Economic SYNOPSES
short essays and reports on the economic issues of the day
2014 ■ Number 27

Monetary Policy and the Output Gap

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With inflation slightly below its long-run target and the unemployment rate down to 5.8 percent, markets have come to expect that the Federal Open Market Committee (FOMC) will soon begin to remove unusual monetary accommodation—that is, start raising short-term interest rates closer to historically normal levels and reducing the Federal Reserve's holdings of securities. In its October 29, 2014, statement, however, the FOMC declared that "even after employment and inflation are near mandate-consistent levels, economic conditions may, for some time, warrant keeping the target federal funds rate below levels the Committee views as normal in the longer run."

In his influential 1993 paper, John Taylor, an economist at Stanford University, argued that a simple rule described how the FOMC manages interest rates. The Taylor rule, as it is now known, describes the federal funds rate as a function of how far inflation and output are from their desired values. Basically, the Taylor rule states that the FOMC has raised interest rates as inflation has risen above its targeted level or when output has been exceptionally strong. Conversely, when inflation has been low or output sluggish, the FOMC has tended to lower interest rates. Many economists (e.g., Woodford, 2001) have further argued that the Taylor rule also works as a guiding principle for monetary policy as it resembles the recommendations from certain theoretical models.[1]

The Taylor rule takes the following form:

$$i_t = i^* + 1.5(\pi_t - \pi^*) + 0.5(y_t - y_t^*),$$

where i_t is the FOMC's operating target for the federal funds rate; π_t and π^* are the actual and targeted inflation rates, respectively; y_t and y_t^* are actual and potential output, respectively; and i^* is the federal funds rate consistent with on-target inflation and output.[2] Typically, inflation is measured by the year-over-year change in the (chain-type) price index for gross domestic product (GDP), and the output gap, $y_t - y_t^*$, is measured by the deviation of real GDP per capita from its linear trend. If the resulting interest rate is negative, then the Taylor rule is set to zero.

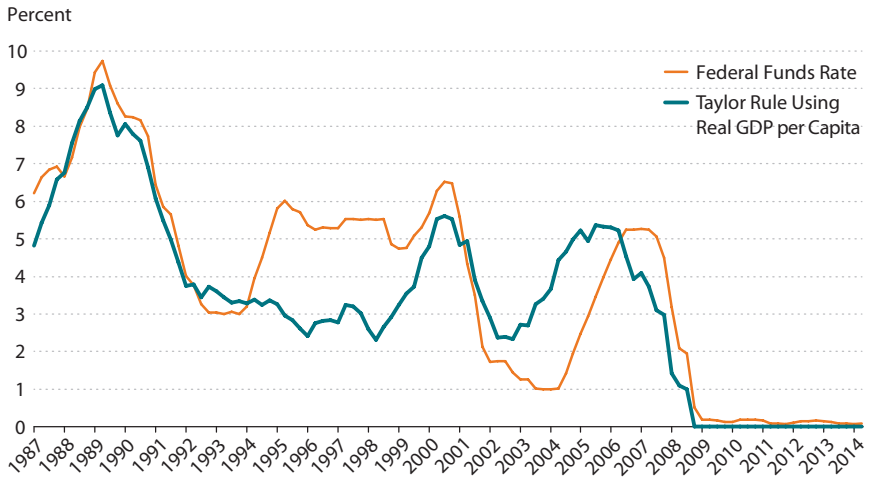
The top panel of the figure shows the actual federal funds rate and the interest rate suggested by the Taylor rule, assuming typical values $i^* = 0.04$ and $\pi^* = 0.02$. I use the linear trend in (log) real GDP per capita for the 1955-2007 period to calculate the output gap. As the figure shows, the rule and the actual interest rate align very closely during the 1987-92 period, which is the period considered by Taylor (1993). After that period, the two series diverge, which means that either monetary policy was not being conducted optimally or the rule did not capture all the elements that entered the formulation of monetary policy.

Overestimating how far the economy is away from its potential unnecessarily risks delaying the end of unusual monetary accommodation.

