Oil Prices, Inflation and U.S. Monetary Policy

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Any opinions expressed here are my own and do not necessarily reflect those of the Federal Open Market Committee.

Introduction

Recent developments in global oil prices

- Crude oil prices have fallen dramatically since mid-2014.
- Oil price movements are an important component of headline inflation in the U.S.
  - Year-over-year headline inflation in the U.S. is currently very low.
- Fed officials have sometimes argued that once oil prices stabilize, headline inflation will naturally return to 2 percent.
- However, crude oil prices have not stabilized in recent weeks, and instead have fallen substantially further.
- What are the implications for current monetary policy?

This talk

- First, I will consider the very recent movements in oil prices in historical context.
- Second, I will review the argument that stabilization of oil prices implies that headline inflation will return to target.
  - This argument still holds, but it now appears that this process will take longer than previously thought.
- Third, I will consider the possibility that inflation expectations are falling in the U.S.
- Fourth, I will discuss the degree to which lower oil prices are ultimately a bullish factor for the U.S. economy.

Preview of conclusions

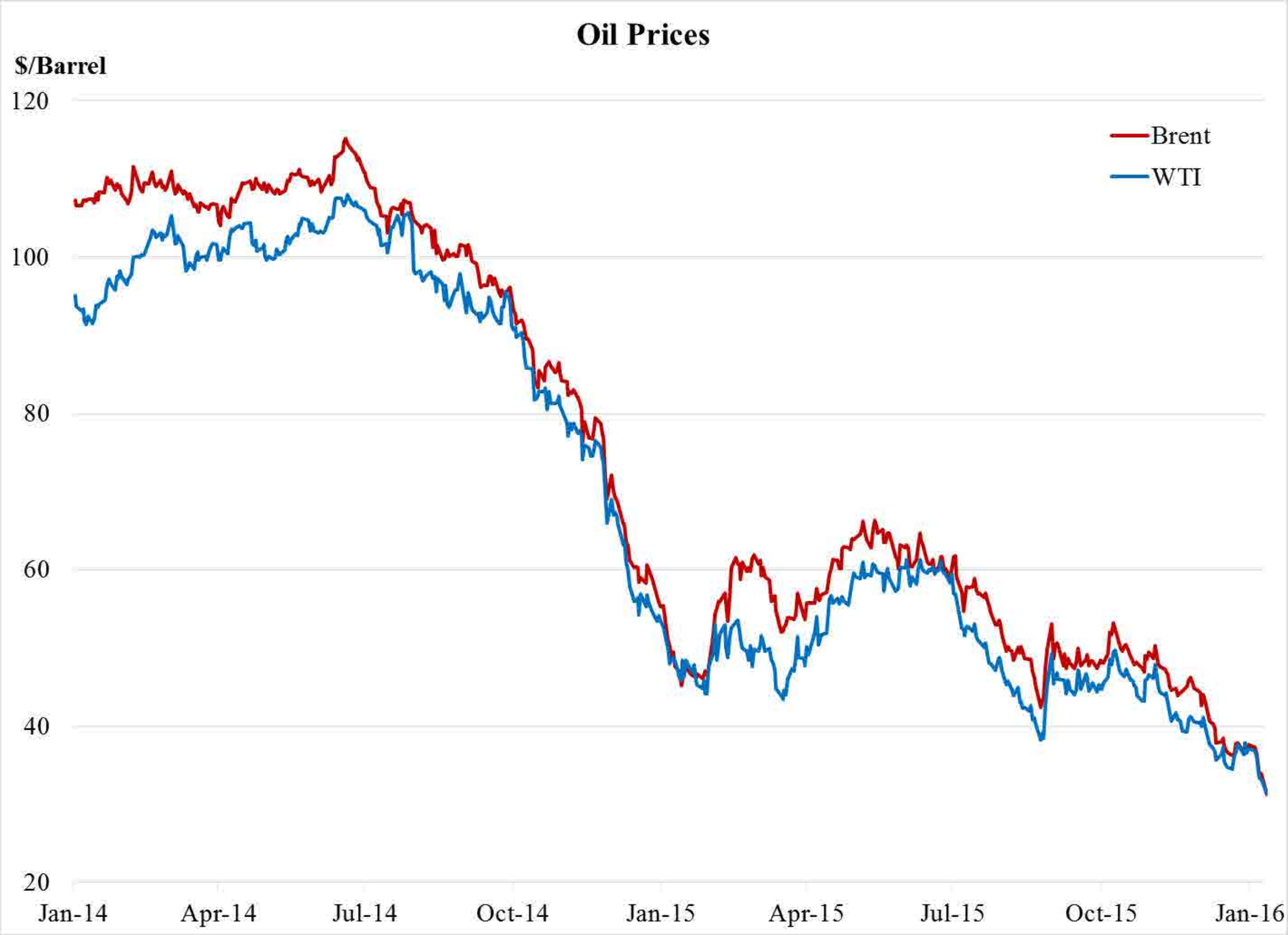
- The recent movements in crude oil prices are very substantial in historical context.
- Headline inflation will return to target once oil prices stabilize, but recent further declines in global oil prices are calling into question when such a stabilization may occur.
- Inflation expectations in the U.S. may be falling. If so, this would put downward pressure on inflation.
- Relatively low oil prices remain a net positive for the U.S. economy.

Recent Crude Oil Price Declines

Recent nominal crude oil price declines

- The price of crude oil began to decline in the summer of 2014.
- It fell by more than half by the beginning of 2015, from above $105 per barrel to below $50 per barrel.
- Since early November 2015, the price has fallen an additional 40 percent by some measures.
- Most of the large movements came in the second half of 2014.

The nominal crude oil price per barrel

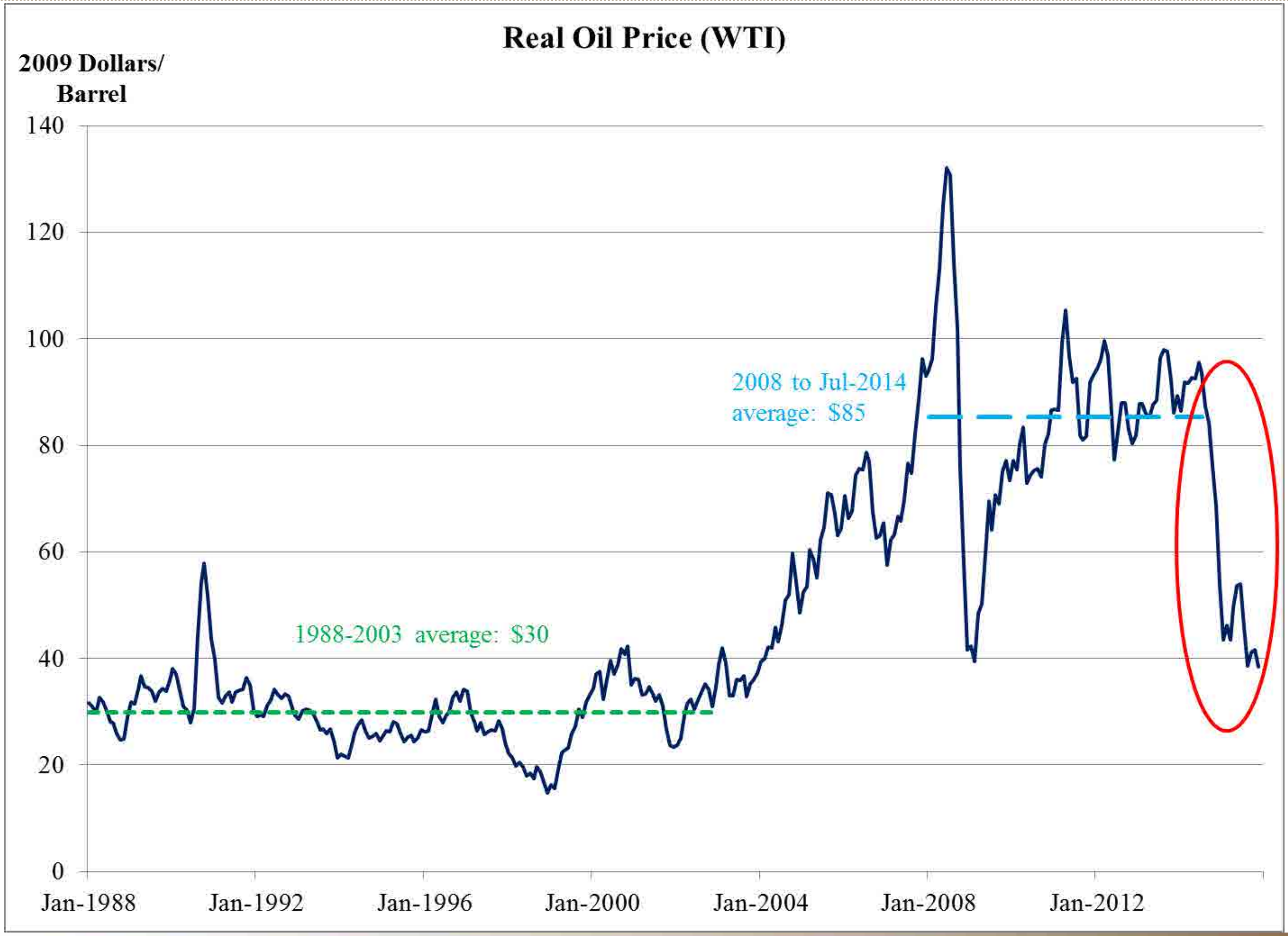


Source: Energy Information Administration and Financial Times. Last observation: January 11, 2016.

Recent crude oil price declines in real terms

- The real dollar price of crude oil was arguably stable between 1988 and 2003 at approximately $30 per barrel in 2009 dollars.
- A key event, as yet unidentified in the academic literature, occurred in 2003 and the real dollar price of oil nearly tripled by 2008 to approximately $85 per barrel in 2009 dollars.
- This higher level was maintained for 6 ½ years, until mid-2014, despite the global financial crisis and its aftermath.
- Recent declines have been substantial, but not quite enough to return the real dollar price to its 1988-2003 average value in 2009 dollars.

Real dollar oil price 1988-2016

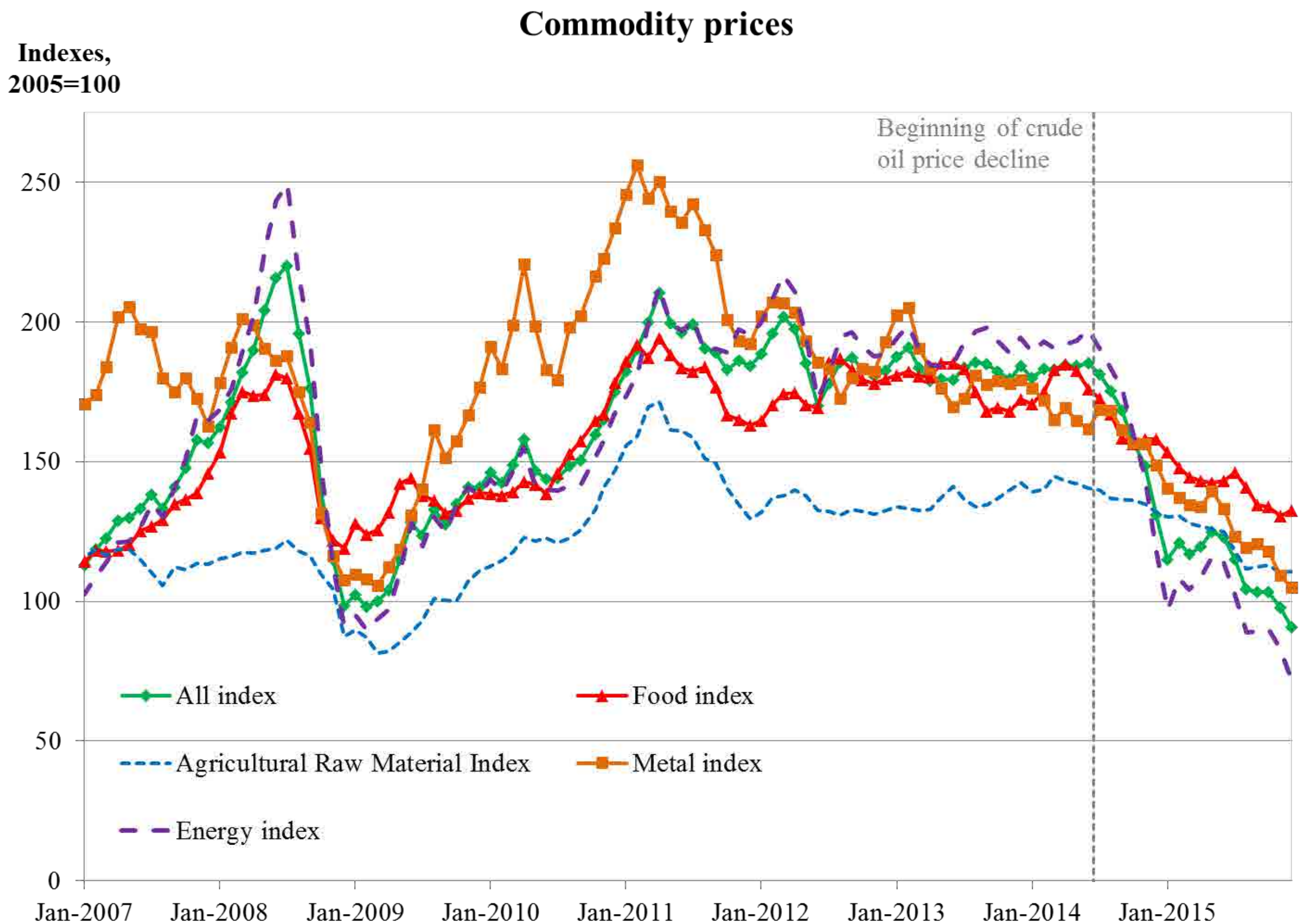


Source: Energy Information Administration, Wall Street Journal, Bureau of Labor Statistics and author's calculations.
Last observation: November 2015.

Supply responses

- Nearly tripling the price of any good or service will attract attention.
- Many previously unused forms of oil extraction became economically feasible during the 2008-2014 price regime.
- This supply response has likely led to overcapacity in global oil markets and caused the current downdraft of prices.
- However, financial markets often interpret oil price declines as declines in the global demand for goods and services.
  - Sometimes arguments in this camp cite declines in commodity prices generally.

Commodity prices falling since mid-2014



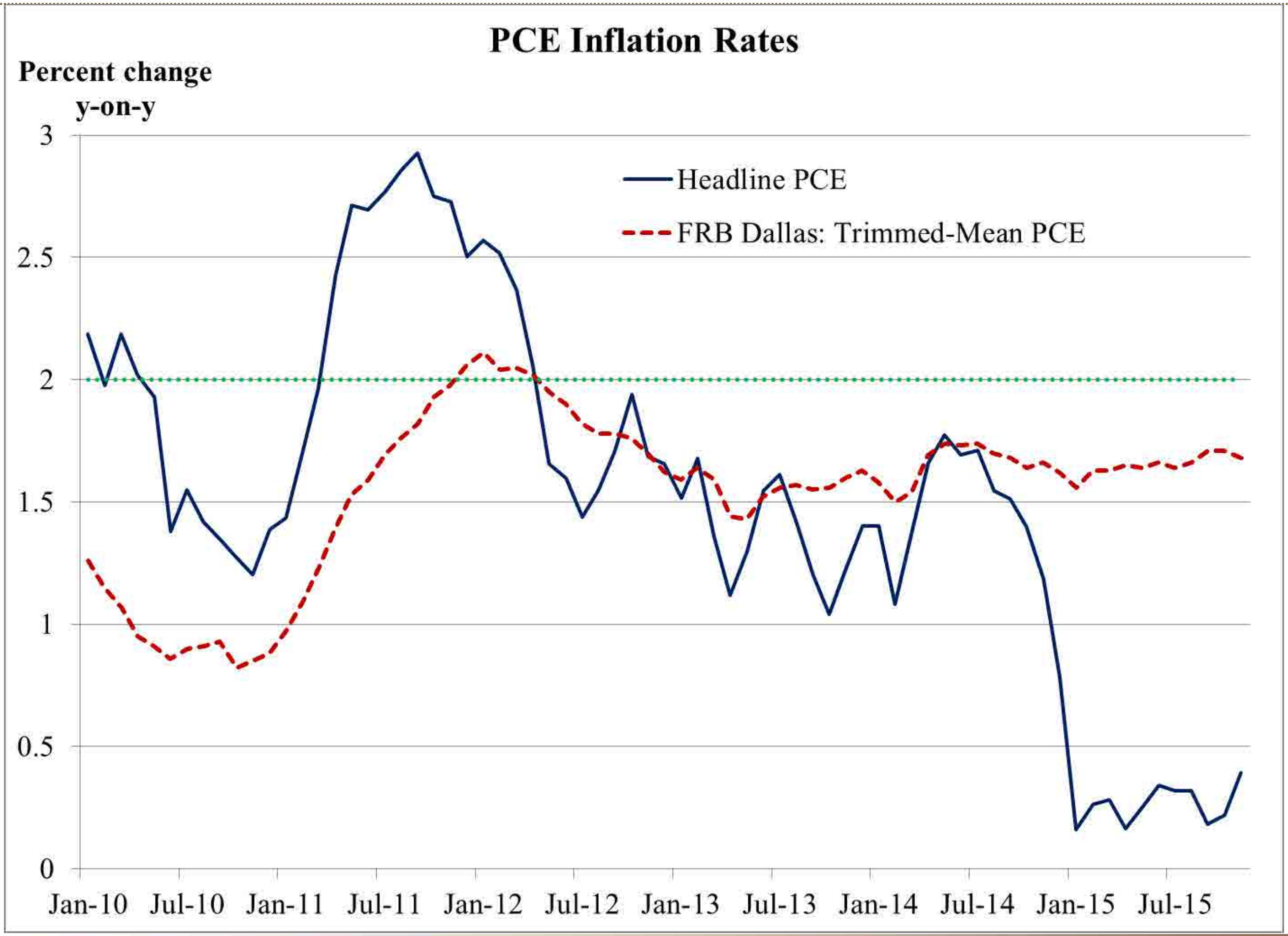
Source: International Monetary Fund. Last observation: December 2015.

Crude Oil Prices and Headline Inflation

Crude oil prices and headline inflation

- The Fed's 2 percent inflation goal is stated in terms of headline personal consumption expenditures (PCE) inflation.
- Large movements in crude oil prices can influence this measure of inflation substantially.
- This is why year-over-year headline inflation is quite low today.
  - One way to control for this is to consider the Dallas Fed's trimmed-mean PCE inflation rate, which is currently about 1.7 percent year-over-year.

