

Economic Trends

September 2014 (August 15, 2014-September 25, 2014)

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FEDERAL RESERVE BANK
of CLEVELAND

Growth Expected to Pick Up

09.25.14

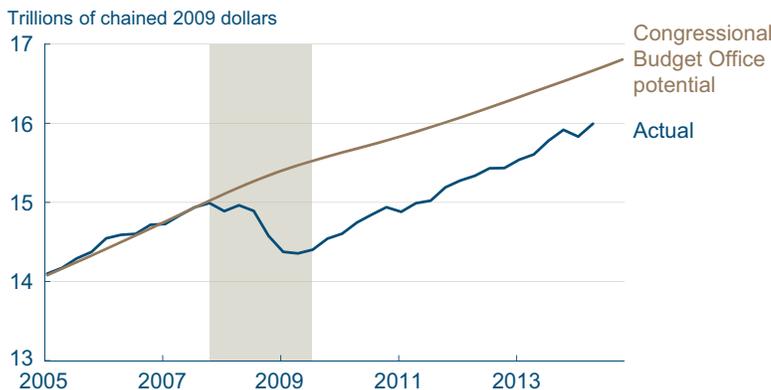
by Filippo Occhino

The effects of the Great Recession have lasted for an exceptionally long period of time. For the past several years the level of output has remained below its potential level (the level that could be reached if all available capital and labor were being used at their full rate). Equivalently, the output gap (the gap between actual output and potential output) has remained wide open. The output gap is still 4 percent five years after the end of the recession. This is much longer than is typical—for instance, it was already less than 1 percent within three years after the end of the last two severe recessions (1973–1975 and 1981–1982).

In turn, the prolonged economic weakness has lowered the level of potential output by discouraging labor force participation and the number of potential hours that could be worked, by slowing the growth of labor skills and of human capital, by restraining the growth of investment and of physical capital, and by reducing R&D spending and total factor productivity growth. According to Congressional Budget Office (CBO) estimates, the Great Recession and the sluggish recovery will reduce the level of potential output in 2017 by 1.8 percentage points—0.7 percentage points from fewer potential labor hours, 0.6 percentage points from reduced capital services, and 0.5 percentage points from lower total factor productivity. Other studies estimate even larger effects. For instance, Ball forecasts that the Great Recession will reduce potential output in 2015 by 5.33 percentage points in the United States and by an average of 8.4 percentage points in 23 OECD countries; in some of these countries, the Great Recession depressed not only the level of potential output but also its growth rate.

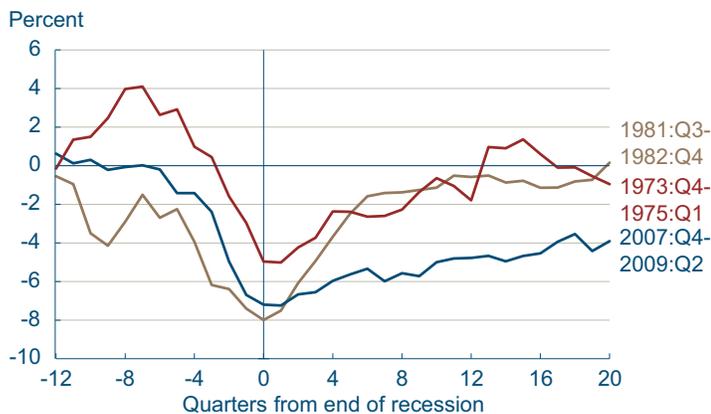
The combination of prolonged economic weakness and slow potential growth has led to a debate on the risk that the economy may have entered or may soon enter a period of stagnation—a prolonged period characterized by low interest rates, low

Real GDP



Note: Shaded bar indicates recession.
Sources: Bureau of Economic Analysis, Congressional Budget Office, Haver Analytics.

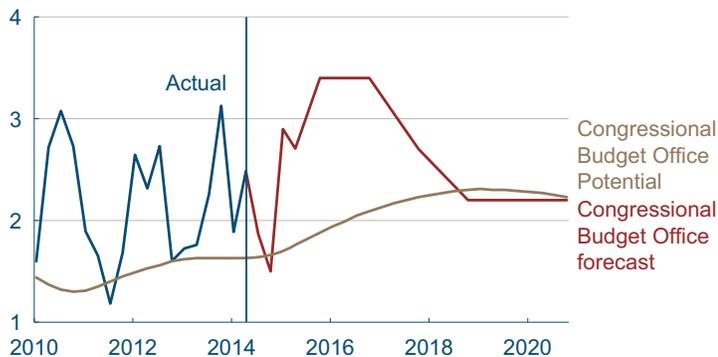
Output Gap



Notes: The output gap is the percent difference between actual and potential output. A negative number indicates that actual output is below potential.
Sources: Congressional Budget Office, Haver Analytics, author's calculations.

Real GDP

Year-over-year percent change

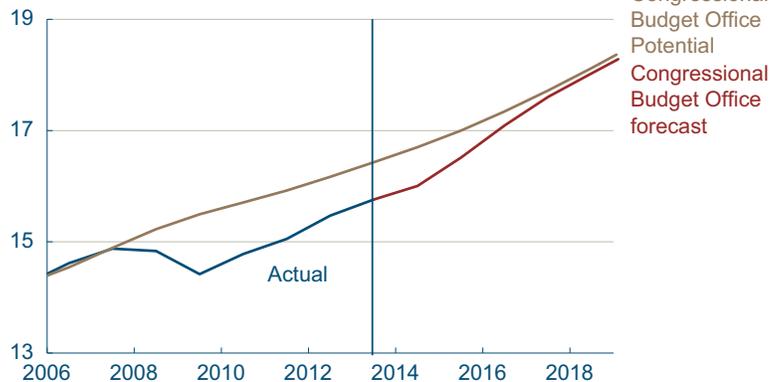


Note: Congressional Budget Office forecast is calculated from the quarterly growth rates implied by the Congressional Budget Office forecast of the yearly growth rates.

Sources: Bureau of Economic Analysis, Congressional Budget Office, Haver Analytics, author's calculations.

Real GDP

Trillions of chained 2009 dollars



Source: Bureau of Economic Analysis, Congressional Budget Office, Haver Analytics, author's calculations.

inflation rates, slow potential growth, and a level of output below potential. (Read a review of different views on the risk of secular stagnation.)

Current economic conditions, however, suggest that the economy continues to recover. In the five years following the end of the Great Recession, the economy grew at a steady, albeit modest, rate—real GDP grew at an average 2.2 percent annual rate. After declining at a 2.1 percent annual rate in the first quarter of 2014 due to temporary factors like bad weather, real GDP rebounded to a 4.2 percent annual growth rate in the second quarter [now revised to 4.6 percent as of 9/26/14], driven by household consumption and business investment. Reports on business conditions indicate that economic activity continues to expand. Growth is expected to pick up in the next few years and then to converge to a moderate rate in the longer run. According to the latest CBO forecast, real GDP will grow 1.5 percent this year, 3.4 percent both in 2015 and in 2016, 2.7 percent in 2017, and 2.2 percent on average between 2018 and 2022. Real GDP will grow faster than potential in the years 2015 through 2017, which will almost completely close the output gap by the beginning of 2018.

Cleveland Fed Estimates of Inflation Expectations, August 2014

News Release: August 19, 2014

Ten-Year Expected Inflation and Real and Nominal Risk Premia

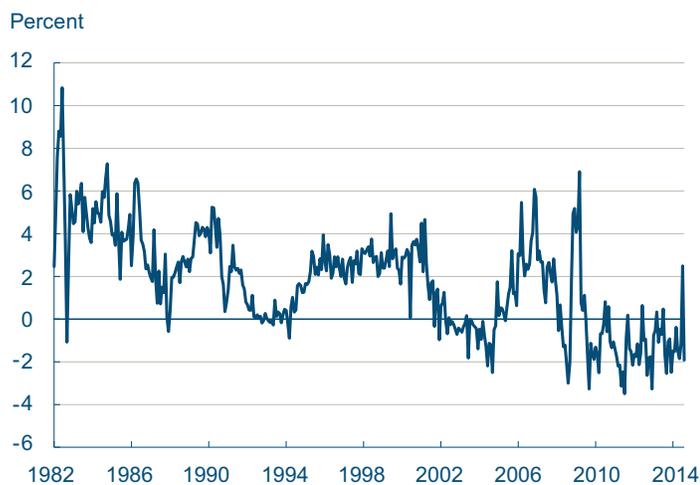


Source: Haubrich, Pennacchi, Ritchken (2012).

The latest estimate of 10-year expected inflation is 1.89 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.

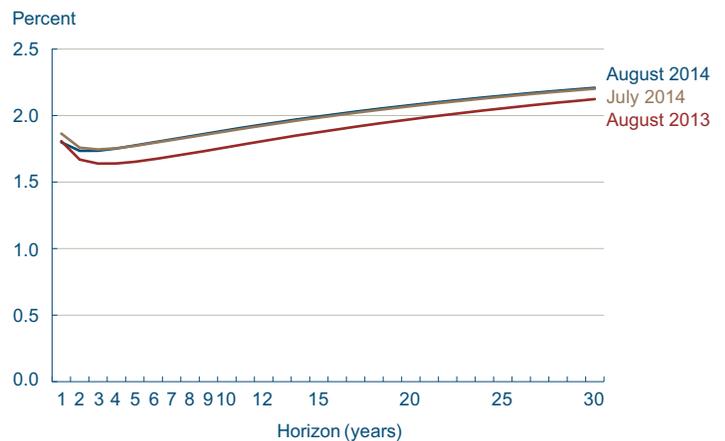
The Cleveland Fed’s estimate of inflation expectations is based on a model that combines information from a number of sources to address the shortcomings of other, commonly used measures, such as the “break-even” rate derived from Treasury inflation protected securities (TIPS) or survey-based estimates. 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.

Real Interest Rate



Source: Haubrich, Pennacchi, Ritchken (2012).

Expected Inflation Yield Curve



Source: Haubrich, Pennacchi, Ritchken (2012).

Evaluating Progress Toward the Fed's Inflation Target

08.26.14

by William Bednar and Todd Clark

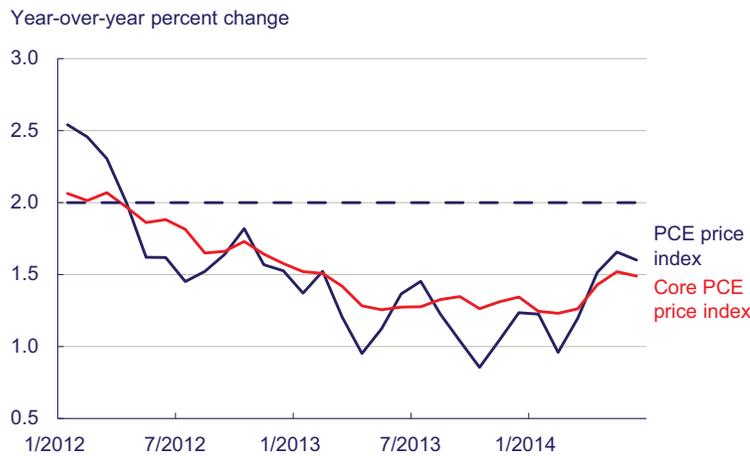
Since January 2012, the Federal Open Market Committee (FOMC) has explicitly stated an inflation target of 2 percent. Since that time, most measures of inflation have been running persistently below that target. While in recent months some inflation indicators have made progress in moving back toward 2 percent, determining just how close we are to the FOMC's target depends on which inflation measure we look at.

For example, measures based on the Personal Consumption Expenditures (PCE) price index indicate that progress has been made toward the 2 percent inflation target but that inflation still remains somewhat below the desired level. The year-over-year percent change in the PCE price index, which remained below 1.5 percent since early 2013, ticked up to near 1.7 percent in May and was at 1.6 percent in June. Additionally, inflation as measured by the core PCE price index, which excludes food and energy costs and is therefore a less volatile measure of underlying inflation, increased to 1.5 percent by June after staying in a narrow range around 1.3 percent over most of the past year.

In contrast, measures based on the Consumer Price Index (CPI) give a different impression of where we are in relation to a 2 percent target. The year-over-year percent change in the CPI increased to 2.0 percent in April of this year and has remained near that level through July. Core CPI inflation increased to 2.0 percent in May, and as of July, was at 1.9 percent. Evaluating current inflation levels with the CPI could lead us to think that we have been right on target over the past few months.

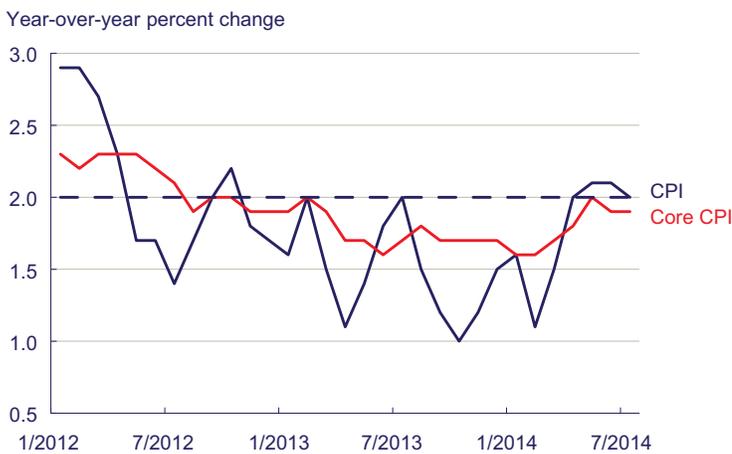
But it isn't quite right to use common CPI measures of inflation to assess proximity to the FOMC's longer-run inflation goal. The FOMC's target is based on the Committee's preferred measure of inflation—the PCE price index. Normally, CPI inflation runs higher than PCE inflation; since 2001, the difference has been about 0.4 percentage

PCE Inflation Measures



Source: Bureau of Economic Analysis.

CPI Inflation Measures



Source: Bureau of Labor Statistics.

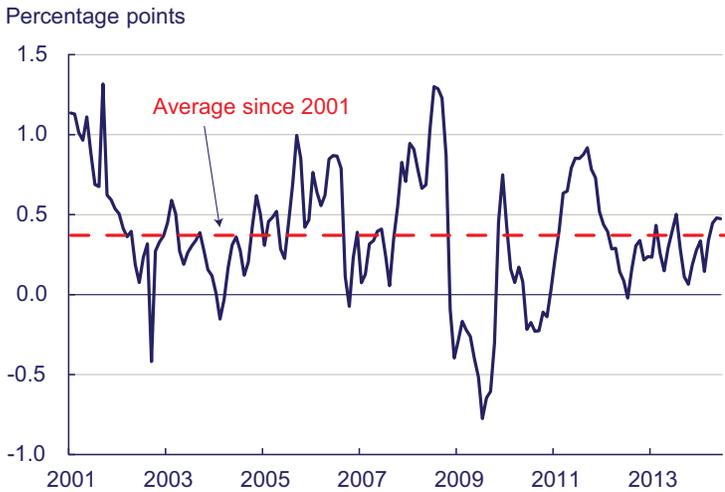
points. There are a number of reasons that CPI inflation commonly exceeds PCE inflation, having to do with the different purposes of the price measures and their construction.

One of the primary drivers of the difference in PCE and CPI inflation rates is known as substitution bias. As the price of one good goes up relative to another, consumers will make substitutions in their purchases, to spend less on the now more expensive good and more on the newly cheaper item. The PCE measure of inflation does a better job of capturing this kind of substitution than does the CPI. Both the CPI and the PCE price index are weighted averages of price indexes for individual categories of goods and services, where the weights are determined based on the composition of consumption. The weights used in the construction of the PCE index are updated each month based on the composition of consumption in that month, while the weights used in the CPI are not. The weights in the CPI are adjusted, but at a lower frequency. As a result, the CPI does not do as good of a job as the PCE price index at capturing substitution, which causes CPI inflation to (on average) exceed PCE inflation.

However, there is a version of the CPI that attempts to account for substitution in a manner similar to the PCE price index: the chain-weighted (or chained) CPI. For the chained CPI, the weights for each individual category are adjusted monthly in order to keep up with changes in consumption. This eliminates the substitution bias in the CPI. Over time, the average rate of inflation in the chained CPI is similar to the average rate of inflation in PCE prices (both overall and the PCE excluding food and energy). As a result, for comparing CPI inflation to the FOMC's 2 percent inflation goal, the chained CPI is more appropriate than the more widely publicized, simple CPI.

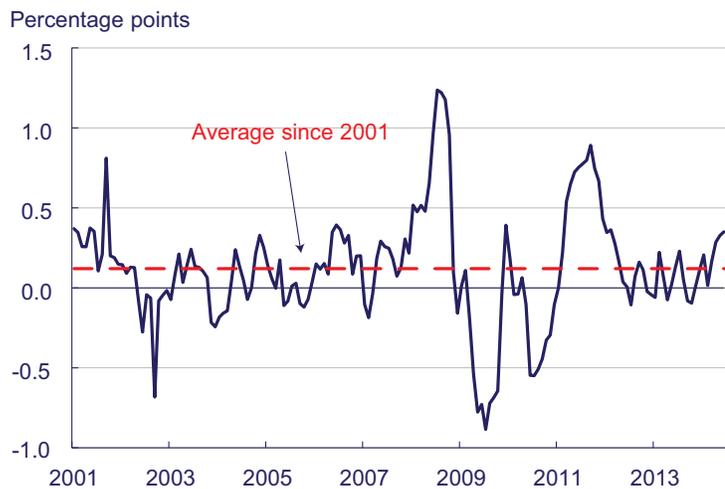
Over the past couple of years, it turns out that chained CPI measures paint a picture pretty similar (although not exactly the same) to the one painted by PCE measures. Inflation in the chained CPI has been very similar to PCE inflation, until very recently, when the chained CPI moved somewhat above PCE inflation. In fact, as of June, inflation in

Gap Between CPI and PCE Inflation



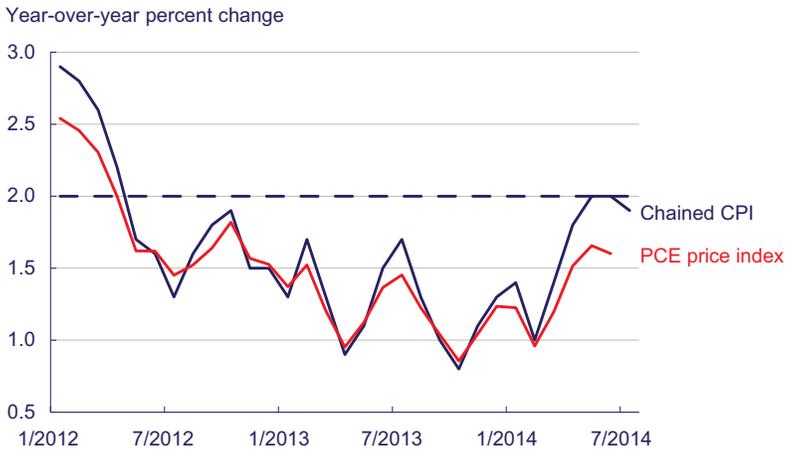
Note: Difference between year-over-year percent change in CPI and PCE price index. Sources: Bureau of Economic Analysis; Bureau of Labor Statistics.

Gap Between Chained CPI and PCE Inflation



Note: Difference between year-over-year percent change in chained CPI and PCE price index. Sources: Bureau of Economic Analysis; Bureau of Labor Statistics.

Chained CPI and PCE Inflation

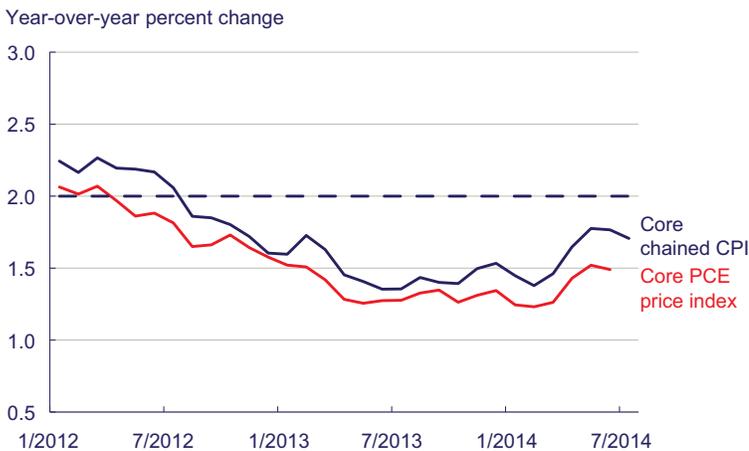


Sources: Bureau of Economic Analysis; Bureau of Labor Statistics.

the chained CPI was 2.0 percent, while PCE inflation was 1.6 percent. For core inflation, the chained CPI excluding food and energy has been running consistently a little higher than core PCE inflation, but following a very similar pattern from month to month. At present, core chain CPI inflation is a little below 1.8 percent, while core PCE inflation is 1.6 percent.

Putting all of this together, the chain CPI, like the PCE, shows some recent progress toward the FOMC's longer-run inflation goal of 2 percent, with chain CPI inflation a little closer to 2 percent than PCE inflation has been.

Core Chained CPI and PCE Inflation



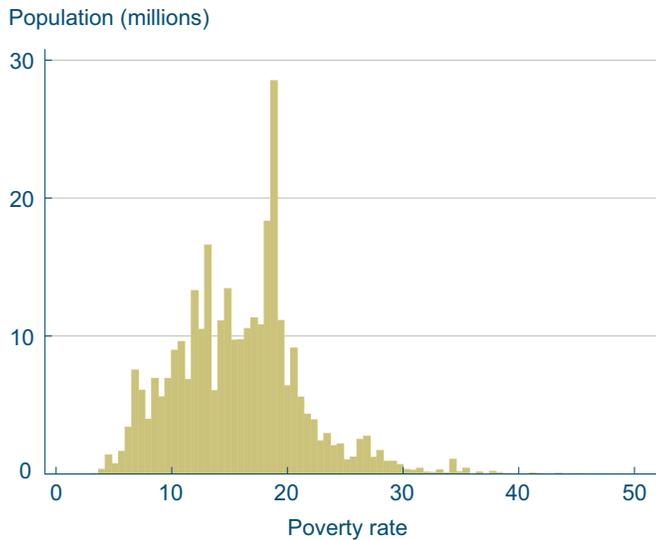
Sources: Bureau of Economic Analysis; Bureau of Labor Statistics.

Industries, Job Growth and Poverty Trends

09.02.14

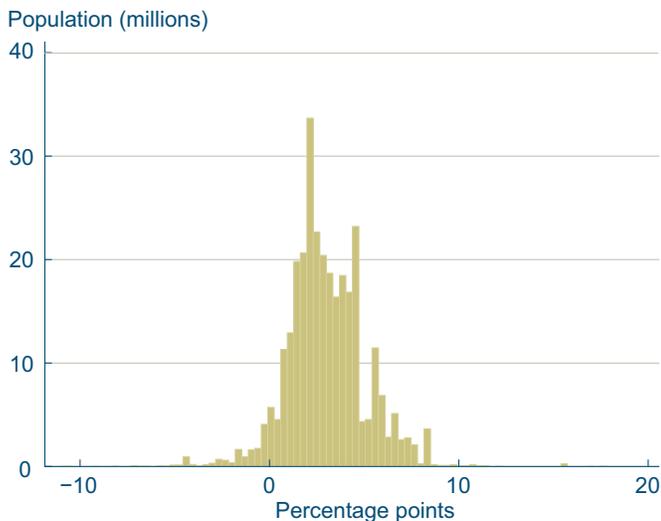
by Stephan Whitaker, Christopher Vecchio, and Anne Chen

Estimated County Poverty Rate: 2012



Source: American Community Survey.

Change in County Poverty Rate: 2007–2012



Source: American Community Survey.

The shares of a county’s employment that are in each major industry classification are correlated with the county’s poverty rate. Employment shares in healthcare and public administration, for example, are positively correlated with poverty rates, while employment shares in professional services and construction are negatively correlated with poverty rates. In this analysis, we examine some of the changes in these correlations in recent years. We will also look at the changes in industry employment that have accompanied changes in county poverty rates.

Between 2007 and 2012, the percentage of Americans living in poverty increased from 12.5 percent to 15 percent. Both poverty rates and poverty growth rates vary a lot across counties. One-quarter of the US population lives in counties in which poverty rates increased 4.3 percentage points or more between 2007 and 2012. Another quarter of the population lives in counties where poverty rates increased by 1.8 percentage points or less. Only 4.75 percent of Americans live in counties that experienced unchanged or declining poverty rates.

Employment in certain industries could be correlated with poverty for many reasons. One possibility is that the industry serves a clientele that is disproportionately poor. The share of employment related to social assistance and welfare administration could be higher in high-poverty counties because workers in this industry manage the public programs designed to assist families in poverty. In the data, this correlation is indeed positive and significant.

Another possibility is that industries that employ low-skilled, low-wage workers might have permanent employees whose household income remains below the poverty thresholds. A higher share of employment in these industries would therefore be associated with higher rates of poverty. Two low-paying industries, agriculture and accommodation

and food service, display significant positive correlations between their shares of employment and the poverty rate. Accommodation and food service's correlation has risen from a value close to zero in 2007. (For median pay by industry, see this BLS news release.)

Following similar reasoning in the opposite direction, counties with higher shares of employment in high-wage industries should have a smaller portion of their residents in poverty. Several high-wage industries do display negative correlations with poverty, including finance, information, management, and professional services.

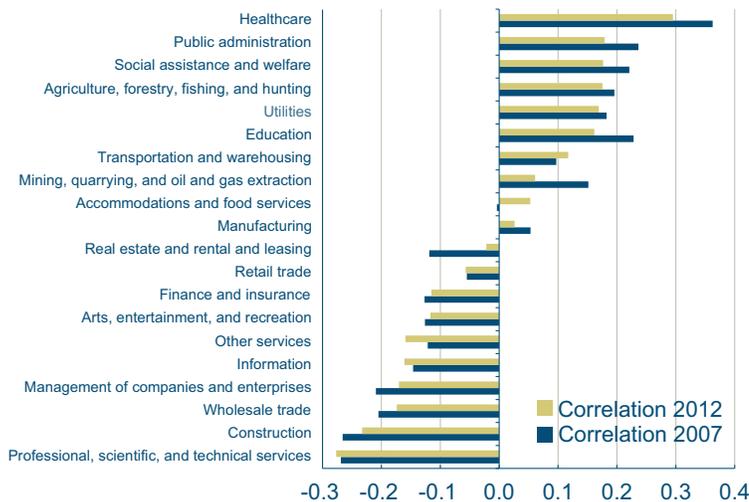
Still, a number of the correlations between employment share and the poverty rate await an alternate explanation. Among the industries with the highest positive correlations are healthcare, public administration, utilities, and education. These industries' median wages rank mid to high among all industries. Shares in the low-wage retail and arts industries display negative correlations with the county's poverty rate.

The broad categories of mining and manufacturing display some of the smallest overall correlations with poverty in 2012. However, disaggregating these categories reveals interesting trends and variation.

As we have seen in the Fourth District, the expanding oil and gas extraction industry has been a source of relatively strong employment growth in an otherwise slow recovery. In 2007, all three subcategories of mining were positively associated with poverty. However, by 2012 all three subcategories of mining employment had dramatically decreased their correlation with poverty. The decline in the correlation for oil and gas was larger than that for the mining subcategory that includes coal.

There are pronounced differences among the 21 subcategories of manufacturing as well. Employment shares related to wood and textiles are positively correlated with poverty at the county level. In contrast, fabricated metals and machinery are negatively correlated with poverty. Computer makers are categorized in manufacturing even if much of their production is offshore. These firms, too,

Correlation between Industry Share of Employment and Poverty Rate



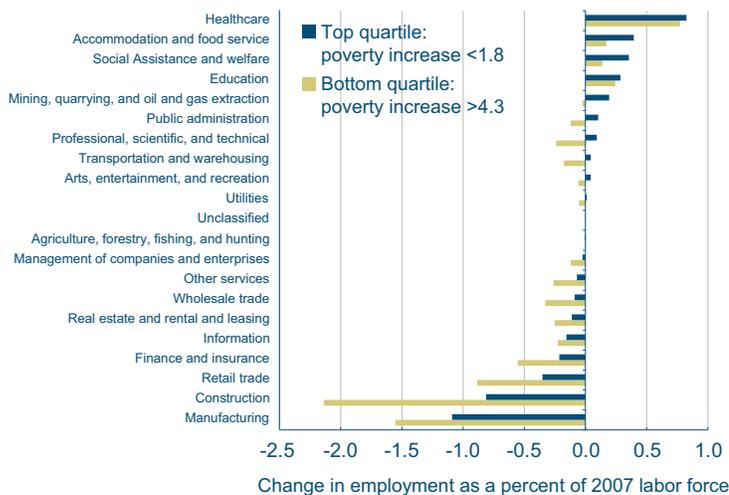
Notes: Observations are 3,132 counties. Calculations are weight by population. Only three correlations are not significant at the 1 percent level: accommodations and food services (2007); manufacturing (2012); and real estate (2012).
Sources: County Business Patterns; Census of Governments; American Community Survey; and authors' calculations.

Correlation between Mining Subcategory's Share of Employment and Poverty Rate

Mining subcategory	Correlation	
	2007	2012
Mining (excluding oil and gas)	0.095*	0.053*
Oil and gas extraction	0.116*	0.048*
Mining support activities	0.129*	0.034

Notes: An asterisk indicates significance at the .05 level. Observations are 3,132 counties. Calculations are weighted by population.
Sources: County Business Patterns; Census of Governments; American Community Survey; and authors' calculations.

Average Change in Industry Employment for Counties with Largest and Smallest Increases in Poverty: 2007–2012



Note: Calculation of average is weighted by population.
Sources: County Business Patterns; