Economic Trends

May 2015 (May 5 – June 4, 2015)

In This Issue:

FEDERAL RESERVE BANK
of CLEVELAND

Difficulties Forecasting Wage Growth

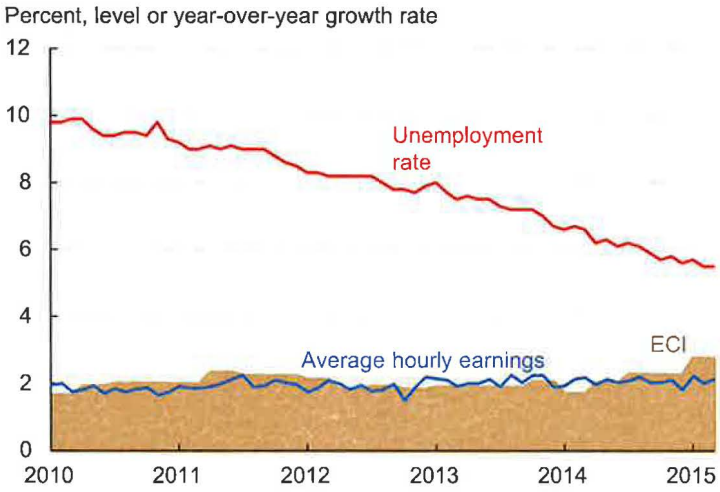
05.08.15
by Edward S. Knotek II

Wages have generated considerable discussion since the end of the recession. The income that households earn from working is an important support for consumer spending, which drives the bulk of activity in the U.S. economy. By this logic, strong labor income gains should boost consumer spending, thereby contributing to a strong economy, which begets strong hiring and wage gains, in a virtuous circle. Some previous research has found support for a wage Phillips curve: historically, as economic conditions have improved and the amount of slack in the labor market has decreased, wage growth has tended to pick up.

This business-cycle expansion has been notable because it has been characterized by a generally subdued rate of wage growth. Even though the unemployment rate fell from 9.8 percent to 5.5 percent between January 2010 and March 2015, growth in average hourly earnings for all employees on private nonfarm payrolls has been remarkably steady near a 2 percent annual rate. An alternative measure from the Bureau of Labor Statistics called the Employment Cost Index (ECI) captures broader compensation costs based on wages and salaries along with benefits. Growth in the ECI for compensation for private industry workers has been relatively similar.

However, the far right side of the chart shows some positive signs. First, an unemployment rate of 5.5 percent is closing in on levels that many economists and policymakers think are consistent with relatively normal conditions. For example, in the Summary of Economic Projections following the March 2015 meeting of the Federal Open Market Committee (FOMC), the central tendency for the unemployment rate in the long run was 5.0 percent to 5.2 percent. Second, there are signs that compensation as measured by the ECI is accelerating. On a year-over-year basis, private industry compensation increased 2.8 percent through March 2015,

Unemployment and Wage Growth



Source: Bureau of Labor Statistics
Note: ECI is compensation for private industry workers; average hourly earnings is for all employees on private nonfarm payrolls.

NFIB Compensation Measures

Note: Quarterly averages.
Sources: National Federation of Independent Business, Haver Analytics.

its highest reading since September 2008. After a long stretch, the wage Phillips curve may finally be coming back to life.

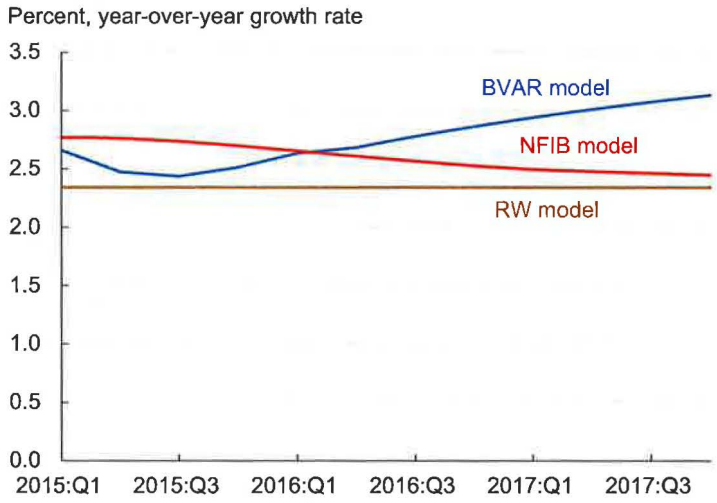
A pickup in compensation growth is consistent with some reports coming from businesses. Several prominent national retail chains have recently announced plans to increase wages. The National Federation of Independent Business (NFIB) provides monthly survey evidence from small businesses showing the net percentage of respondents reporting plans to increase worker compensation in the next three months and the net percentage of respondents who increased worker compensation over the past three months. After falling off to extremely low levels during the recession, these readings have gradually recovered and are back within the range of readings from the previous two business cycles.

What can shrinking slack in the labor market or reports from businesses on their wage plans tell us about the trend for wages going forward? To address this question, I consider three models for forecasting wage growth. I take a broad view of "wages" by looking at employee compensation for private industry workers as measured by the ECI.

The first model is a medium-scale statistical model used in previous work, called a Bayesian vector autoregression (BVAR), which includes ECI growth, the unemployment rate, productivity, inflation, and several other typical macroeconomic data series. This model allows for the possibility that there is a wage Phillips curve in which a falling unemployment rate puts upward pressure on wage growth, but it also includes a variety of other factors that may affect wage growth, such as productivity and inflation. The second model uses information from businesses to predict future ECI growth. In particular, I map the NFIB survey responses on plans to raise worker compensation to ECI growth via a simple forecasting model. The third model is not much of a model at all: it simply assumes that future year-over-year ECI growth will be equal to its most recently observed value. This is a random walk model.

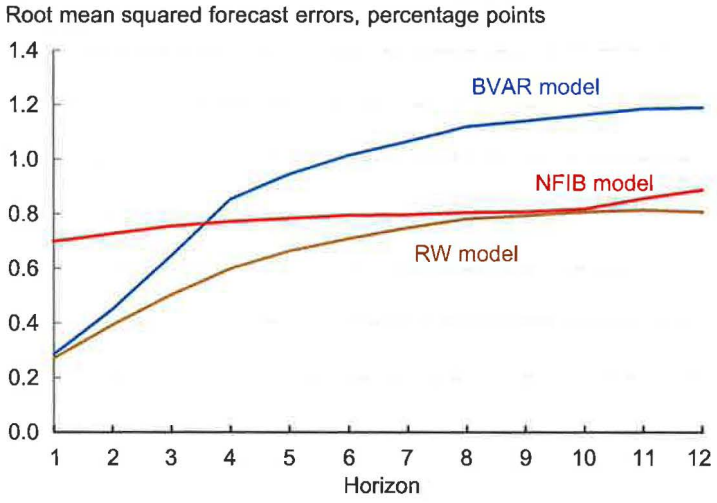
Using data available through the fourth quarter of 2014, I generate forecasts from these three models.

