When Will U.S. Inflation Return to Target?

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President and CEO

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Any opinions expressed here are my own and do not necessarily reflect those of the Federal Open Market Committee.
Introduction
Inflation in the U.S. has surprised to the downside this year.

U.S. real economic performance has been better during the second half of 2017, but 2018 growth is expected to slow.

U.S. financial conditions are considered easy, but this observation does not have strong predictive content for the economy.

Implications for near-term U.S. monetary policy: The current level of the policy rate is likely to remain appropriate over the near term.
The 2017 Inflation Surprise
U.S. inflation in 2017

• The U.S. inflation rate has been below the 2 percent inflation target since 2012.*

• Inflation data during 2017 have surprised to the downside and call into question the idea that U.S. inflation is reliably returning toward target.

* The inflation target is in terms of the annual change in the price index for personal consumption expenditures (PCE).
U.S. inflation has been mostly below target since 2012

Smoothed inflation readings are lower in 2017

<table>
<thead>
<tr>
<th>Inflation measure</th>
<th>Dec-2016</th>
<th>Last obs.</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticky CPI (FRB of Atlanta)</td>
<td>258</td>
<td>212</td>
<td>-46</td>
</tr>
<tr>
<td>Median CPI (FRB of Cleveland)</td>
<td>250</td>
<td>217</td>
<td>-33</td>
</tr>
<tr>
<td>Core CPI</td>
<td>220</td>
<td>170</td>
<td>-50</td>
</tr>
<tr>
<td>Trimmed-mean PCE (FRB of Dallas)</td>
<td>191</td>
<td>163</td>
<td>-28</td>
</tr>
<tr>
<td>Core PCE</td>
<td>187</td>
<td>133</td>
<td>-54</td>
</tr>
</tbody>
</table>

Values are expressed in basis points. Inflation rates are measured as percent changes from one year earlier. Sources: Bureau of Labor Statistics, FRB of Cleveland, FRB of Atlanta, Bureau of Economic Analysis, FRB of Dallas and author’s calculations. Last observation: September 2017.
Trimmed-mean PCE inflation lower than expected

Trimmed-Mean PCE Inflation Rate

Core PCE inflation lower than expected

The FOMC’s take on the 2017 inflation surprise

• The Federal Open Market Committee (FOMC) makes projections for core PCE inflation.

• The current median projection for core PCE inflation is 1.5 percent at the end of 2017.*

• If the Committee is going to hit the inflation target, it will likely have to occur in 2018 or 2019.

• The two most cited factors that could drive inflation higher are inflation expectations and a faster pace of economic expansion.

• Let’s now turn to considering these factors.

* See the September 2017 Summary of Economic Projections.
Inflation Expectations
**Inflation expectations remain low**

- One important influence on actual inflation is the state of inflation expectations.
- Expected inflation measures based on Treasury Inflation-Protected Securities (TIPS) remain relatively low.
- Survey-based measures have also slipped in the last year.
- Inflation expectations are sometimes sensitive to movements in oil prices, and oil prices have increased in recent trading.
Market-based inflation expectations

• TIPS-based inflation compensation is based on headline consumer price index (CPI) inflation.

• Survey-based measures are less specific about the inflation index.

• Historically, CPI inflation has run somewhat higher than PCE inflation, with an adjustment of about 30 basis points at an annual rate.*

• Other factors can influence TIPS-based expected inflation.

* This adjustment is conservative. The difference between CPI and PCE inflation since January 1960 was, on average, 46 basis points.
Market-based inflation expectations

Source: Federal Reserve Board. Last observations: Nov. 10 (breakeven inflation rates) and Nov. 3, 2017.
Survey-based inflation expectations

University of Michigan: Expected Inflation Rate, Next Five Years

Oil prices and inflation

• Global oil prices fell dramatically during 2014 and then stabilized.

• Headline inflation and inflation expectations can be sensitive to oil price movements.

• Recent trading has generated upward movements in oil prices due in part to political developments in Saudi Arabia.

• U.S. production, which is substantial, tends to increase when prices rise, limiting price movements.
Oil prices somewhat higher since June

U.S. as a marginal producer

U.S. Crude Oil Production

Real GDP Growth Likely Slower in 2018
The data since the financial crisis suggest that the U.S. has converged to 2 percent real GDP growth.