Personal consumption expenditures (PCE) inflation



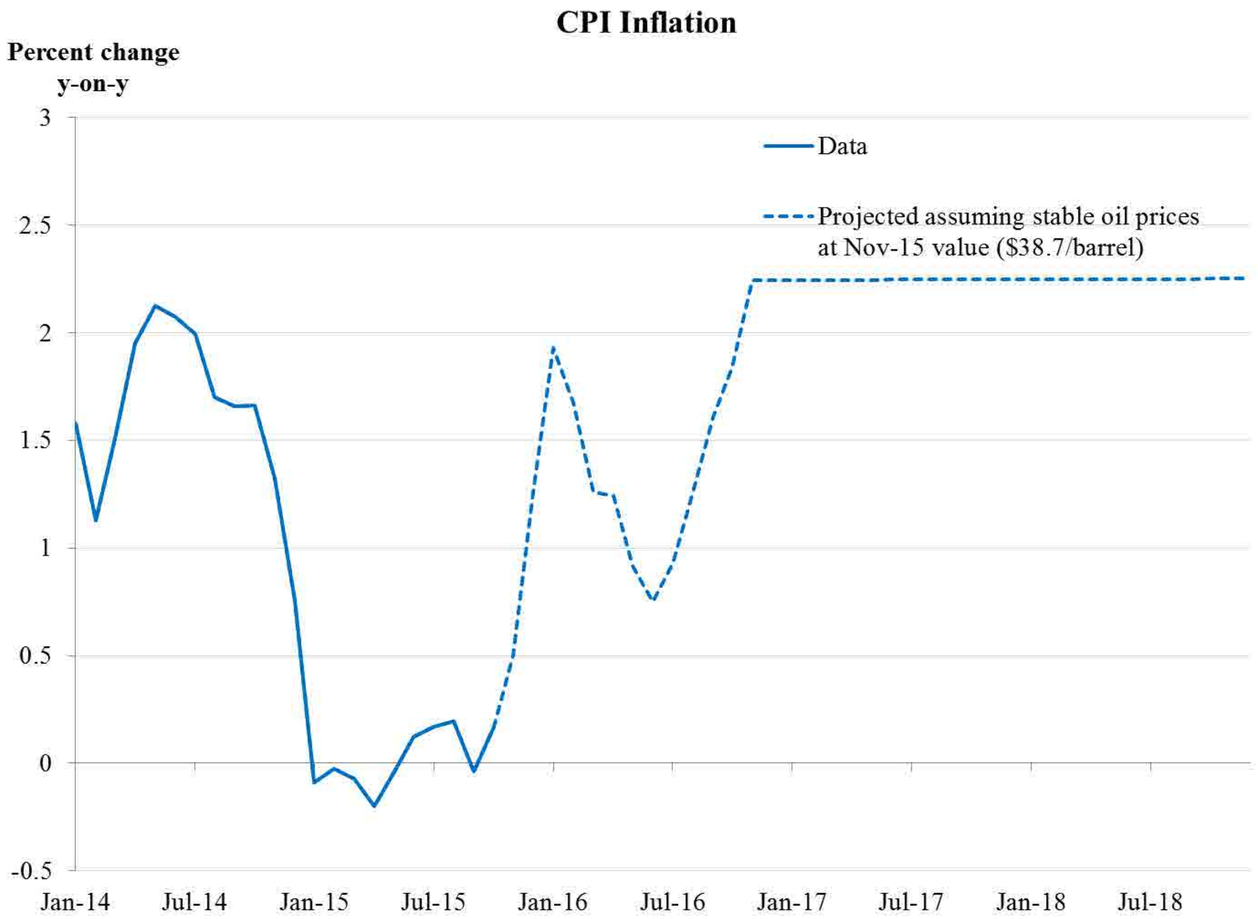
Source: Bureau of Economic Analysis and Federal Reserve Bank of Dallas. Last observation: November 2015.

Headline inflation once oil prices stabilize

- The fall in crude oil prices to lower levels, even if maintained indefinitely, has only a one-time influence on the year-over-year inflation rate.
- Let's suppose that oil prices had stabilized around the November 2015 level (approximately $40/barrel) and remained at that level for several years.*
- Let's further suppose that all other prices had continued to increase at the same pace as they did during 2015.
- What would the headline consumer price index (CPI) inflation rate be at the end of 2016 under such a scenario?
  - Answer: More than 2 percent.

* Oil prices, measured by the U.S. crude oil imported acquisition cost by refiners, were at $38.70 per barrel in November 2015.

Headline inflation once oil prices stabilize



Source: Bureau of Labor Statistics, Energy Information Administration and author's calculations.
Last observation: November 2015.

