

Economic Trends

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FEDERAL RESERVE BANK
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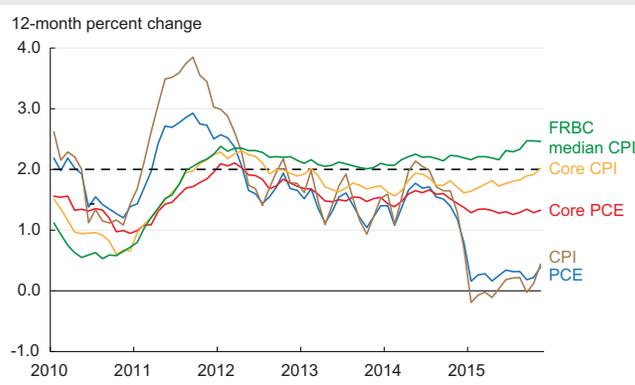
Recent Inflation Trends

Todd Clark and Christian Garciga

The Federal Reserve's Federal Open Market Committee (FOMC) has set a long-run objective for consumer price inflation, as measured by the price index for Personal Consumption Expenditures (PCE), of 2.0 percent. For some time, PCE-based measures of inflation in the US have fallen short of this objective. The year-over-year percent change in the PCE price index was 0.4 percent in November, the most recent observation available; this inflation measure has been below 0.5 percent throughout 2015. The year-over-year percent change in the core PCE price index (which excludes food and energy prices) was 1.3 percent in November; this indicator has been below 1.5 percent every month of the year.

CPI measures of inflation paint a more mixed picture of price trends. Overall CPI inflation, like PCE inflation, has been stable at an extremely low level. On a year-over-year basis, overall CPI inflation was 0.4 percent in November. But measures of core CPI inflation have been drifting up. The core CPI (which excludes food and energy prices) was 2.0 percent in November, compared to 1.6 percent at the beginning of the year. On a year-over-year basis, the median CPI published by the Cleveland Fed (which excludes all items except the one in the middle of the price-change distribution) was 2.5 percent in November, up from 2.2 percent in January.

Inflation Measures: 12-Month Percent Change



Last observation: November 2015.

Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Federal Reserve Bank of Cleveland.

What do these recent moves in 12-month inflation rates mean for underlying trend inflation rates? Trend inflation can be thought of as the rate of inflation that would be expected to prevail if there were no temporary factors, such as a level of economy activity below the economy's potential, influencing the inflation rate. Put another way, trend inflation is the inflation rate that we would expect after temporary factors subside.

There are a number of ways to estimate trend inflation. Different approaches can be reasonable because, with the available data, it can be difficult to distinguish a change in trend from a persistent deviation of inflation from the trend. One model might attribute a long-running change in inflation to a change in the trend, while another attributes the change to a persistent deviation of inflation from an unchanged trend. Both models may nonetheless predict a similar path of inflation in the future.

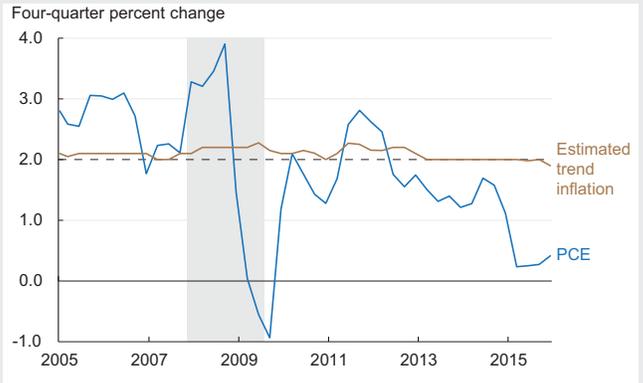
This article compares the implications of four different measures of the inflation trend. The measures have been found to forecast relatively well, yet they are quite different. Three stood out in a recent research study which compared how well different measures of trend inflation forecasted inflation from 1975 through 2012 (see Clark and Doh 2014). The fourth is a new model of trend inflation that makes use of data on both inflation and long-run inflation expectations from surveys in estimating trend inflation (see Chan, Clark, and Koop 2015).

