

How Much of the Fall in Inflation Can be Explained by Energy and Import Prices?

By A. Lee Smith

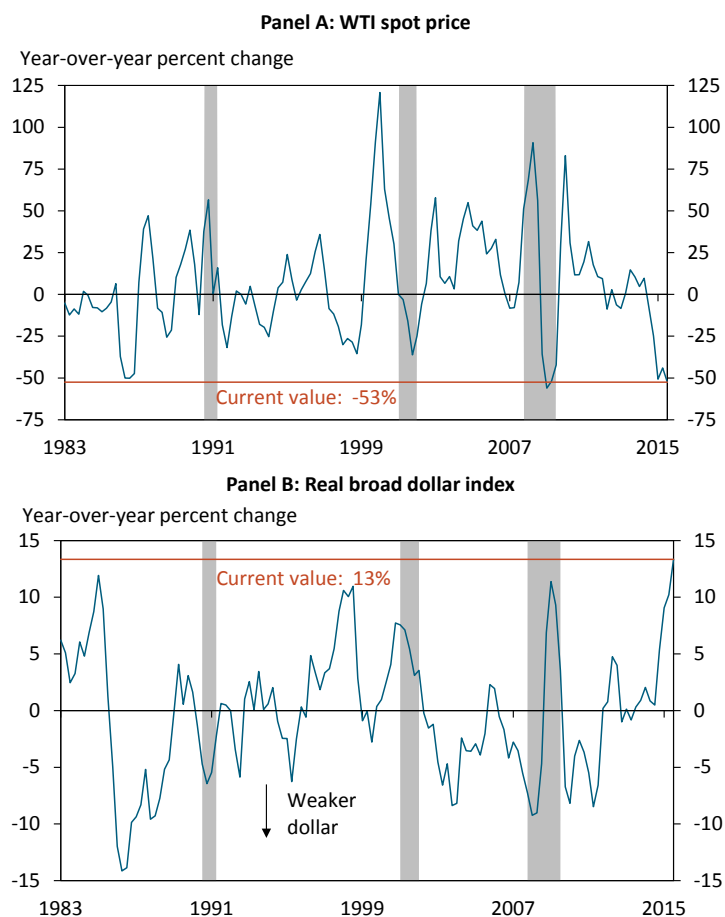
Although inflation has declined recently, it doesn't necessarily indicate underlying economic weakness. According to estimates from a statistical model, the recent decline in inflation is due to a historically large decline in oil prices and appreciation of the U.S. dollar.

Over the past year, the Federal Open Market Committee's (FOMC) preferred measure of inflation—the percent change in the personal consumption expenditure (PCE) deflator—has fallen further below its longer-run objective of 2 percent. In the third quarter of 2014, PCE inflation over the previous four quarters was 1.6 percent. In the third quarter of 2015, this same measure of inflation stood at just 0.3 percent. While much of this decline in headline inflation was due to falling energy prices, an alternative measure of PCE inflation that strips out the direct effects of volatile food and energy components fell from 1.6 percent to 1.3 percent over this same time period. This decline in inflation has come against a macroeconomic backdrop of falling unemployment and an increasing growth rate of labor compensation in the nonfarm business sector. As tighter labor markets are typically associated with higher rates of inflation, the recent fall in inflation seems puzzling.

However, Chart 1 shows that over the past year, movements in oil prices and the foreign exchange value of the dollar have been historically large. The spot price of one barrel of West Texas Intermediate (WTI) crude oil fell by 53 percent from the third quarter of 2014 to the third quarter of 2015, more than it has ever fallen outside of a U.S. recession. In contrast, the real trade-weighted value of the U.S. dollar (against a broad basket of currencies) appreciated 13 percent over the past year. This appreciation of the dollar, the largest in one year since the early 1980s, pushed down the prices of goods imported into the United States.

Sharp swings in energy prices and the dollar typically have large but temporary effects on headline measures of inflation. Consequently, FOMC members often look at core PCE inflation to look past these temporary effects. But energy prices can influence even core PCE

Chart 1: Changes in oil prices and the foreign exchange value of the dollar



Note: Gray bars denote NBER-defined recessions.
Sources: Wall Street Journal and Federal Reserve Board of Governors.