ECI Forecasts



Source: author's calculations.

ECI Forecast Errors, 1994–2014



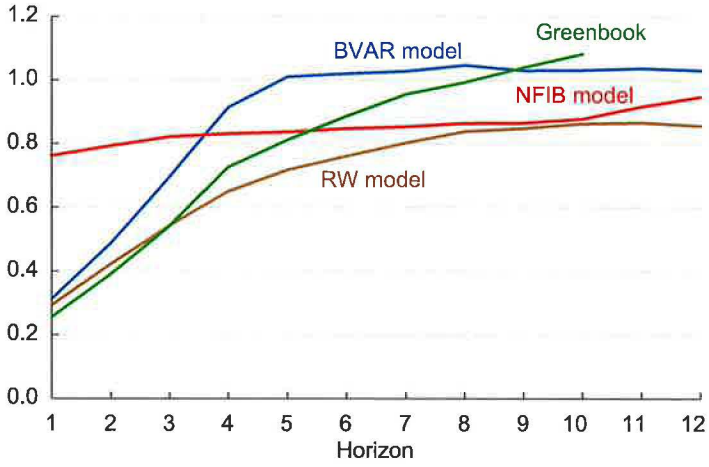
Source: author's calculations.

After a decline in the middle of this year, the BVAR model puts ECI growth on an upward trajectory over the next several years, consistent with further improvements in labor markets, which the model predicts as well. By the end of 2017, ECI growth is a little above 3 percent in this forecast. The simple NFIB model almost perfectly predicted the ECI reading in the first quarter of 2015 of 2.8 percent. But this model would actually forecast that ECI growth should taper off somewhat, gradually falling to about 2½ percent by the end of the forecast period. By construction, the random walk forecast calls for ECI growth to be steady at a little under 2½ percent for the next three years. Of course, if I were to redo the forecasts using the most recent ECI reading of 2.8 percent, the random walk model would now call for that rate of ECI growth to persist going forward.

Given that the NFIB model made an excellent forecast for the first quarter of 2015, should we place the most weight on that model? Looking at the historical forecast accuracy of these three models is revealing. For each quarter starting in the first quarter of 1994 and ending in the fourth quarter of 2014, I generate the ECI growth forecast coming from each model for the next 12 quarters and then see how accurate those forecasts turned out to be. I assume the forecasts would have been made approximately in the middle of the middle month of the quarter, and wherever possible I use the data that would have been available to a forecaster in "real time" at that point. The BVAR model has historically generated reasonably accurate forecasts at short horizons and much less accurate forecasts at longer horizons, based on the typical forecast misses—technically, the root mean squared forecast errors—from this model. Relative to the BVAR model, typical forecast misses have been somewhat larger at short horizons for the simple NFIB model but smaller at longer horizons. But at each horizon, the random walk model has been the most accurate of the three models. This result suggests that movements in compensation growth—which depend on a complex combination of labor market slack, bargaining power, worker productivity, inflation, and myriad other factors—have been essentially unpredictable since the mid-1990s. These difficulties

ECI Forecast Errors, 1994–2009

Root mean squared forecast errors, percentage points



Source: author's calculations.

in forecasting labor compensation provide at least some evidence for why wages often appear to have little predictive power when forecasting inflation (see, for example, Stock and Watson 2008). In discussing the outlook for wages in her press conference following the March FOMC meeting, Federal Reserve Board Chair Yellen raised the possibility that wage growth may not pick up, a forecast in line with the predictions of a random walk model.

Of course, one distinct possibility is that these models for forecasting wage growth are inferior to other models. In this case, looking at the ECI forecast accuracy of other forecasters could be instructive. For the period 1994-2009, it is possible to see the publicly available forecasts for ECI growth that were made by one well-known forecasting body: the Federal Reserve Board of Governors staff, in the Greenbook. Greenbook forecasts are made immediately prior to each FOMC meeting. There are two regularly scheduled meetings of the FOMC in each quarter, and thus two Greenbooks; I use the second forecast from each quarter, potentially giving the Greenbook an information advantage over my previous forecasts, which were made using information available only through the first half of each quarter.

For the sake of comparability, I shorten the sample and look at the forecasting performance of the other models over the period 1994-2009 as well. Over short horizons—one to two quarters—the Greenbook's forecasts for ECI growth were slightly more accurate than those from the other models. But as the forecast horizon lengthens, the typical forecast misses from the random walk model were again smaller than those coming from the Greenbook. In other words, extrapolating the recent past into the future was also a more accurate forecast for ECI growth on average than the Greenbook forecasts.

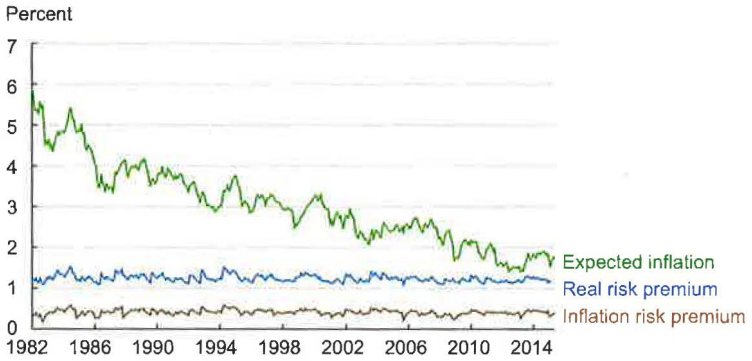
Cleveland Fed Estimates of Inflation Expectations, May 2015

News Release: May 22, 2015

The latest estimate of 10-year expected inflation is 1.79 percent, according to the Federal Reserve Bank of Cleveland. In other words, the public currently expects the inflation rate to be less than 2 percent on average over the next decade.

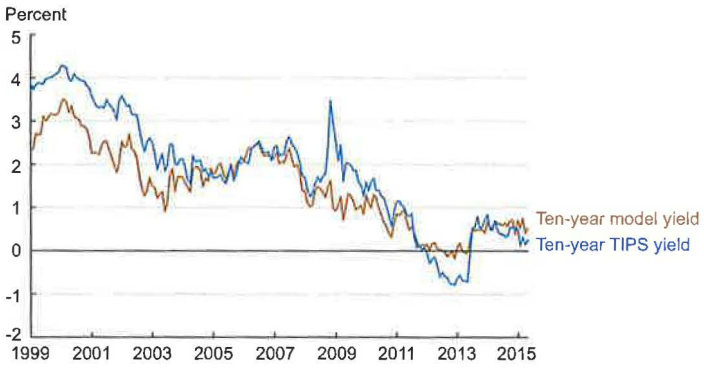
The Cleveland Fed's estimate of inflation expectations is based on a model that combines information from a number of sources to address the shortcomings of other, commonly used measures, such as the "break-even" rate derived from Treasury inflation protected securities (TIPS) or survey-based estimates. The Cleveland Fed model can produce estimates for many time horizons, and it isolates not only inflation expectations, but several other interesting variables, such as the real interest rate and the inflation risk premium.

Ten-Year Expected Inflation and Real and Nominal Risk Premia



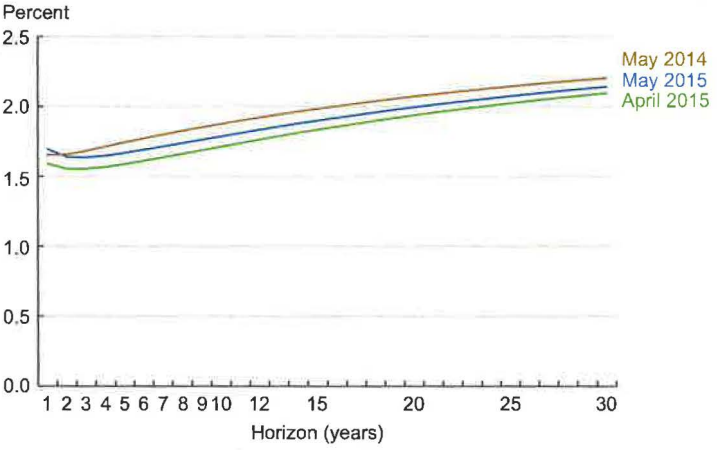
Source: Haubrich, Pennacchi, Ritchken (2012).

Ten-Year TIPS Yields versus Real Yields



Source: Haubrich, Pennacchi, Ritchken (2012).

Expected Inflation Yield Curve



Source: Haubrich, Pennacchi, Ritchken (2012).

The Gap between Services Inflation and Goods Inflation

06.02.2015
by Saeed Zaman

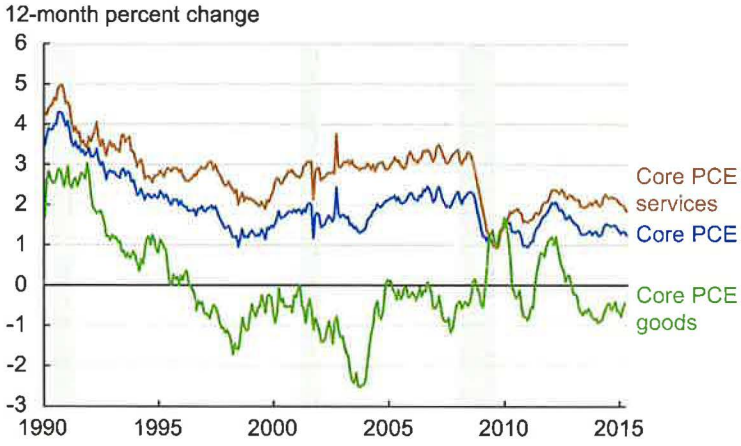
Inflation as measured by the price index for personal consumption expenditures (PCE) has been running below the Federal Reserve's longer-run objective of 2 percent for the last three years. Similarly, the PCE price index excluding food and energy, also known as core PCE inflation, has been below 2 percent over the same period. Core PCE inflation as of April 2015 was 1.24 percent on a year-over-year basis. This reading is little changed from where it was in early 2014 in spite of improvements seen in the labor market over the last year, as pass-through from sharply lower oil prices and a sharply stronger dollar have weighed on inflation readings.

Digging a little deeper into the behavior of the two components of core PCE inflation, core services and core goods, may provide some additional insights into why core inflation has been coming in persistently low and whether there is a cause for concern that it could remain low going forward. Doing so reveals that subdued core services inflation continues to be the primary factor keeping core inflation low.

Since the early 1990s, inflation rates for both core services and core goods inflation have declined sharply, with core goods inflation falling more than core services inflation. While core services inflation never fell below 2 percent, core goods inflation continued to decline and eventually became negative by the mid-1990s. Since then, it has been consistently and significantly negative. Core services inflation has gradually trended up from its recession lows and stabilized around 2 percent over the last three years. Currently it remains near that level, a full percentage point lower than its average in the five years prior to the Great Recession.

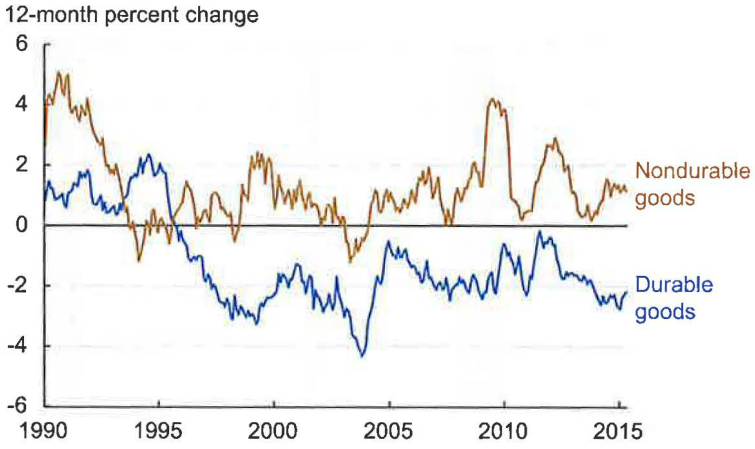
One can glean additional insight into the deflationary behavior of core goods inflation by looking at the behavior of its two subcomponents: durable goods and nondurable goods (both of which exclude energy and food). It is durable goods which