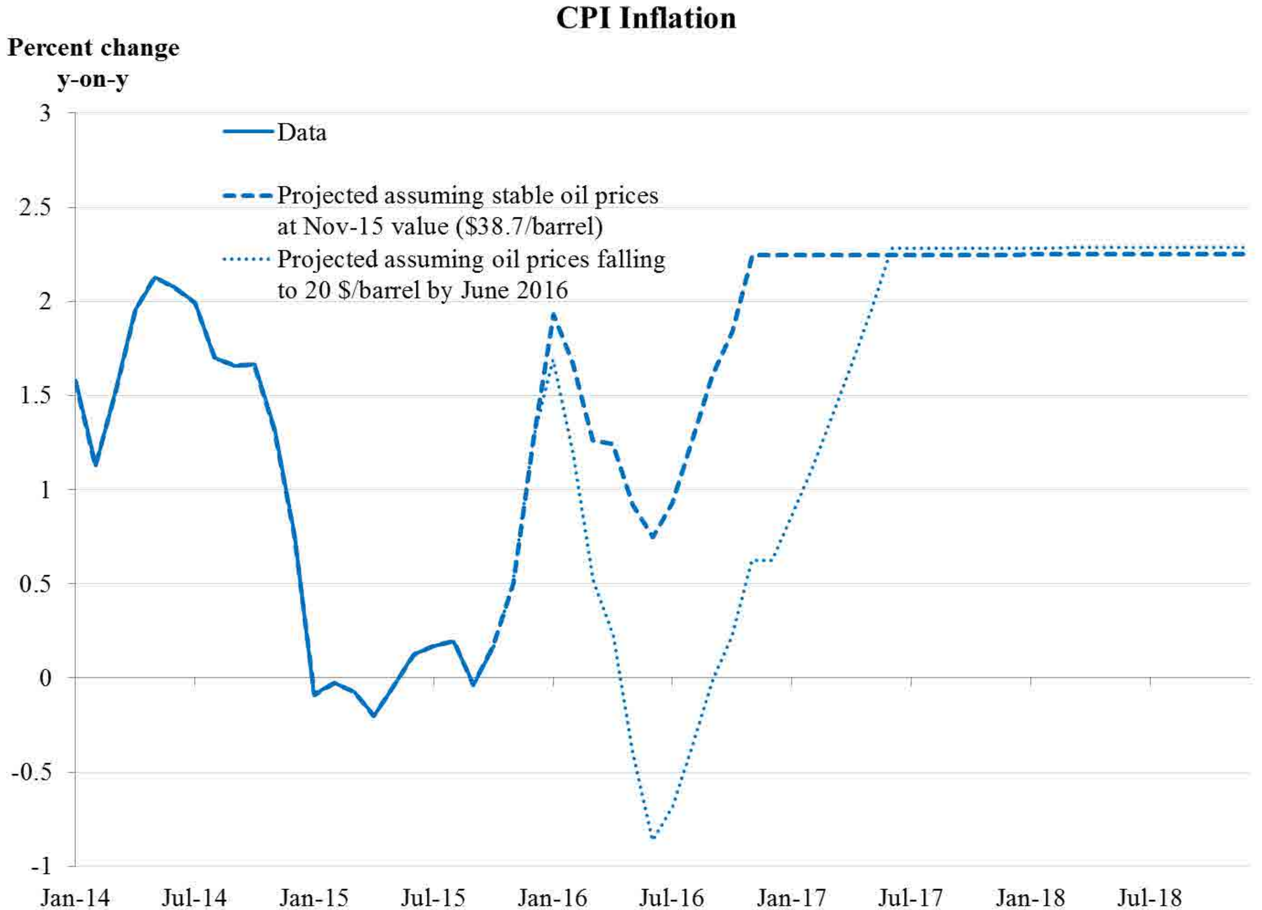
Has this argument changed?

- The renewed fall in crude oil prices since November 2015 calls into question this line of thinking.
- How would this calculation change given the new downward pressure on crude oil prices?

Headline inflation once oil prices stabilize

- To assess the new situation, let's now suppose hypothetically that oil prices continue to fall and only stabilize around $20/barrel by June 2016 and remain at that level for several years.
- Let's further suppose that all other prices continue to increase at the same pace as they did during 2015.
- What would the headline CPI inflation rate be at the end of 2016 under such a scenario?
  - Answer: 0.6 percent, not reaching 2 percent until mid-2017.
- Bottom line: The argument is the same, but it takes longer for CPI inflation to return above 2 percent.

Inflation if oil prices fall further, then stabilize



Source: Bureau of Labor Statistics, Energy Information Administration and author's calculations. Last observation: November 2015.

