index are based on superlative index-number formulas, they tend to behave more similarly over time. That said, these two indexes can still move differently because of scope, weight, and other effects.

³ McCully, Moyer, and Stewart, “Comparing the Consumer Price Index.” (2007).

⁴ Energy Information Administration; see “Petroleum & Other Liquids” (U.S. Energy Information Administration, April 27, 2011), http://tonto.eia.doe.gov/dnav/pet/pet_pri_wco_k_w.htm (visited April 27, 2011).