Core PCE Inflation and Its Components



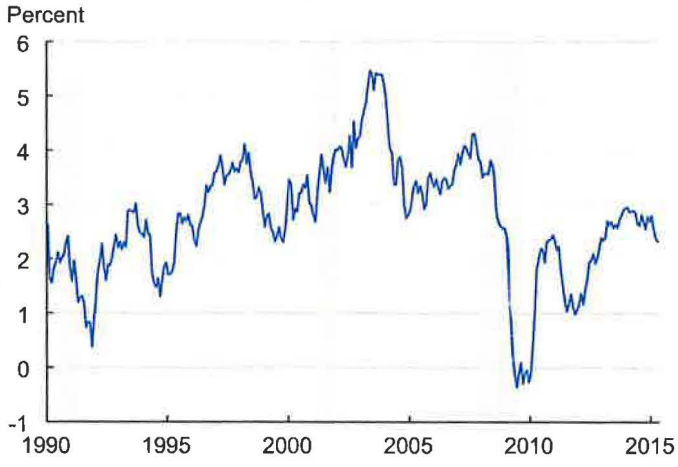
Notes: Last observation was April 2015. Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis.

Core PCE Goods Breakdown



Notes: Last observation was April 2015. Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis.

Core Services Less Core Goods Inflation (Gap)



Note: Last observation was April 2015.
Sources: Bureau of Economic Analysis.

have had the greatest effect on total core goods inflation. Since 1995, durable goods inflation has been persistently and significantly negative. It measured -2.2 percent in April 2015 on a year-over-year basis, whereas nondurable goods inflation was 1.2 percent.

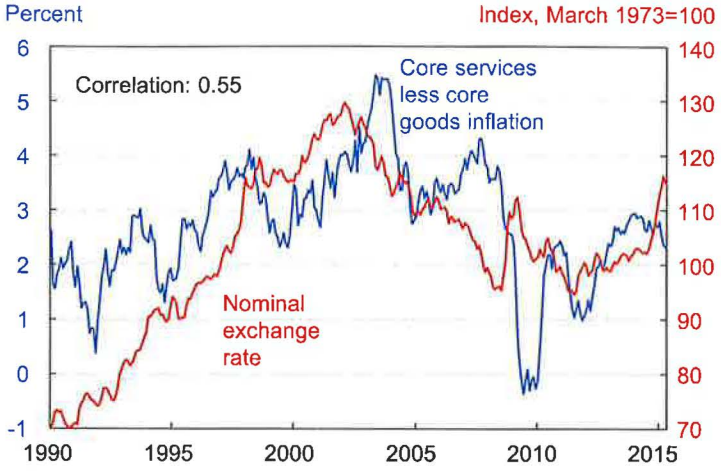
The large spikes observed in total core goods inflation around the Great Recession and one year later were primarily driven by spikes in nondurable goods inflation. A little digging reveals that those spikes were indeed driven by temporary factors. The spike in 2009 was due to an increase in tobacco taxes introduced that year, which at the time was dubbed one of the largest federal tax increases in US history. Another spike in nondurables occurred around 2011-2012 and was partly due to a sharp rebound in clothing prices, which had been falling for more than a decade.

Over the last two years, the inflation rates for nondurable goods and durable goods have been on a divergent path, with durable goods inflation trending lower and nondurable goods inflation trending higher. The combined effect has kept overall core goods inflation relatively stable (but negative).

Past studies (see Peach, Rich, and Antoniadas 2004, and Peach, Rich, and Linder 2013) have stressed the importance of examining the underlying behavior of these two major components of aggregate inflation along with the measured gap between them, because such information may provide deeper insights into the observed behavior of aggregate inflation and help to inform the near-term outlook for aggregate inflation

It has been well documented that core goods inflation is usually lower than core services inflation (see Clark 2004). As a result, the gap between them has historically been positive. The Great Recession saw a reversal of this relationship, when the slowdown in core services inflation and the surge in core goods inflation caused the gap to turn negative in May 2009 for the first time since 1990. The gap once again turned positive in February 2010 and has been widening since. The improving economy helped support services inflation, and from 2011 onwards the rising value of the dollar has weighed on core goods inflation. Recently, with core goods

Services and Goods Differential versus Exchange Rate



Notes: Last observation was April 2015. Exchange rate is the broader trade weighted index.
Sources: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System, and author's calculations.

inflation remaining relatively stable, and core services inflation edging slightly lower, the gap between the two has narrowed slightly. Currently it is 2.3 percentage points, which is near its historical average over the past 25 years of 2.8 percentage points. This gap is significantly lower than the peak value of 5.5 percentage points attained in May 2003, which at the time contributed to concerns about the potential for deflation.

Yield Curve and Predicted GDP Growth, May 2015

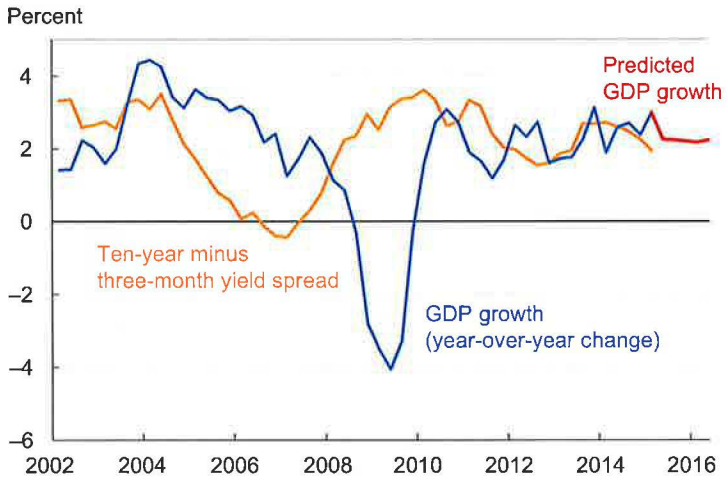
Covering April 24–May 22, 2015
by Joseph G. Haubrich and Sara Millington

Highlights

	May	April	March
Three-month Treasury bill rate (percent)	0.02	0.03	0.03
Ten-year Treasury bond rate (percent)	2.23	1.94	2.00
Yield curve slope (basis points)	221	191	197
Prediction for GDP growth (percent)	2.2	2.2	2.1
Probability of recession in one year (percent)	3.42	5.25	4.85

Sources: Board of Governors of the Federal Reserve System; authors' calculations.

Yield Curve-Predicted GDP Growth



Sources: Bureau of Economic Analysis; Board of Governors of the Federal Reserve System; authors' calculations.