Crude Oil Price Declines and Inflation Expectations

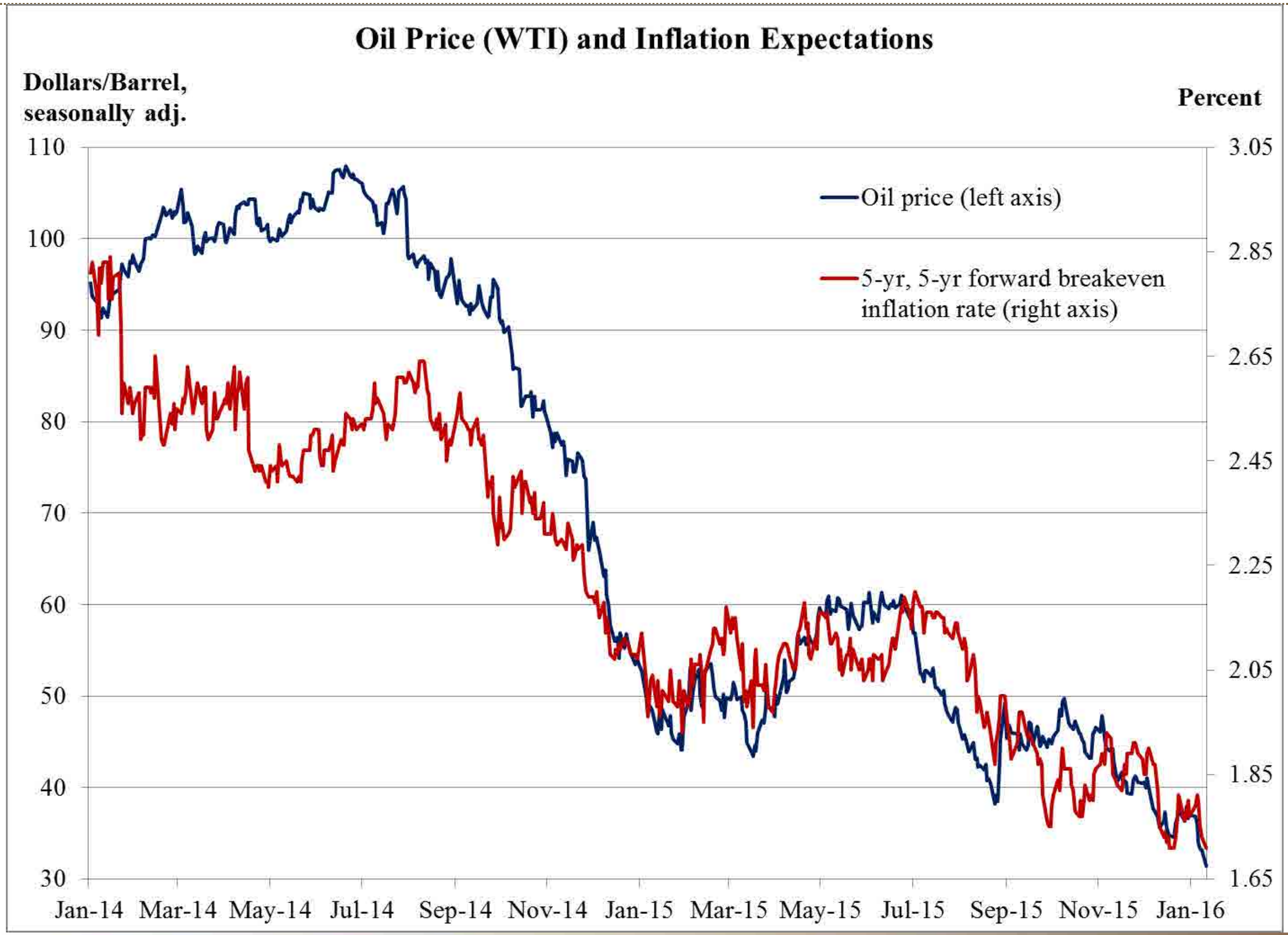
Crude oil prices and inflation expectations

- Traditional central banking argues that policymakers should "look through" changes in crude oil and other commodity prices in order to gauge underlying trend inflation.
  - This is the purpose of a measure like the Dallas Fed's trimmed mean PCE inflation rate.
- However, one circumstance where one may be more concerned is when inflation expectations themselves begin to change due to the changes in crude oil prices.
- Arguably, such a phenomenon is occurring in the current environment.

Market-based measures of inflation expectations

- Market-based indicators of inflation expectations, such as the Treasury Inflation Protected Securities (TIPS) spreads, have fallen in tandem with the fall in crude oil prices since the middle of 2014.
- Longer-term inflation expectations, such as the five-year-five-year-forward breakeven inflation rate, should in principle be independent of movements in crude oil prices.
- Nevertheless, the correlation between the two variables has been very high over the last 18 months.

Crude oil price and expected inflation



Source: Energy Information Administration and Federal Reserve Board. Last observation: January 11, 2016.

Declining inflation expectations

	July 1, 2014	January 8, 2016	Difference
2-year *	188	106	**– 82**
5-year **	200	123	**– 77**
10-year **	226	148	**– 78**
5-year forward **	252	173	**– 78**

* Inflation compensation: continuously compounded zero-coupon yields (basis points).
** Breakeven inflation rates (basis points).

Source: Haver Analytics and Federal Reserve Board. Last observation: January 8, 2016.

