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Jonathan Church  
*Bureau of Labor Statistics*

Kenneth J. Stewart  
*Bureau of Labor Statistics*

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# The Consumer Price Index and the 'Median CPI'

## **Abstract**

The broadest measure of consumer price change is the Consumer Price Index for All Urban Consumers (CPI-U), published each month by the U.S. Bureau of Labor Statistics (BLS). Shortly after the publication of the CPI, the Federal Reserve Bank of Cleveland publishes its 'median CPI'. This article summarizes the difference between these two measures of retail inflation.

## **Keywords**

Bureau of Labor Statistics, BLS, Consumer Price Index, CPI, median CPI

## **Comments**

### **Suggested Citation**

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## The Consumer Price Index and the 'median CPI'

Authors: Jonathan Church and Kenneth J. Stewart

**T**he broadest measure of consumer price change is the Consumer Price Index for All Urban Consumers (CPI-U), published each month by the U.S. Bureau of Labor Statistics (BLS). Shortly after the publication of the CPI, the Federal Reserve Bank of Cleveland publishes its 'median CPI'.<sup>1</sup> This article summarizes the difference between these two measures of retail inflation.

**Differences between the CPI-U and the 'median CPI'.** The CPI-U measures the average price change urban consumers face each month, from food to gasoline to shoes, and represents the rate of inflation the average urban American is experiencing. As such, the CPI is a vital tool for assessing the performance of the economy

### Related articles

More BLS articles and information related to the CPI are available online at the following links:

- "Addressing misconceptions about the Consumer Price Index," *Monthly Labor Review*, <http://www.bls.gov/opub/mlr/2008/08/art1full.pdf>.
- "Will the 2012 drought have a bigger impact on grocery prices than the 1998 drought," <http://www.bls.gov/opub/btn/volume-1/will-the-2012-drought-have-a-bigger-impact-on-grocery-prices-than-the-1988-drought.htm>

and for adjusting Social Security cost-of-living adjustments (COLAs), poverty thresholds, and federal income tax brackets.

However, some researchers are not necessarily interested in everything a consumer buys; their sole focus may be on what they perceive to be the core or 'underlying' rate of inflation. For example, some researchers focus on the CPI for all items less food and energy, which excludes items whose prices may be volatile due to severe weather conditions or international political instability.

An alternative way some researchers estimate the underlying rate of inflation is to calculate the 'median' price change experienced by consumers. For this reason, the Federal Reserve Bank of Cleveland publishes the 'median CPI'. Using a set of categories, and sorting them from the lowest to the highest price change, the median CPI uses the middle or median price change as its estimate of the underlying rate of inflation.

**How the 1-month median CPI is calculated.** To calculate the median CPI, the Federal Reserve Bank of Cleveland divides the spectrum of consumer items into 45 item categories. Each category is sorted from lowest to highest percent change for the month (the percent changes are seasonally adjusted and annualized). Table 1 shows a subset of item categories sorted by price change for September 2013.<sup>2</sup> The second column lists the annualized 1-month change (or what the 12-month change would be if the September change happened 12 months in a row) and the third column lists the 'relative importance', or relative weight of each item category. In the fourth column, the cumulative CPI relative expenditure weights expressed as the percentage of the total are summed. The median CPI is simply the price change for the item category that crosses the 50 percent cumulative relative importance threshold. In this case, the 1-month percent change in the median CPI for September 2013 was the price change for Motor vehicle maintenance and repair,

**Table 1**

September 2013 Median CPI for selected components			
Component	Annualized 1-month percentage change	Relative importance	Cumulative relative importance
Fresh fruits & vegetables	-12.3	1.018	1.018
Women's & girls' apparel	-11.5	1.507	2.525
Footwear	-8.4	0.7	3.225
Lodging away from home	-5.0	0.747	3.973
Infants' & toddlers' apparel	-4.3	0.191	4.163
Processed fruits & vegetables	-3.2	0.296	4.460
Leased cars and trucks	1.8	0.369	45.196
New vehicles	2.0	3.18	48.375
Cereals & bakery products	2.1	1.23	49.605
Motor vehicle maintenance & repair	2.1	1.153	50.758
Motor vehicle insurance	2.4	2.542	53.300
Public transportation	11.3	1.163	99.295
Watches & jewelry	13.5	0.316	99.611
Car and truck rental	14.8	0.069	99.681
Fuel oil and other fuels	20.5	0.319	100.000

SOURCE: U.S. Bureau of Labor Statistics.