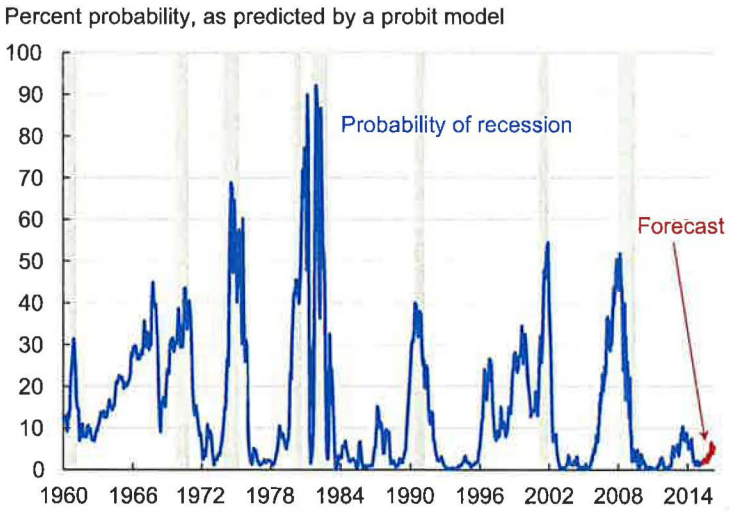
Overview of the Latest Yield Curve Figures

The yield curve got steeper in May. As has been typical lately, most of the action was mainly at the long end while the short end dropped slightly, with the three-month (constant maturity) Treasury bill rate falling to 0.02 percent (for the week ending May 22), down a hair from April's 0.03 percent, which was even with March's rate. The ten-year rate (also constant maturity) rose a full 29 basis points—almost a third of a percent—to 2.23 percent from April's 1.94 percent and was even nearly a quarter point above the March number of 2.00 percent. These changes increased the slope to 221 basis points, up from the 191 basis points seen in April and the 197 basis points in March.

The steeper slope did not have a large impact on predicted real GDP growth and expected growth stayed constant. Using past values of the spread and GDP growth suggests that real GDP will grow at about a 2.2 percent rate over the next year, even with last month's reading, which was barely up from March. The influence of the past recession continues to push towards relatively low growth rates, but recent year-over-year growth has been stronger (despite the recent negative number for the first quarter of 2015) and is counteracting that push. Although the time horizons do not match exactly, the forecast is slightly more pessimistic than some other predictions, but like them, it does show moderate growth for the year.

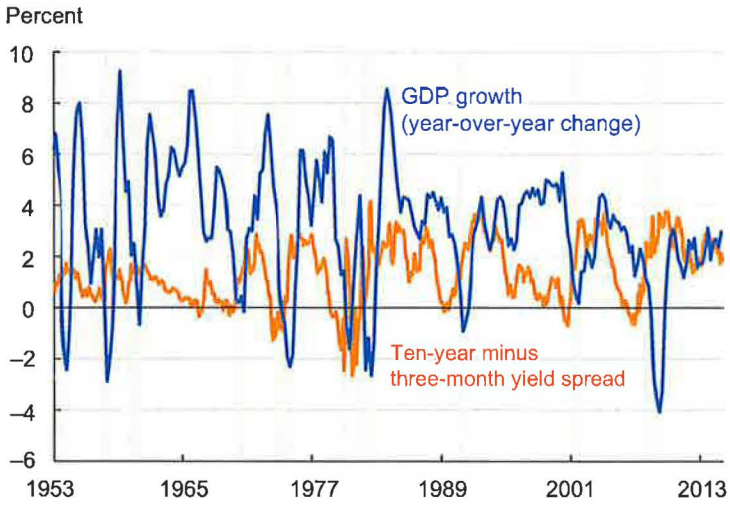
The increased slope, however, did have the usual effect on the probability of a recession, which dropped. Using the yield curve to predict whether or not the economy will be in recession in the future, we estimate that the expected chance of the economy being in a recession next May at 3.42 percent, down from April's at 5.25 percent and even below the March number of 4.85 percent. So even though the most recent real GDP estimate saw the economy contract in the first quarter of 2015,

Recession Probability from Yield Curve



Source: Board of Governors of the Federal Reserve System; NBER; authors' calculations.

Yield Curve Spread and Real GDP Growth



Note: Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System.

the yield curve is optimistic about the recovery continuing, even if it is somewhat pessimistic with regard to the pace of growth over the next year.

The Yield Curve as a Predictor of Economic Growth

The slope of the yield curve—the difference between the yields on short- and long-term maturity bonds—has achieved some notoriety as a simple forecaster of economic growth. The rule of thumb is that an inverted yield curve (short rates above long rates) indicates a recession in about a year, and yield curve inversions have preceded each of the last seven recessions (as defined by the NBER). One of the recessions predicted by the yield curve was the most recent one. The yield curve inverted in August 2006, a bit more than a year before the current recession started in December 2007. There have been two notable false positives: an inversion in late 1966 and a very flat curve in late 1998.

More generally, a flat curve indicates weak growth, and conversely, a steep curve indicates strong growth. One measure of slope, the spread between ten-year Treasury bonds and three-month Treasury bills, bears out this relation, particularly when real GDP growth is lagged a year to line up growth with the spread that predicts it.

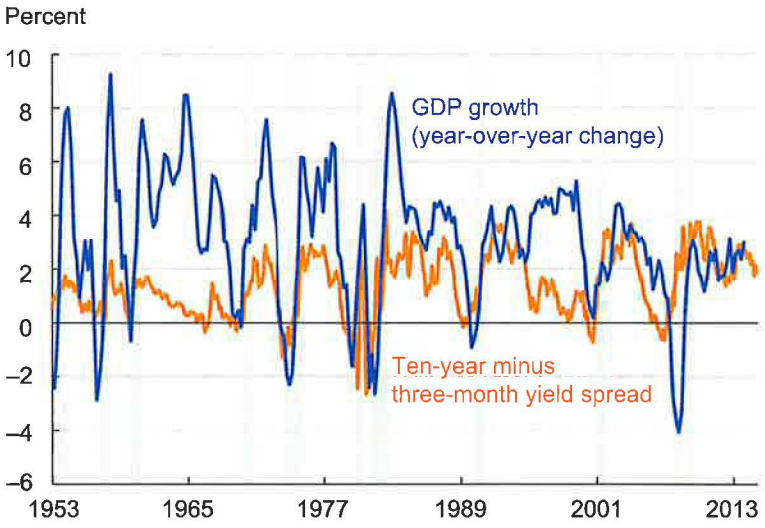
Predicting GDP Growth

We use past values of the yield spread and GDP growth to project what real GDP will be in the future. We typically calculate and post the prediction for real GDP growth one year forward.