Our analysis uses quarterly data on overall PCE inflation, core PCE inflation, and core CPI inflation through late 2015 to assess what each model says about the current trend rate of inflation and what each implies for the inflation outlook. (For comparison, earlier analyses are available from 2014 and 2015.) For the fourth quarter of 2015, the nowcasts of inflation obtained from the methods of Knotek and Zaman (2014) are used as actual values of fourth-quarter inflation rates. These nowcasts reflect published monthly PCE and CPI prices for October and November and forecasts for December. Note that the charts below show historical inflation rates measured on a four-quarter basis, as opposed to the 12-month basis used in the chart above.

Four Measures of Trend Inflation

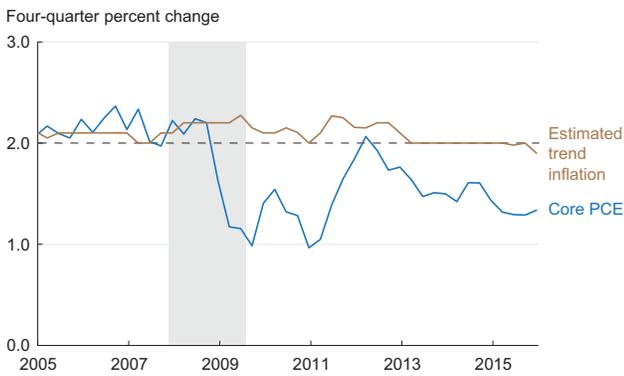
One approach to measuring trend inflation (denoted survey-based trend inflation below) is to define it as the long-run forecast of professional forecasters. The forecast used is the 10 year annual-average inflation forecast from the Survey of Professional Forecasters (SPF). By this measure, trend inflation has remained stable: The survey estimates of long-run inflation haven't changed much. This definition of trend inflation implies that the recent decline in PCE inflation (overall and core) is a persistent deviation from an unchanged trend, rather than a change in the trend itself. The same is true for core CPI inflation, although the recent rise in core inflation means the deviation of inflation from the trend has declined in recent months.

Survey-Based Trend Inflation: PCE



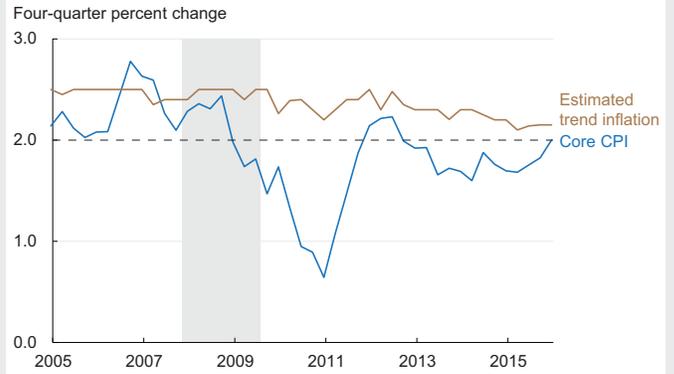
Note: Shaded bar indicates a recession.
Sources: Bureau of Economic Analysis, Survey of Professional Forecasters.

Survey-Based Trend Inflation: Core PCE



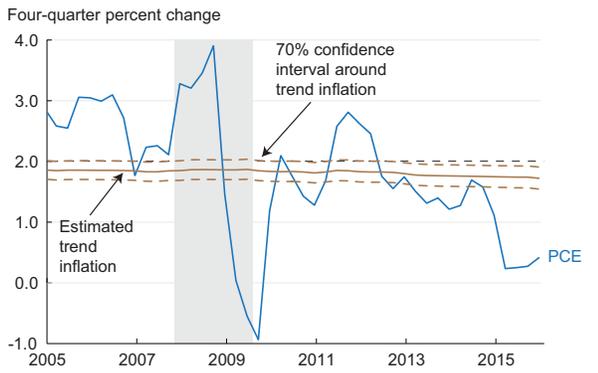
Note: Shaded bar indicates a recession.
Sources: Bureau of Economic Analysis, Survey of Professional Forecasters.

Survey-Based Trend Inflation: Core CPI



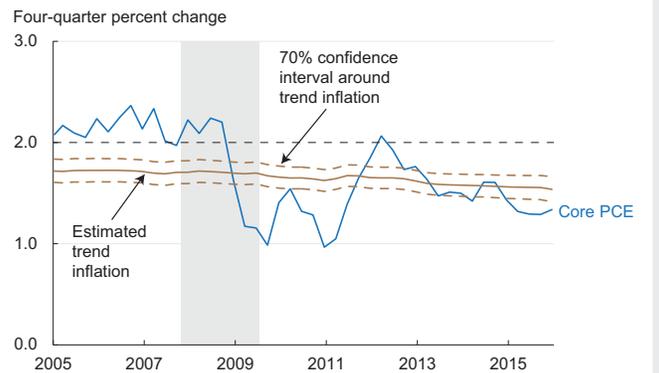
Note: Shaded bar indicates a recession.
Sources: Bureau of Labor Statistics, Survey of Professional Forecasters.