which crossed the cumulative relative importance threshold at 50.758. Because Motor vehicle maintenance and repair rose at an annualized 2.1-percent rate in September—which translates into a 0.2 percent increase on a monthly basis—the ‘median CPI’ ticked up 0.2 percent in September, the same as the actual CPI.<sup>3</sup>

### Price trends: Small increases in energy and food accompany modest overall inflation

#### All items

The U.S. all items Consumer Price Index for All Urban Consumers (CPI-U) increased at a 1.7-percent seasonally adjusted annual rate (SAAR) during the third quarter of 2013. This follows increases of 2.1 percent and 1.0 percent in the first and second quarters, respectively. For the first 9 months of 2013, the index has increased at a 1.6-percent SAAR. This compares with a rise of 1.7 percent for 2012.

The energy index rose 3.2 percent in the third quarter of 2013, compared with a 33.0-percent annualized rate in the

third quarter of 2012. The food index and the index for all items less food and energy grew at slower rates, up 1.3 and 1.6 percent, respectively, in the third quarter. See chart 1.

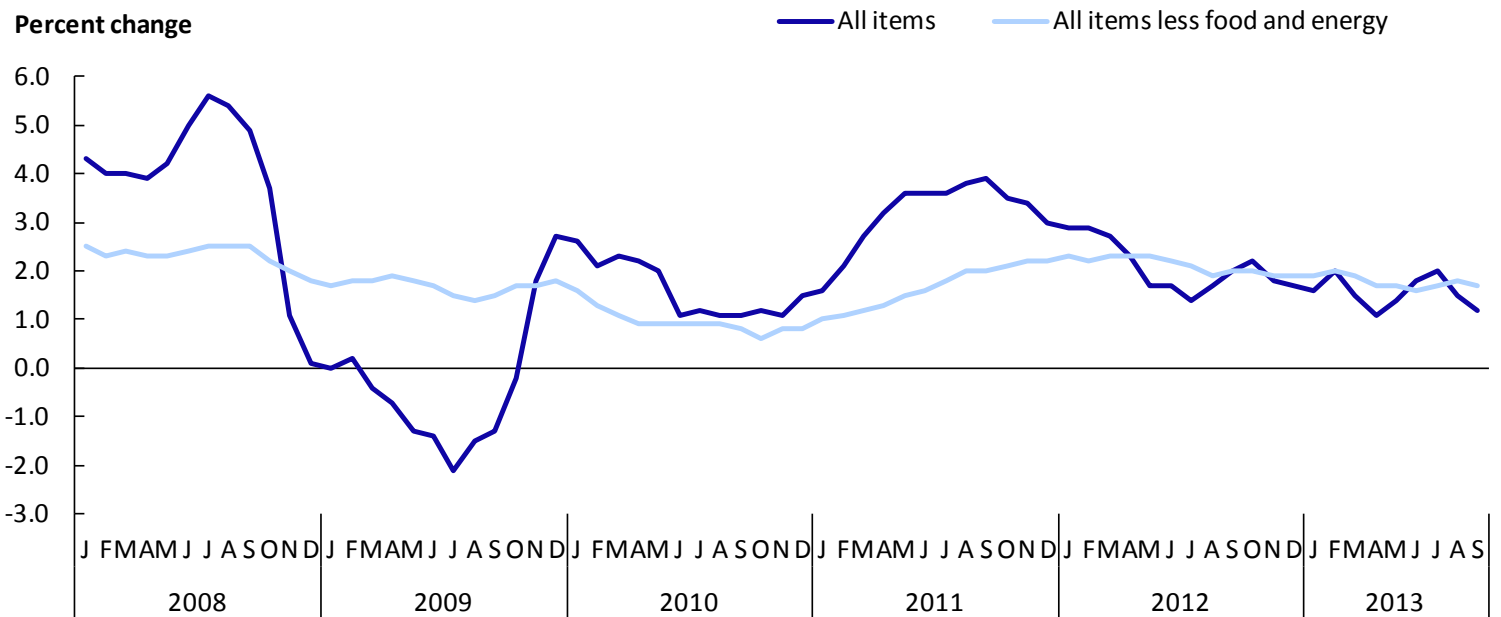
#### Energy

The energy index continued to fluctuate from quarter to quarter. The third quarter’s 3.2-percent rise followed a second-quarter decline of 2.7 percent and a first-quarter climb of 3.7 percent. Overall, the energy index was up 0.5 percent in 2012 and 6.6 percent in 2011. Reflecting how high gas prices were in the summer of 2008, energy prices have decreased at an average annual rate of 0.7 percent from September 2008 to September 2013. Measured over the 4-year period from September 2009 to September 2013, energy prices increased at an average annual rate of 5.3 percent.

Household energy decreased 1.9 percent, with a 12.9-percent decline in natural gas more than offsetting a 13.6-percent increase in fuel oil. Electricity prices were relatively unchanged, increasing 0.1 percent over the

Chart 1

Twelve-month percent change, All items and All items less food and energy, January 2008–September 2013



Source: U.S. Bureau of Labor Statistics.



quarter. The decline in the household energy index follows three consecutive quarters of increases: 7.9 percent during the second quarter, 3.2 percent during the first quarter, and 4.7 percent during the fourth quarter of 2012. Overall, household energy is up 3.4 percent on a 12-month basis.

The motor fuel index rose 7.1 percent during the third quarter, a much more modest increase than the 62.1 percent jump in the third quarter of 2012. The gasoline index was up 6.5 percent, and the other motor fuels index rose 20.6 percent. The increase in gasoline prices followed an 8.8-percent decline in the second quarter and a 4.8-percent increase in the first quarter. Motor fuel index decreased 7.4 percent in the last 12 months. Gasoline prices were down 7.5 percent over the last 12 months, compared with 12-month changes for all items and all items less food and energy of 1.2 percent and 1.7 percent, respectively.

In sum, energy price movements in the third quarter were relatively modest, with energy prices rising 3.2 percent, driven by a 1.9-percent decrease in household energy prices and a 7.1-percent increase in motor fuel.

### **Food**

Food prices increased at a slightly higher rate of 1.3 percent in the third quarter of 2013, after rising 1.1 percent in the second quarter and 0.8 percent in the first quarter. Consistent with its slow quarterly rates of growth, the food index increased at an annualized rate of 1.0 percent through the third quarter, after climbing 1.8 percent in 2012, and rising at a 1.8-percent annualized rate from September 2008 to September 2013. Grocery store food prices rose 1.0 percent in the third quarter, after being essentially unchanged in the first and second quarters.

Four of the six major grocery categories increased during the quarter. Fruits and vegetables saw the largest increase, rising 7.1 percent. The meats, poultry, fish, and eggs index was next, increasing 3.4 percent in the quarter. Some notable increases in this category were a 21.5 percent increase in bacon prices and a 20.9

percent rise in the index for pork chops. Prices for eggs, however, decreased 21.2 percent. The index for dairy and related products rose 1.8 percent, after two consecutive quarters of declines (2.4 percent in the first quarter and 3.7 percent in the second quarter). Cereals and bakery products prices increased at a rate of 0.6 percent, slowing from a 2.5-percent increase in the second quarter; a decline in the prices of Cereals and cereal products of 3.8 percent was more than offset by an increase of 1.8 percent in bakery products.

The index for nonalcoholic beverages and beverage materials declined 3.4 percent during the quarter, continuing recent decreases of 2.8 percent and 2.5 percent in the first and second quarters, respectively. Coffee prices continued relatively large declines in prices, decreasing 7.2 percent during the quarter, after decreasing 9.7 percent in the first quarter and 13.1 percent in the second quarter. The other major category of food at home experiencing a decline was in the other food at home category, which decreased a modest 2.7 percent. Notable price movements within this category include a 15.6-percent decline in butter prices and a 14.2-percent decline in soup prices.

Food away from home price growth has remained relatively consistent throughout 2013. The food away from home index increased 1.8 percent, 2.7 percent, and 1.7 percent in the first, second, and third quarters of 2013, respectively. The 12-month increase was 1.9 percent for September. The index for food at employee sites and schools declined 8.8 percent in the third quarter, after six consecutive quarterly increases. The index for food from vending machines and mobile vendors had the next largest third-quarter decline (3.5 percent) among the major index categories under food away from home. The third-quarter increases in the indexes for full service meals and snacks, limited service meals and snacks, and other food away from home were 1.6 percent, 1.6 percent, and 2.0 percent, respectively.