Predicting the Probability of Recession

While we can use the yield curve to predict whether future GDP growth will be above or below average, it does not do so well in predicting an actual number, especially in the case of recessions. Alternatively, we can employ features of the yield curve to predict whether or not the economy will be in a recession at a given point in the future. Typically, we calculate and post the probability of recession one year forward.

Yield Spread and Lagged Real GDP Growth



Note: Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System.

Of course, it might not be advisable to take these numbers quite so literally, for two reasons. First, this probability is itself subject to error, as is the case with all statistical estimates. Second, other researchers have postulated that the underlying determinants of the yield spread today are materially different from the determinants that generated yield spreads during prior decades. Differences could arise from changes in international capital flows and inflation expectations, for example. The bottom line is that yield curves contain important information for business cycle analysis, but, like other indicators, should be interpreted with caution. For more detail on these and other issues related to using the yield curve to predict recessions, see the Commentary "Does the Yield Curve Signal Recession?" Our friends at the Federal Reserve Bank of New York also maintain a website with much useful information on the topic, including their own estimate of recession probabilities.

Mutable Economic Laws and Calculating Unemployment and Output Gaps—An Application to Taylor Rules

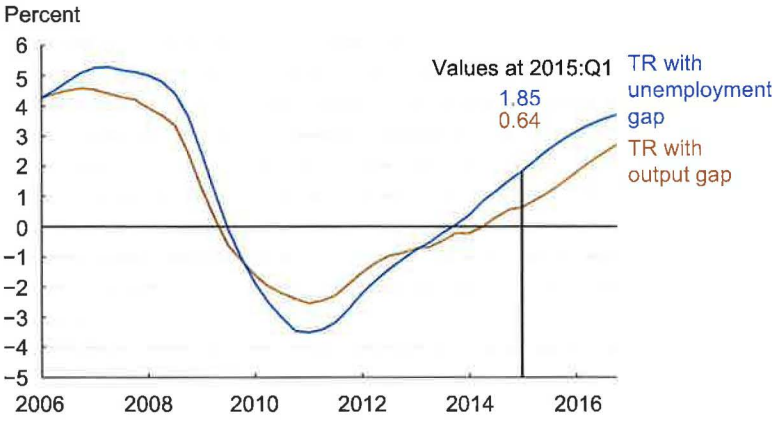
06.04.2015

by Charles T. Carlstrom and Timothy Stehulak

The Taylor rule, which expresses the federal funds rate as a function of how far inflation is from its long-run target and how far output is from its potential, is often thought to be a useful guide to monetary policy. Economist John Taylor proposed that the weight on the inflation gap be 1.5 and the weight on the output gap be 1. Given that the dual mandate of the Federal Reserve includes inflation and employment, many people write the Taylor rule in terms of an employment gap instead of an output gap. With an unemployment Taylor rule, the funds rate responds to deviations of unemployment from its "natural rate," sometimes called the nonaccelerating inflation rate of unemployment or NAIRU. The coefficient on the unemployment gap is usually taken to be 2. Many economists typically include the lagged funds rate as well. We also include this "inertial" term (which is estimated to be 0.8) because while the funds rate typically moves in the direction suggested by the Taylor's original rule, these movements are typically only partial; thus, it takes a series of policy moves to reach the level a simple Taylor rule suggests.

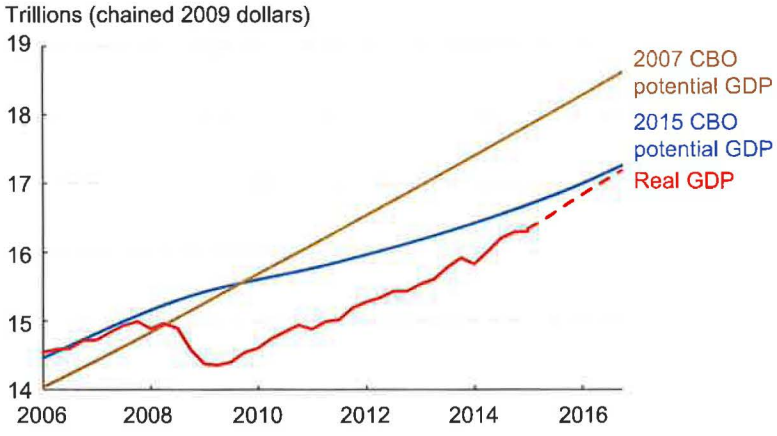
The Taylor rule is garnering more attention lately as many think that the fed funds rate may be raised soon ("liftoff"). Some believe that the Fed is already behind the curve and should have raised rates a while ago. The chart below shows that if the Fed would have followed an unemployment Taylor rule, the funds rate today would be 1.85 percent, and if it had followed the output Taylor rule, the rate would be 0.69 percent. Notice that there is over a percentage point difference in these two rules. Both of these estimates suggest that the Fed may have been slow to increase rates. But such conclusions depend critically on how accurately potential output or the natural rate of unemployment is measured (such conclusions also depend in part on the particular form of the Taylor rule used; for simplicity, this analysis focuses on the simple rule described

Where the Fed Funds Rate Would Be Using a Taylor Rule



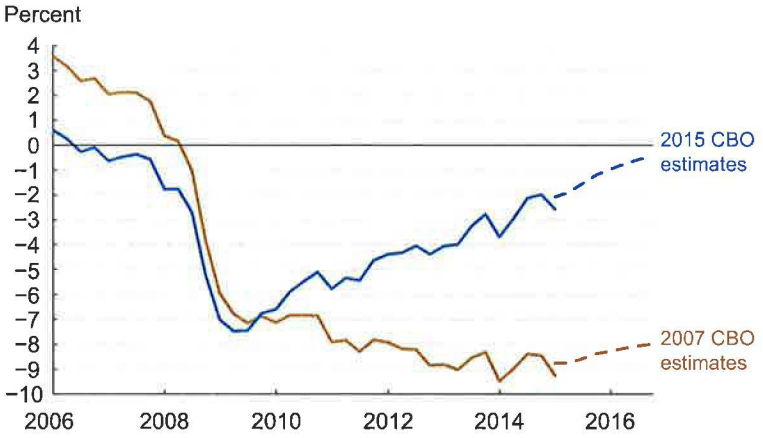
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Congressional Budget Office, and authors' calculations.

