

January 15, 2016

Are Long-Term Inflation Expectations Declining? Not So Fast, Says Atlanta Fed

"Convincing evidence that longer-term inflation expectations have moved lower would be a concern because declines in consumer and business expectations about inflation could put downward pressure on actual inflation, making the attainment of our 2 percent inflation goal more difficult."

—Fed Chair Janet Yellen, in a December 2, 2015, [speech](#) to the Economic Club of Washington

To be sure, Chair Yellen's claim is not controversial. Modern macroeconomics gives inflation expectations a central role in the evolution of actual inflation, and the stability of those expectations is crucial to the Fed's ability to achieve its price stability mandate.

The real question on everyone's mind is, of course, what might constitute "convincing evidence" of changes in inflation expectations. Recently, several economists, including former Treasury Secretary Larry Summers and St. Louis Fed President James Bullard, have weighed in on this issue. Yesterday, President Bullard [cited](#) downward movements in the five-year/five-year forward breakeven rates from the five- and 10-year nominal and inflation-protected Treasury bond yields. In November, Summers [appealed](#) to measures based on inflation swap contracts. The view that inflation expectations are declining has also been echoed by the [New York Fed President William Dudley](#) and [former Minneapolis Fed President Narayana Kocherlakota](#).

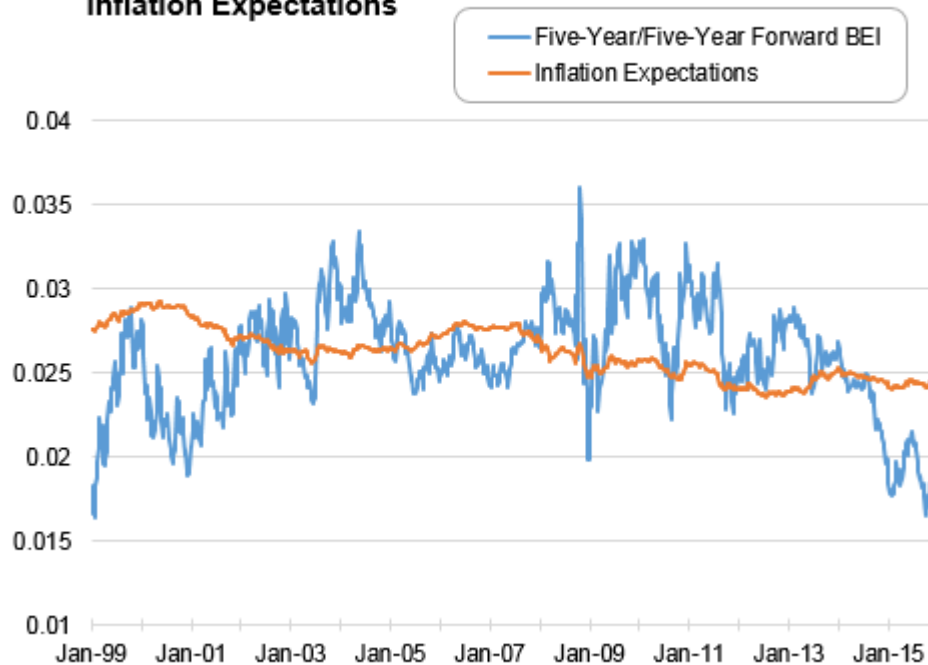
Broadly speaking, there seems to be a growing view that market-based long-run inflation expectations are declining and drifting significantly away from the Fed's 2 percent target and that this decline is troublingly correlated with oil prices.

A problem with this line of argument is that the breakeven and swap rates are not necessarily clean measures of inflation expectations. They are really better referred to as measures of inflation compensation because, in addition to inflation expectations, these measures also include factors related to liquidity conditions in the markets for these securities, technical features of the inflation protection in each security, and inflation risk premia. Here at the Atlanta Fed, we've built a model to separate these different components and isolate a better measure of true inflation expectations (IE).

In technical terms, we estimate an affine term structure model—similar to that of [D'Amico, Kim and Wei \(2014\)](#)—that incorporates information from the markets for U.S. Treasuries, Treasury Inflation-Protected Securities (TIPS), inflation swaps, and inflation options (caps and floors). Details are provided in "Forecasts of Inflation and Interest Rates in No-Arbitrage Affine Models," a forthcoming Atlanta Fed working paper by Nikolay Gospodinov and Bin Wei. (You can also see [Gospodinov and Wei \(2015\)](#) for further analysis.) Essentially, we ask: what level of inflation expectations is consistent with this entire set of financial market data? And we then follow this measure over time.

As chart 1 illustrates, we draw a very different conclusion about the behavior of long-term inflation expectations. The chart plots the five-year/five-year forward TIPS breakeven inflation (BEI) and the model-implied inflation expectations (IE) for the period January 1999–November 2015 at a weekly frequency. Unlike the raw BEI, our measure is quite smooth, suggesting that long-term inflation expectations have been, and still are, well anchored.

Chart 1
Five-Year/Five-Year Forward Breakeven Inflation (BEI) and Inflation Expectations

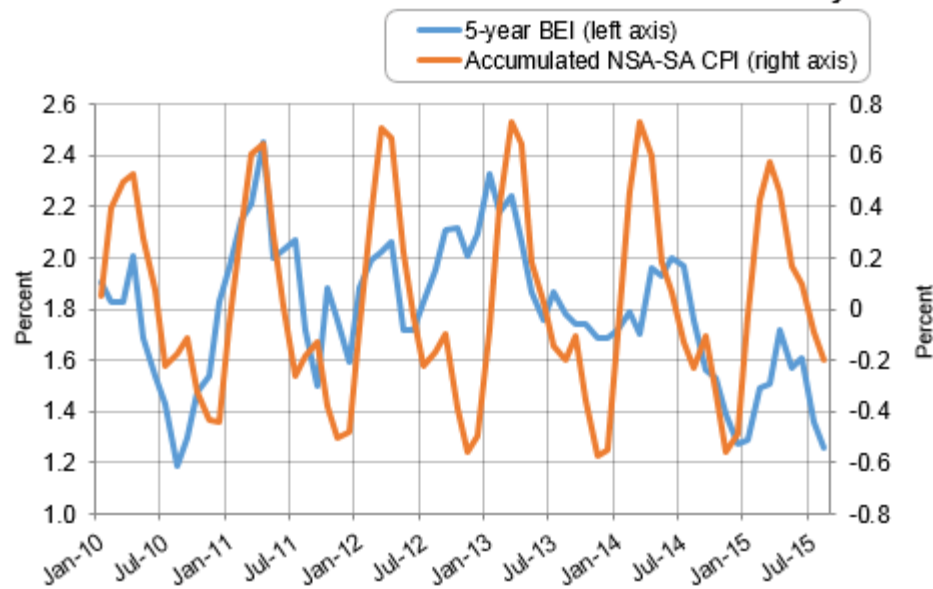


Source: Federal Reserve Board of Governors and authors' calculations

After making an adjustment for the inflation risk premium, we term the difference between BEI and IEs a "liquidity premium," but it

really includes a variety of other factors. Our more careful look at the liquidity premium reveals that it is partly made up of factors specific to the structure of inflation-indexed TIPS bonds. For example, since TIPS are based on the non-seasonally adjusted consumer price index (CPI) of all items, TIPS yields incorporate a large positive seasonal carry yield in the first half of the year and a large negative seasonal carry yield in the second half. Chart 2 illustrates this point by plotting CPI seasonality (computed as the accumulated difference between non-seasonally adjusted and seasonally adjusted CPI) and the five-year breakeven inflation.

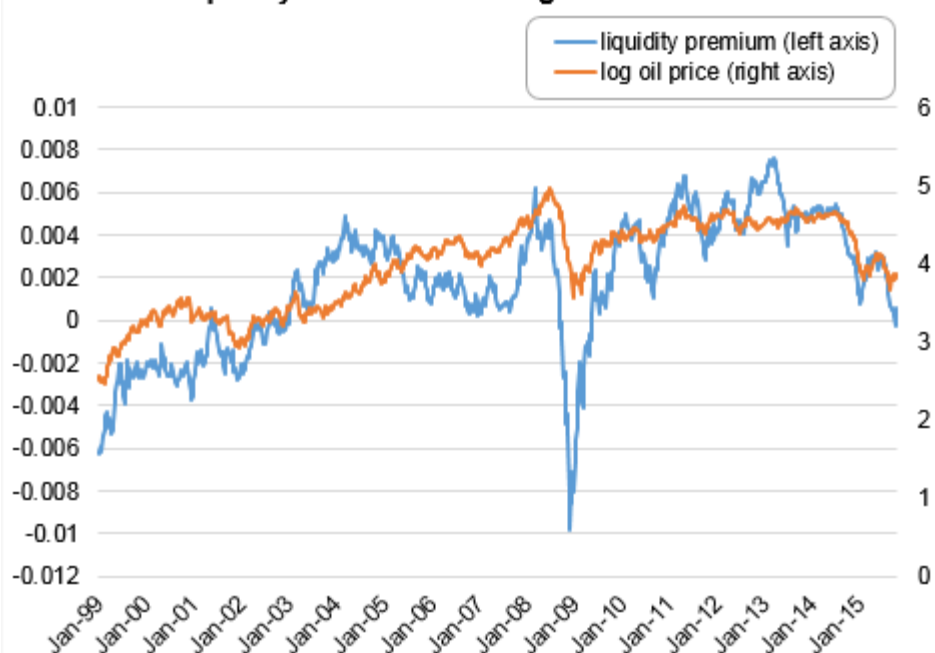
Chart 2
Five-Year Breakeven Inflation versus CPI Seasonality



Source: Federal Reserve Board of Governors, Bureau of Labor Statistics, and authors' calculations

Redemptions, reallocations, and hedging in the TIPS market after oil price drops and global financial market turbulence can further exacerbate this seasonal pattern. Taken together, these factors are the source of correlation between the BEI measures and oil prices. To confirm this, chart 3 plots (the negative of) our liquidity premium estimate and the log oil price (proxied by the nearest futures price).

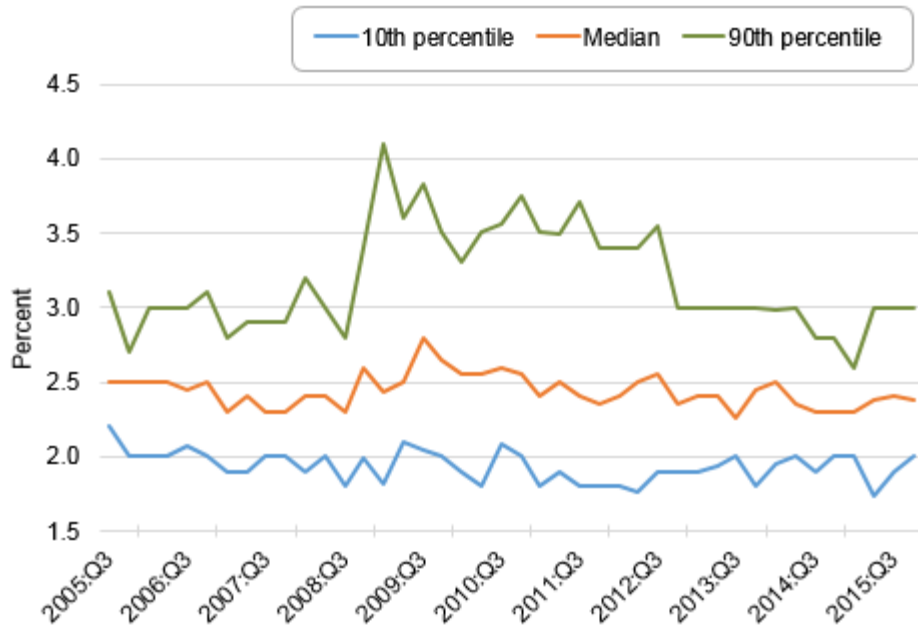
Chart 3
TIPS Liquidity Premium and Log Oil Prices



Source: Bloomberg and authors' calculations

Our measure of long-term inflation expectations is also consistent with long-term measures from surveys. Chart 4 presents the median along with the 10th and 90th percentiles of the five-year/five-year forward CPI inflation expectations from the Philadelphia Fed's Survey of Professional Forecasters (SPF) at quarterly frequency. This measure can be compared directly with our IE measure. Both the level and the dynamics of the median SPF inflation expectation are remarkably close to that for our market-based IE. It is also interesting to observe that the level of inflation "disagreement" (measured as the difference between the 10th and 90th percentiles) is at a level similar to the level seen before the financial crisis.

Chart 4
Five-Year/Five-Year Forward CPI Inflation Expectations



Source: Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters and authors' calculations

Finally, we note that TIPS and SPF are based on CPI rather than the Fed's preferred personal consumption expenditure (PCE) measure. CPI inflation has historically run above PCE inflation by about 30 basis points. Accounting for this difference brings our measure of the level of long-term inflation expectations close to the Fed's 2 percent target.

To summarize, our analysis suggests that (1) long-run inflation expectations remain stable and anchored, (2) the seemingly large correlation of market-implied inflation compensation with oil prices arises mainly from the dynamics of the TIPS liquidity premium, and (3) long-run market- and survey-based inflation expectations are remarkably close in terms of level and dynamics over time. Of course, further softness in the global economy and commodity markets may eventually drag down long-term expectations. We will continue to monitor the pure measure of inflation expectations for such developments.

By Nikolay Gospodinov, financial economist and policy adviser; Paula Tkac, vice president and senior economist; and Bin Wei, financial economist and associate policy adviser, all of the Atlanta Fed's research department