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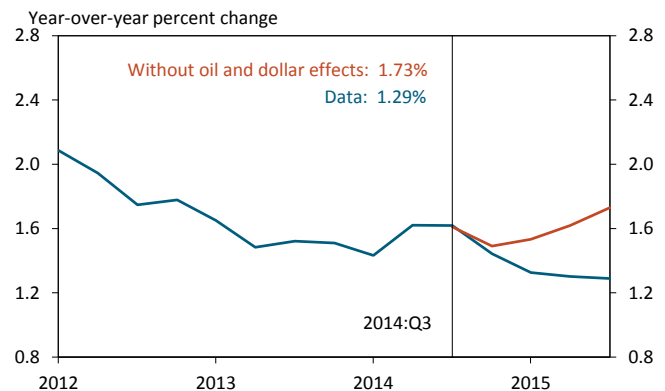
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inflation, as the cost of energy influences the prices of energy-intensive goods and services such as airfares. Moreover, the core PCE price index counts many imported goods, such as clothing and apparel, which fall in price as the dollar appreciates. For these reasons, energy and import prices may have temporary effects on core PCE inflation.

I use a statistical framework to measure the cumulative effects of oil prices and the foreign-exchange value of the U.S. dollar on core PCE inflation over the past year.¹ Results from the model suggest core inflation would have increased over the past year if oil and import prices had not fallen. Chart 2 shows a historical decomposition of core PCE inflation from July 2014 to September 2015. The blue line represents the actual data, while the red line represents a counterfactual scenario in which the effects of the primary contributors to the drop in oil prices and the appreciation of the dollar are removed from the data.

Chart 2: Core PCE inflation decomposition



Sources: BEA, Thompson Reuters, Department of Energy, Wall Street Journal, and author's calculations.

According to the model decomposition, oil prices have primarily been driven down by a decrease in oil-specific demand, which is the demand for oil unique from other bulk commodities. Davig and others explore these oil-specific demand factors in detail. The model also suggests that shocks outside of the oil market have primarily driven the appreciation of the dollar. The red line shows that without disinflationary forces from oil and foreign exchange markets, core PCE inflation would stand at almost 1.75 percent in the third quarter of 2015. Therefore, this model suggests that much of the recent softness in core PCE inflation does not indicate underlying weakness in domestic demand.²

How much longer will these factors hold down inflation? The statistical model estimates that movements in oil prices and the appreciation of the dollar have their peak effect on core PCE inflation after 12–15 months. As the dollar continued to appreciate in the fourth quarter of 2015 and oil prices edged even lower, this fresh round of disinflationary forces will take time to work their way through headline and core inflation. Therefore, according to the model, inflation may not return to the FOMC's longer-run 2 percent target until 2017. However, should oil prices continue to decline or the foreign-exchange value of the dollar continue to appreciate, then the return to 2 percent would be further delayed. In contrast, if oil prices rebound faster than futures markets currently anticipate, core PCE inflation could approach 2 percent more quickly.

¹ The model is an augmented version of a model used by Davig and others. I construct a vector autoregression (VAR) model using the following variables ordered as listed: the percent change in global oil production; the natural log of the real Baltic Dry Index (BDI), which is an indicator of worldwide commodity demand; the natural log of the real spot price of WTI; the natural log of the real trade-weighted foreign exchange value of the U.S. dollar against a broad basket of currencies; and the natural log of the core

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PCE price index. The model is estimated using monthly data from April 1985 to September 2015 and three lags as suggested by the Akaike Information Criterion. Shocks to the variables are identified using a Cholesky factorization. The first three variables create the same oil market (supply, commodity demand, oil-specific demand) identification as in Kilian. In the lower block, I order inflation last and interpret the orthogonalized shock to inflation as a residual that cannot be explained by the oil market or exchange rate shocks. Kilian argues that disentangling the source of the movement in oil prices is important for eliciting the quantitative effects of oil prices on inflation.

² Zaman uses a different VAR model estimated over a longer sample on quarterly data and reaches a similar conclusion.

References

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