Expected inflation and actual inflation

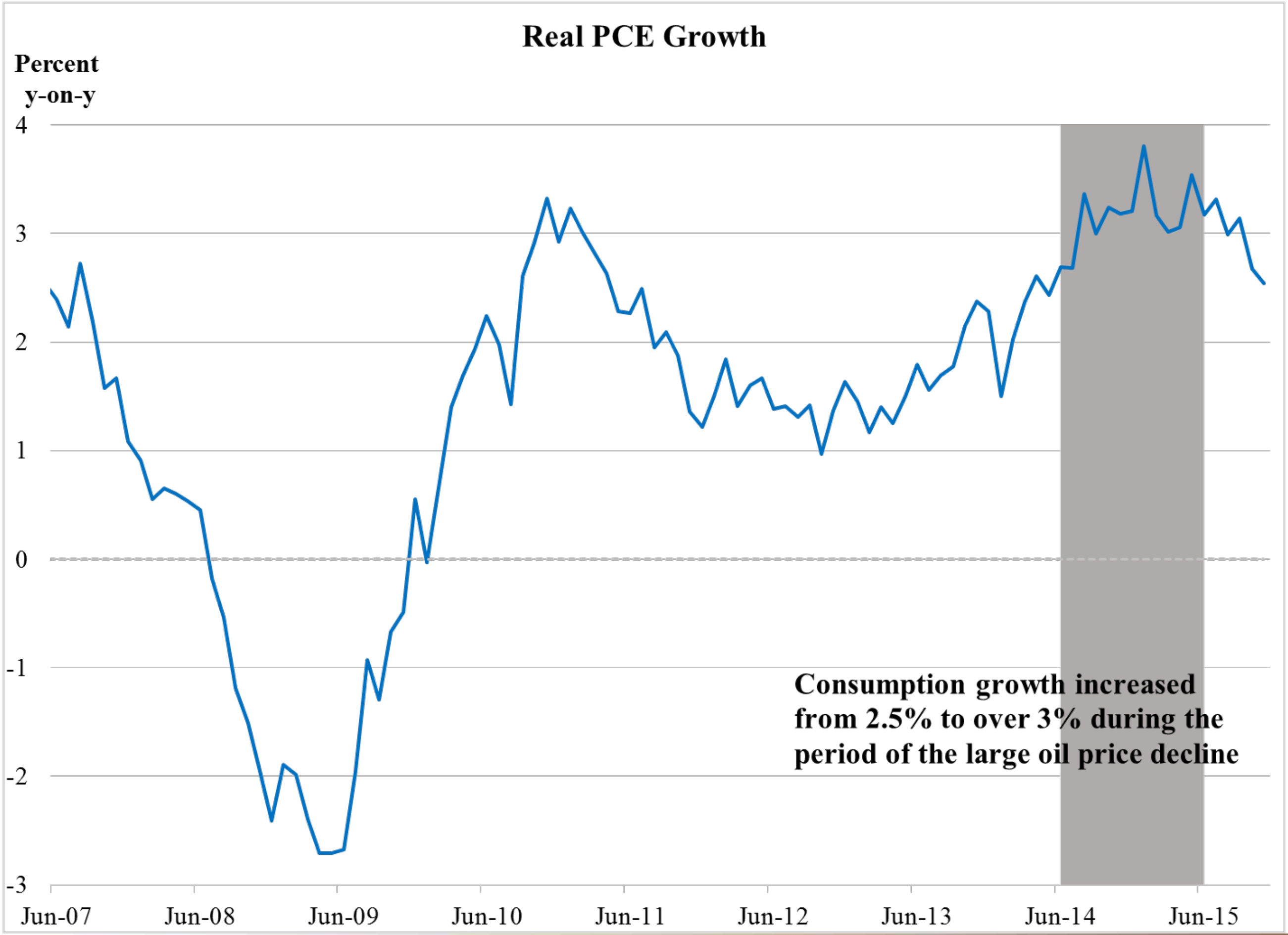
- Expectations of inflation are a major determinant of actual inflation according to modern macroeconomic theory.
- Low inflation expectations may keep actual inflation lower, all else equal, making it more difficult for the Fed to return inflation to target.
- I have argued that market-based measures of inflation expectations have been unduly influenced by the large movements in crude oil prices.
- Nevertheless, with renewed declines in crude oil prices in recent weeks, the associated decline in market-based inflation expectations measures is becoming worrisome.

Crude Oil Prices and the U.S. Economy

Crude oil prices and the U.S. economy

- Crude oil price declines since mid-2014 are helping to keep headline inflation very low in the U.S.
- For the macroeconomy as a whole, the relatively low crude oil prices the U.S. is enjoying today are likely a bullish factor.
- Automobile sales, for instance, have been strong.
- More generally, real personal consumption expenditures (PCE) growth accelerated during the period of the large drop in oil prices from mid-2014 to mid-2015.
- This could be viewed as mild evidence that the oil price decline is a bullish factor for the U.S.

Consumption growth increased as oil prices declined



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Summary

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