Trend Inflation from Model 1: PCE



Note: Shaded bar indicates a recession.
Source: Bureau of Economic Analysis, authors' calculations.

Trend Inflation from Model 1: Core PCE

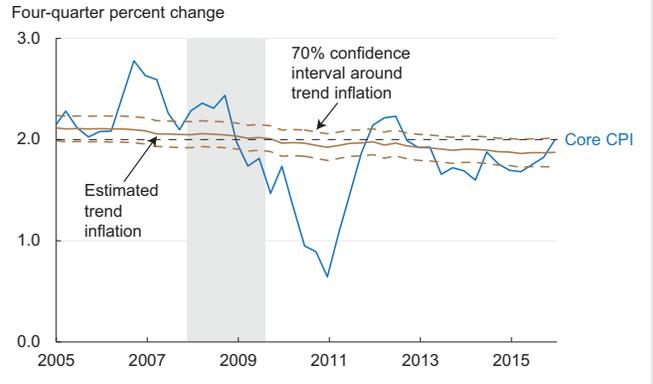


Note: Shaded bar indicates a recession.
Source: Bureau of Economic Analysis, authors' calculations.

A second measure of trend inflation can be obtained from a statistical model (denoted Model 1 at right) that uses information from both inflation and long-run inflation expectations obtained from the Survey of Professional Forecasters (see Chan, Clark, and Koop 2015 for details). These estimates imply trend inflation to be stable, at levels below 2 percent: 1.7 percent for overall PCE inflation, 1.5 percent for core PCE inflation, and 1.9 percent for core CPI inflation. Accordingly, at present, overall PCE inflation is far below trend, core PCE inflation is slightly below trend, and core CPI inflation is slightly above trend.

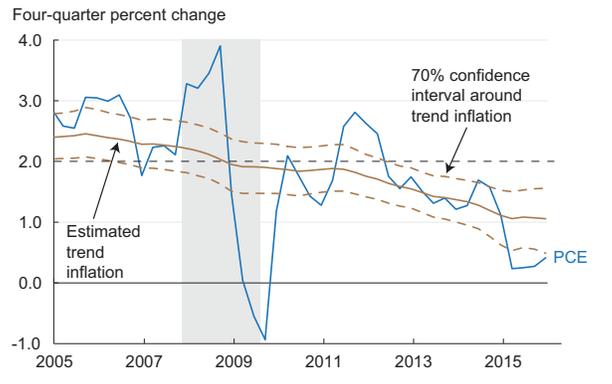
A third approach to quantifying trend inflation relies on a simple statistical model (denoted Model 2 at right) that decomposes inflation into a trend component and noise – very temporary deviations from trend (see Stock and Watson 2007 for details). According to this approach, trend inflation rates for PCE measures have fallen noticeably over the past several years but remained fairly stable in 2015. In contrast, the trend in core CPI inflation edged up in 2015. However, the estimate of trend from this model has been quite variable over time, and it tends to move somewhat in line with actual inflation. According to this method, the recent disinflation in PCE prices looks to be caused by both the decline in the trend and temporary deviation from it. This implication was noted in the 2014 and 2015 analyses as well.

Trend Inflation from Model 1: Core CPI



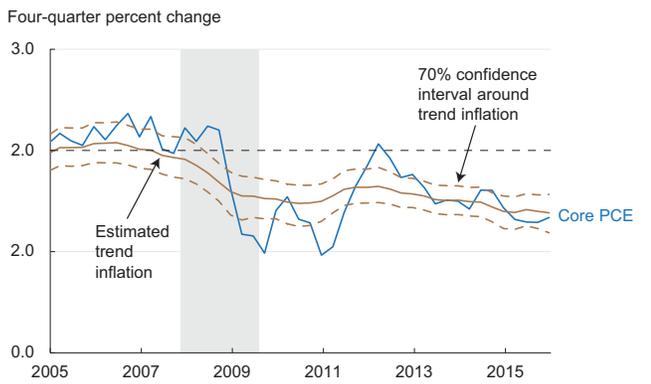
Note: Shaded bar indicates a recession.
Source: Bureau of Labor Statistics, authors' calculations.