### **All items less food and energy**

The index for all items less food and energy rose at a 1.6 percent seasonally adjusted annual rate (SAAR) in the third

quarter of 2013, about the same as the increases of 1.6 percent, 2.1 percent, and 1.5 percent during the last three quarters. The 12-month percent change was 1.7 percent. The shelter index increased 2.5 percent in the third quarter, following increases of 2.4 percent in each of the first two quarters of 2013. Shelter also increased 2.4 percent during the last 12 months ending September 2013. Within the shelter index, owners' equivalent rent (2.5 percent) rose less than residential rent (3.3 percent) in the third quarter. The residential rent index also rose more quickly than the owners' equivalent rent index in the second quarter (2.7 percent versus 2.3 percent) and first quarter (2.9 percent versus 2.1 percent). Similarly, the 12-month percent change for residential rent (3.0 percent) exceeds the corresponding figure (2.2 percent) for owners' equivalent rent. Lodging away from home declined 3.5 percent in the third quarter, but increased 1.5 percent from September 2012 to September 2013.

Within transportation items, a decline of 2.0 percent in the used cars and trucks index was balanced by a 1.1 percent increase in the new vehicles index. Airline fares fell at a 14.5-percent annual rate in the third quarter.

Medical care (4.4 percent), education (0.5 percent), other goods and services (2.5 percent), and apparel (0.8 percent) all exhibited modest price growth in the third quarter. Recreation declined 0.4 percent, after modest growth in the second quarter (0.1 percent) and first quarter (1.8 percent). Communication rose 0.1 percent in the third quarter, after decreasing 3.2 percent in the previous quarter, and was relatively flat at annualized 0.1 percent rate through September 2013.

Household furnishings and operations declined 1.8 percent in the third quarter of 2013. Prescription drug prices rose 6.0 percent in the third quarter, after two consecutive quarters of modest declines. Medical care services increased 4.7 percent from July to September, after 3.4 percent and 1.6 percent increases in the first two quarters of the year. Hospital services drove the increase in medical care services with a 12.7-percent rise in its index. Dental services (2.7 percent), eyeglasses and eye care (3.5 percent), and services by other medical professionals

(2.9 percent) rose more modestly. Tobacco prices (up 7.9 percent) drove the third-quarter increase in other goods and services (2.5 percent).

Television prices continued to drop by double-digit amounts. The television index saw a 17.6-percent decline, after decreases of 11.5 percent in the second quarter, 16.6 percent in the first quarter, and 14.7 percent in the fourth quarter of 2012. The index for photographic equipment and supplies also saw a double-digit decline, decreasing 12.7 percent in the third quarter and 16.2 percent in the second quarter, after a 13.7-percent increase in the first quarter. The toy index declined 11.9 percent in the third quarter. Educational books and supplies were barely changed at 0.1 percent in the third quarter, after increases of 5.7 and 5.1 percent in the first and second quarters of 2013, but the index for college textbooks rose 6.7 percent during the quarter.

In conclusion, overall inflation was modest in the third quarter of 2013. The all items index increase of 1.7 percent was accompanied by relatively small increases of 3.2 percent in the energy index and 1.3 percent in the index for food. Thus, the increase in the index for all items less food and energy (1.6 percent) was roughly the same as the increase in the aggregate index for all items.

Price movements described in this article reflect data released on October 30, 2013. All percent changes of 12 months or greater reflect data that are not seasonally adjusted. Data are annualized if the period covered is greater than a year. Percent changes covering less than a year are based on seasonally adjusted annual rates, unless otherwise noted. CPI seasonally adjusted indexes and percent changes are subject to annual revision. ■

This **Beyond the Numbers** article was prepared by Jonathan Church and Kenneth J. Stewart, economists in the Office of Prices and Living Conditions, U.S. Bureau of Labor Statistics. Email: [church.jonathan@bls.gov](mailto:church.jonathan@bls.gov). Telephone: (202) 691-5379.

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<http://www.bls.gov/opub/btn/volume-2/the-consumer-price-index-and-the-'median-cpi'.htm>.

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**Notes**

1. See <http://www.clevelandfed.org/research/data/us-inflation/mcpi.cfm>.
2. For the current median CPI from the Federal Reserve Bank of Cleveland, see <http://www.clevelandfed.org/research/data/us-inflation/mcpitable.cfm>.
3. Shelter prices are often the 'median CPI' category because rent, and especially owners' equivalent rent, have large weights in the U.S. CPI, and because they typically show very stable inflation. In response to this, the Federal Reserve Bank of Cleveland changed its methodology in 2007 to divide owners' equivalent rent (which is about 24 percent of the CPI-U) into four separate regional indexes. See <http://www.clevelandfed.org/research/data/us-inflation/revmcpicpi.cfm> for more details.