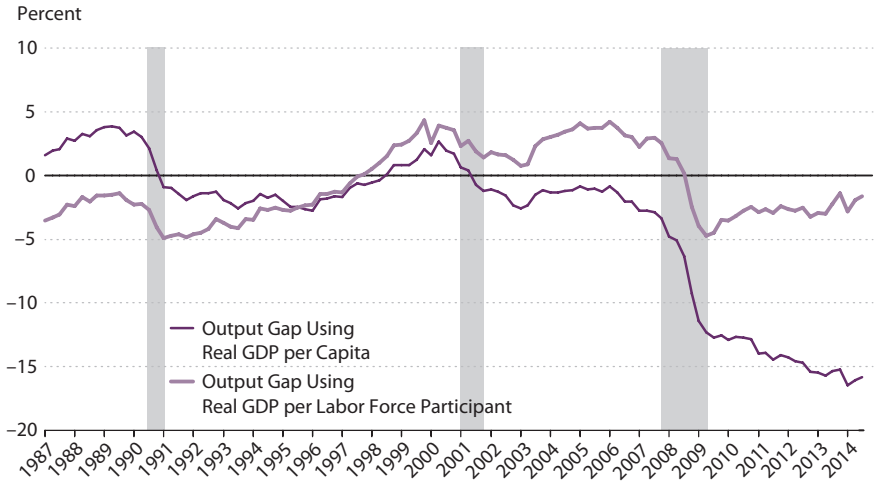
Since late 2008, the Taylor rule has prescribed a zero nominal interest rate, which coincides with the policy rate set by the FOMC. With inflation currently close to its 2 percent annual target, the large negative output gap is driving the Taylor rule to zero: As of 2014:Q3, output per capita is roughly 15 percent below its pre-Great Recession trend (see the middle panel). In fact, the output gap is so large that, if it were feasible, the Taylor rule would suggest a negative federal funds rate. Looking ahead and assuming that inflation remains roughly on target, the output gap would need to be reduced by half before the Taylor rule would start prescribing a positive interest rate. This is one way to explain the stance adopted by the FOMC in the previously quoted statement.

Is a zero nominal interest rate the right prescription? The answer appears to hinge on whether one thinks that output will recover to the trend it was following prior to the recent recession or whether other factors, such as lower labor force participation, have permanently lowered its level.[3]

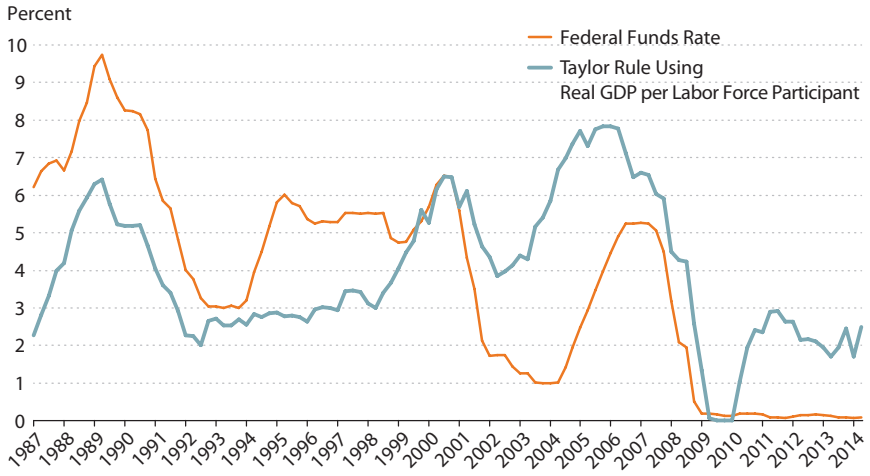
Federal Funds Rate and the Taylor Rule



Output Gap



The Taylor Rule Using Real GDP per Labor Force Participant



NOTE: The shaded bars indicate recessions as determined by the National Bureau of Economic Research.
SOURCE: Haver Analytics and author's calculations.

The middle panel shows measures of the output gap using real GDP per capita and real GDP per labor force participant. As shown, when the shrinkage of the labor force is accounted for, the output gap indeed widened during the recession but is now almost closed. It follows that the difference between real GDP per capita and its linear trend may not adequately measure the gap between actual and potential economic activity. If, instead, real GDP per labor force participant is used as the output measure, then the Taylor rule prescription for the federal funds rate changes significantly.

The bottom panel shows that using real GDP per labor force participant in the Taylor rule would still have called for adopting a zero nominal interest rate in 2009, but it would have prescribed a positive interest rate since early 2010. Currently, the federal funds rate should be around 2 percent annually, which is still lower than the historical average.

This exercise suggests that the debate about monetary policy should revolve around how to measure potential output. Overestimating how far the economy is from its potential unnecessarily risks delaying the end of unusual monetary accommodation and the return to an historically more normal policy stance. ■

NOTES

[1] See also Thornton (2013) on the difficulties faced by policymakers in adopting rules.

[2] On occasion, the Taylor rule is formulated as $i_t = \pi_t + r^* + 0.5(\pi_t - \pi^*) + 0.5(y_t - y_t^*)$, where r^* is the natural real interest rate, usually set equal to 0.02. Given that $i^* = r^* + \pi^*$, this formulation is equivalent to the one in this essay.

[3] The labor force participation rate measures the share of the civilian, noninstitutionalized population that is either employed or unemployed but looking for work. The Bureau of Labor Statistics currently projects that labor force participation will continue to decline for the foreseeable future. For further analysis, see Canon, Kudlyak, and Debbaut (2013); Bullard (2014); and Martin (2014).

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Posted on December 19, 2014
Views expressed do not necessarily reflect official positions of the Federal Reserve System.