Trend Inflation from Model 2: PCE



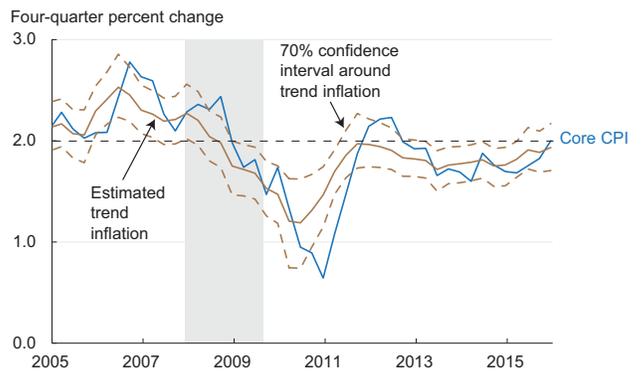
Note: Shaded bar indicates a recession.
Source: Bureau of Economic Analysis, authors' calculations.

Trend Inflation from Model 2: Core PCE



Note: Shaded bar indicates a recession.
Source: Bureau of Economic Analysis, authors' calculations.

Trend Inflation from Model 2: Core CPI



Note: Shaded bar indicates a recession.
Sources: Bureau of Labor Statistics, authors' calculations.

A fourth measure of trend inflation comes from a model (denoted Model 3 here) that decomposes inflation into a trend component and somewhat persistent deviations from trend (see Cogley and Sargent 2005 for details). By this measure, trends in PCE and core PCE inflation have moved down gradually in recent years, whereas the trend for core CPI inflation has been stable. At this point, core measures of inflation are approximately at their respective trends from this model, but PCE inflation is well below trend.

Implications for the Inflation Outlook

Overall, despite some significant differences among them, these four trend inflation models have been similarly successful in predicting future inflation in the past. So it is not easy or possible to say which will give the most accurate forecast going forward. But at this time, for the most part the different models imply similar outlooks for inflation over 2016 and 2017, with PCE inflation rising gradually in most cases and core inflation remaining in the vicinity of recent levels.

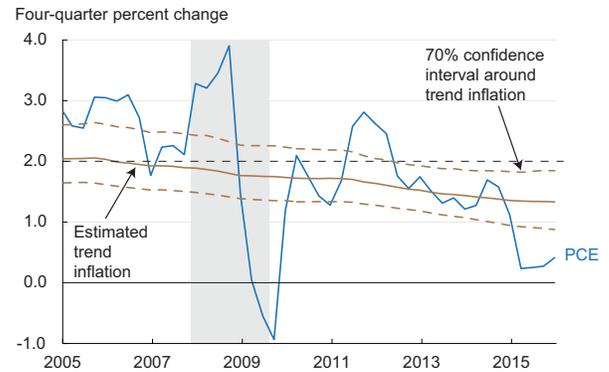
More specifically, for overall PCE prices, all four models project a rise in inflation this year to around 1 percent. Three of the four models project that PCE inflation will continue to rise gradually, to between 1.3 and 1.7 percent in late 2017; the other model (Model 2) forecasts that inflation will remain at about the model's long-run trend rate of 1 percent. For the core PCE measure, all four models project inflation will remain around 1.5 percent. Two of the model forecasts (Model 2 and Model 3) show inflation to be more or less flat, at about 1.4 percent in late 2017. The other two models predict a small, gradual uptick in core PCE inflation, to 1.5 or 1.6 percent in late 2017. Similarly, all of the models forecast a more or less flat path of core CPI inflation, ranging from 1.9 to 2.1 percent in late 2017.