Estimates of Potential GDP



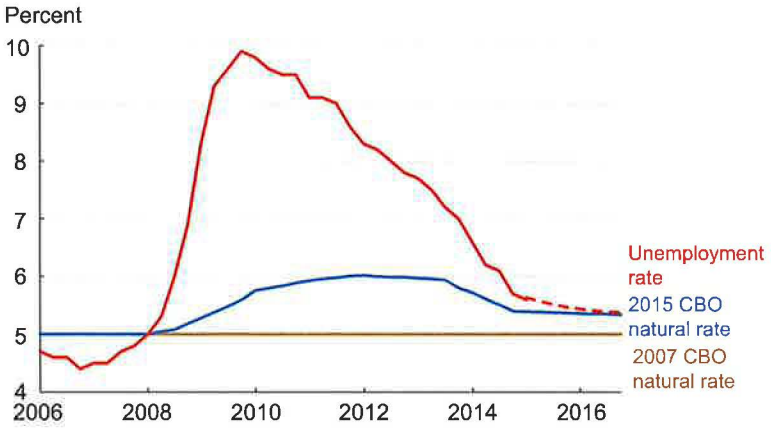
Sources: Congressional Budget Office, Bureau of Economics Analysis, and authors' calculations.

Estimates of the Output Gap



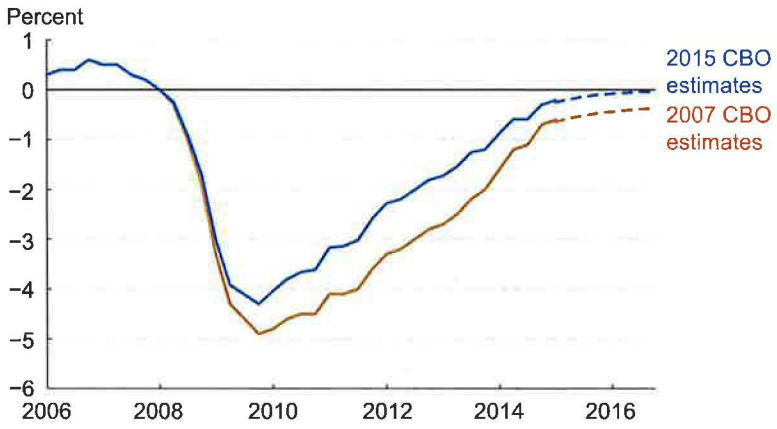
Sources: Bureau of Economic Analysis, Congressional Budget Office, and authors' calculations.

Estimates of the Natural Unemployment Rate



Sources: Bureau of Labor Statistics, Congressional Budget Office.

Estimates of the Unemployment Gap



Source: Bureau of Labor Statistics, Congressional Budget Office, authors' calculations.

above). Both concepts are hard to estimate with any precision, and this lack of precision should be recognized when policy recommendations are made using a Taylor-type rule.

Potential output and the natural rate of unemployment are useful economic concepts, but they are measured with considerable error. Estimates are extremely difficult to make, and large revisions are made periodically. This is particularly true in the aftermath of the Great Recession. For example, the Congressional Budget Office's (CBO) 2007 estimate of what output would be in 2015 differs from its current estimate by approximately a trillion dollars. This difference is similar to the decline in the gap at the trough of the recession. It is as if the CBO now sees the recession as a permanent shock to GDP. Put another way, after the large fall in GDP, output increased at roughly the same rate as potential (as projected in 2007).

The revision translates into nearly a 7 percentage-point difference in the output gap. In terms of Taylor rules, this difference suggests that if potential output today were at the 2007 estimate, the Taylor rule would call for a federal funds rate of about -5 percent (if interest rates were not constrained by the zero lower bound). This is not meant to say that people currently believe that output is over 9 percent below potential. But estimates of potential GDP are very fluid, and it suggests there is considerable error in our current measure.

The CBO's estimate of the natural rate of unemployment is also fluid, though the revisions are much smaller. In 2007 the CBO estimated that the natural rate of unemployment was, and would remain, at 5 percent. But today the estimate is 5.4 percent. A Taylor rule with the 5 percent natural rate would predict a federal funds rate of 0.59 percent in 2015:Q1, while the funds rate predicted would be 1.85 percent with a 5.4 percent natural rate.

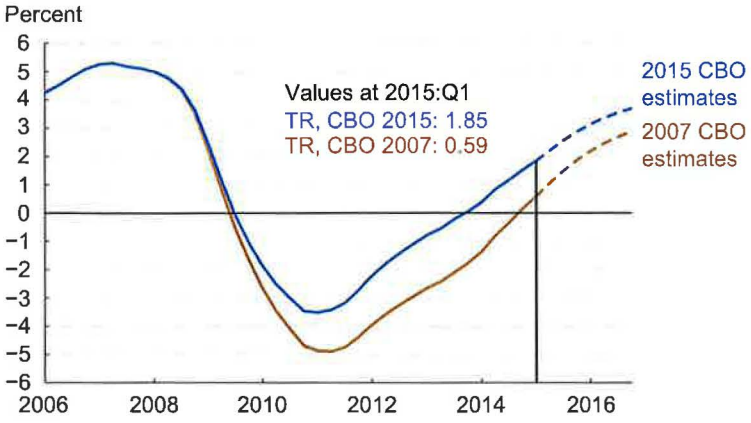
This difference is especially dramatic because a Taylor rule with our current estimate of the natural rate suggests that liftoff would have been about a year ago, in 2013:Q4 (the old natural rate estimate suggests liftoff in 2014:Q4). Contributing to this difference is that the CBO now thinks the natural

rate peaked at about 6 percent in 2012:Q1. This is compared to the 5 percent that in 2007 they had projected it would be in 2012.

One problem in calculating the natural rate and potential output is that they both rely on statistical regularities that do not hold independent of policy and expectations. Both NAIRU and potential output are basically theoretical constructs that are fundamentally unobservable. For example, to calculate the natural rate of unemployment the CBO and others use an empirical relationship called the Phillips curve. The Phillips curve stipulates that when unemployment is above the NAIRU, inflation will decrease one year later. During the recession inflation did not decline nearly as much as some estimates of the Phillips curve would predict, and this discrepancy has continued to this day. The issue is sometimes referred to as the missing inflation puzzle. The Phillips curve is a statistical relationship and is not necessarily stable over time, the CBO revises its NAIRU series so that it better aligns with an estimated Phillips curve. This is seen in the chart below, where the orange dots have been revised up to the blue dots. While other input such as demographic data is used to determine the NAIRU, the CBO still relies on an empirical relationship to help inform it about what NAIRU is.

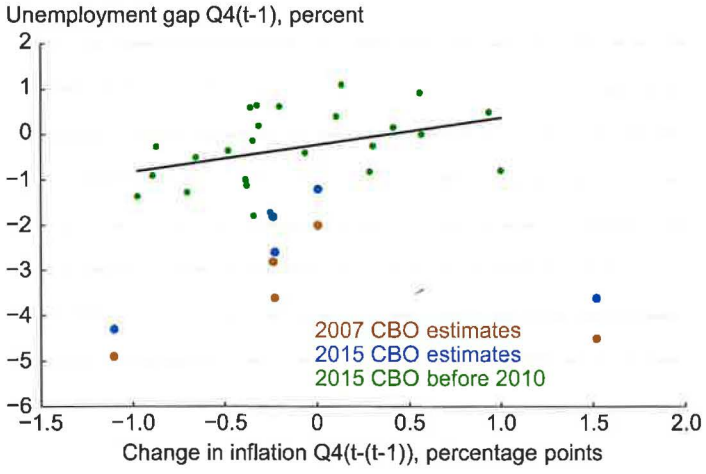
It should not be surprising that this empirical relationship missed substantially after a big crisis like the Great Recession, especially given all the unconventional monetary policies during the period. But a problem arises when this simple statistical relationship is taken to always hold. Today most researchers believe the Phillips curve is not backward looking but forward looking. But because expectations are hard to measure, many forecasters use a backward-looking curve. Arguably during normal times this may not be too far off, but currently it is much less clear. The version of the Phillips curve researchers use states that changes in inflation depend on expectations of the gap going forward and not just today's gap. One reason inflation did not collapse during the Great Recession is because the Fed promised low interest rates going forward as well. How much this mattered quantitatively is not clear, making it extremely difficult to know how much missing inflation there should have been during the Great Recession.

Estimates of the Federal Funds Rate Using Taylor Rule with the Unemployment Gap



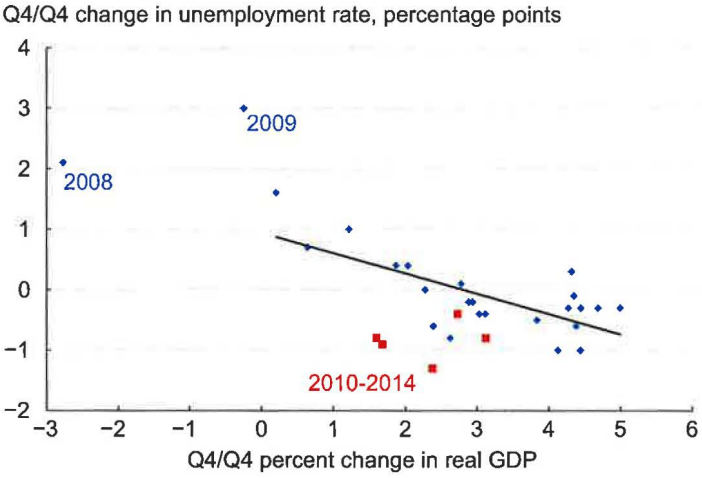
Sources: Bureau of Labor Statistics, Congressional Budget Office; authors' calculations.

Phillips Curve, 1985–2014



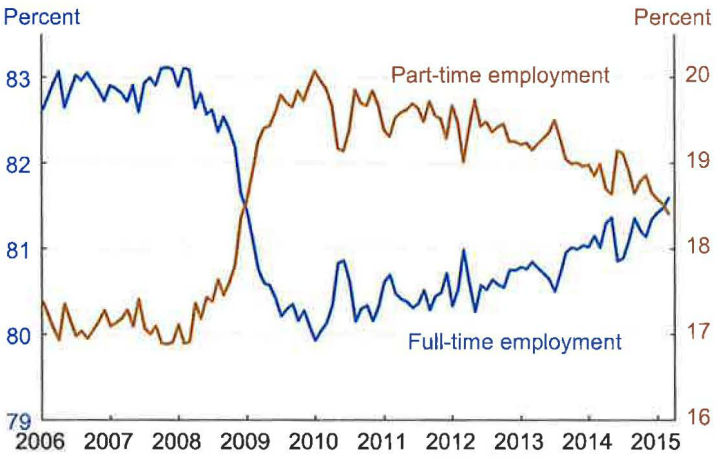
Note: Trend line calculated using data from 1985–2009.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, Congressional Budget Office, authors' calculations.

Okun's Law 1985-2014



Note: Trend line calculated using data from 1985-2007.
Sources: Bureau of Economic Analysis, Bureau of Labor Statistics, authors' calculations.

Full-Time or Part-Time Employment



Source: Bureau of Labor Statistics.

Potential output is calculated from the natural rate series. Thus, potential output will incorporate all the errors involved in calculating the NAIRU. To arrive at potential, researchers make some adjustments to the natural rate of unemployment and use Okun's law to transform unemployment into output. Okun's law is a historical correlation stating that when unemployment decreases by 1 percent, GDP increases by 2 percent. Just like the Phillips curve, this is actually not a law, but is instead a rough empirical relationship that has been observed over time. Unfortunately, this relationship, too, has fared particularly poorly during the recovery. Now instead of a missing inflation puzzle, there is a puzzle over missing output. Unemployment has declined from a high of 10 percent in October 2009 to 5.5 percent today, but GDP has not had nearly such a robust recovery.

These misses are quite large and accumulate. Because of the failure of Okun's law, GDP is about 2 percent below potential, while unemployment is only 0.3 percentage points above its natural rate. Potential will likely be revised down in the future if these misses continue.

But even here the policy implications are not obvious. One reason why Okun's law may have fared so poorly is because of the increased use of part-time employment. Part-time workers are not unemployed, but they do not produce the same output as full-time workers.

Because of the relatively large share of employment that is part-time, some think that the output gap may be closer than the unemployment rate gap in terms of measuring the amount of slack in the economy. These are important issues for the stance of policy, but unfortunately there is no clear right or wrong answer. It does suggest that perhaps we should pay relatively more attention to inflation in setting policy than our slack estimates.

While the prevailing methodologies to estimate NAIRU and potential output are imperfect, they are still useful. However, everyone needs to be mindful of the imprecision that results from the methodologies, and take care in predicting policy actions like liftoff.

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