The current estimate for U.S. real GDP growth in the first half of 2017 is 2.1 percent at an annual rate.

Second-half real GDP growth is showing some improvement from the first half of the year, with current tracking estimates near 3 percent.

Real GDP growth will likely be slower in 2018 than it has been in the second half of 2017.
The 2 percent growth regime since the recession

## Tracking estimates for 2017-Q4 U.S. real GDP growth

<table>
<thead>
<tr>
<th>Source</th>
<th>Date</th>
<th>Estimate*</th>
<th>2017†</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atlanta Fed GDPNow</td>
<td>Nov. 9</td>
<td>3.3%</td>
<td>2.6%</td>
</tr>
<tr>
<td>CNBC Moody’s Consensus (median)</td>
<td>Nov. 9</td>
<td>2.8%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Blue Chip Consensus</td>
<td>Nov. 10</td>
<td>2.7%</td>
<td>2.5%</td>
</tr>
<tr>
<td>St. Louis Fed Economic News Index</td>
<td>Nov. 10</td>
<td>3.0%</td>
<td>2.6%</td>
</tr>
<tr>
<td>FRBNY Staff Nowcast</td>
<td>Nov. 10</td>
<td>3.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Macroeconomic Advisers</td>
<td>Nov. 10</td>
<td>2.5%</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

* percent change from the previous quarter, annualized
† average of Bureau of Economic Analysis’ 2017-Q1, Q2, Q3 estimate (1.2%, 3.1% and 3%, respectively) and 2017-Q4 estimates
2018 real GDP growth

Sources: FRB of St. Louis, FRB of Atlanta, Federal Reserve Board, International Monetary Fund and Blue Chip Economic Indicators.
Note: For 2017 and 2018, growth rates are Q4-on-Q4 except for the World Economic Outlook (y-on-y).
U.S. labor market performance

- The pace of growth in employment has been generally slowing since January 2015.
- The unemployment rate is relatively low.
- The statistical relationship between unemployment and inflation has broken down during the last 20 years.
  - This means low unemployment is probably not a harbinger of higher inflation.
Employment growth has slowed since 2015

Employment Growth, Total Nonfarm

The unemployment rate is low

The U.S. unemployment rate was 4.1 percent in the October reading.

Does this mean that U.S. inflation is about to increase substantially?

The short answer is no, based on current estimates of the relationship between unemployment and inflation.
The estimated influence of unemployment on inflation

• Let’s consider one study, Blanchard (2016), which estimates a Phillips curve relationship for the U.S.*

• Let’s suppose the unemployment rate continued to fall from current levels.

• How much would the inflation rate increase according to these estimates?

The estimated influence of unemployment on inflation

<table>
<thead>
<tr>
<th>If the unemployment rate was …</th>
<th>The predicted core PCE inflation rate would be …</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1% *</td>
<td>1.3% *</td>
</tr>
<tr>
<td>4.0%</td>
<td>1.3%</td>
</tr>
<tr>
<td>3.5%</td>
<td>1.4%</td>
</tr>
<tr>
<td>3.0%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

* current value (October 2017 for unemployment, September 2017 for inflation)

- Bottom line: Even if the U.S. unemployment rate declines substantially further, the effects on U.S. inflation are likely to be small.
U.S. Financial Conditions
U.S. financial conditions are easy

• U.S. financial conditions are considered easy, or “low stress,” according to commonly used indexes.
• The indexes take into account factors such as market volatility (which has been low) and interest rate spreads (which have been relatively narrow).
• However, these indexes have an important asymmetry:
  o High-stress readings are associated with economic weakness.
  o Low-stress readings do not reliably predict future economic outcomes.
  o The current low readings probably do not contain any important signal at this point.
Financial conditions have improved during the past year

Sources: FRB of St. Louis and Goldman Sachs. Last observations: Week of Nov. 3, and Nov. 9, 2017.
Note: Lower readings mean improved financial conditions.
Conclusion
Inflation has surprised to the downside in 2017.

Inflation expectations remain below the level that would be historically consistent with the FOMC’s inflation target.

Real GDP growth looks like it may surprise to the upside during the second half of 2017 before shifting toward slower growth in 2018.

Low unemployment readings are probably not an indicator of meaningfully higher inflation over the forecast horizon.

The current level of the policy rate is appropriate given current macroeconomic data.
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