References

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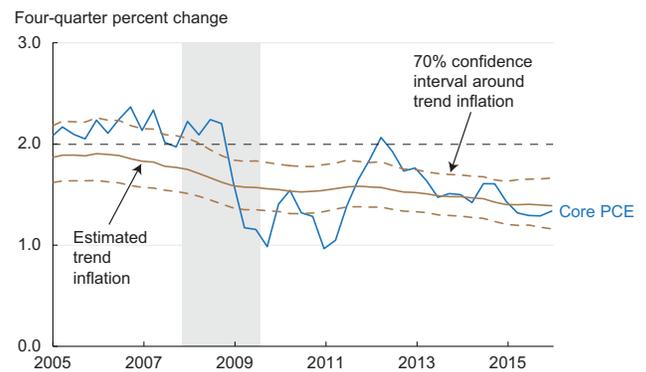
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Trend Inflation from Model 3: PCE



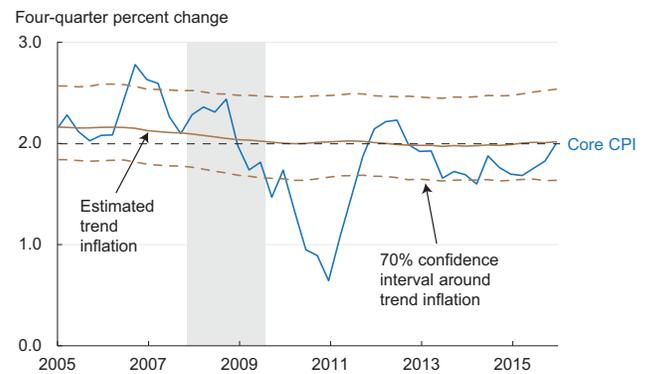
Note: Shaded bar indicates a recession.
Source: Bureau of Economic Analysis, authors' calculations.

Trend Inflation from Model 3: Core PCE



Note: Shaded bar indicates a recession.
Source: Bureau of Economic Analysis, authors' calculations.

Trend Inflation from Model 3: Core CPI



Note: Shaded bar indicates a recession.
Sources: Bureau of Labor Statistics, authors' calculations.

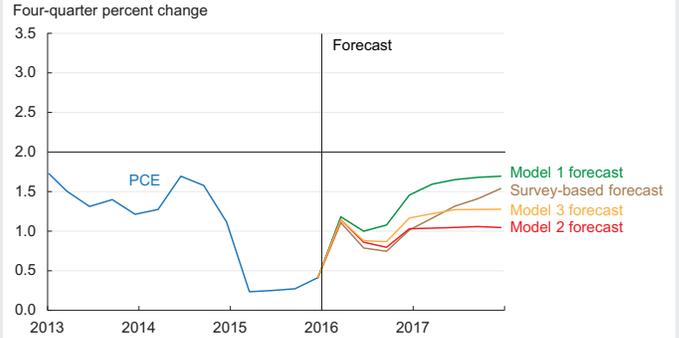
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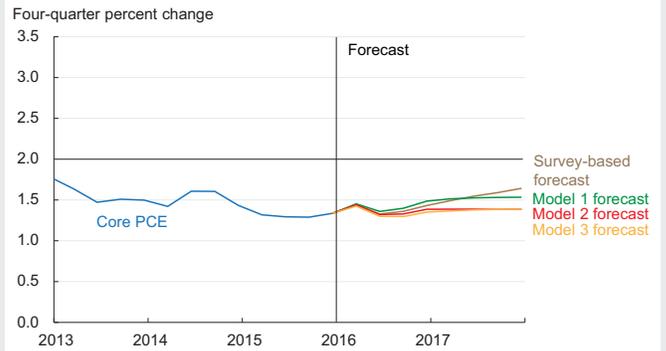
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Forecasts of PCE Inflation



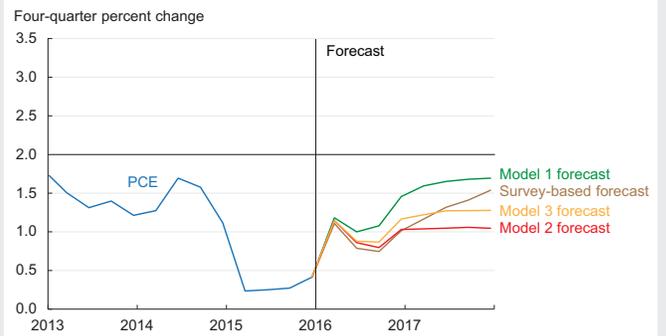
Source: Bureau of Economic Analysis, authors' calculations.

Forecasts of Core PCE Inflation



Source: Bureau of Economic Analysis, authors' calculations.

Forecasts of PCE Inflation



Source: Bureau of Economic Analysis, authors' calculations.



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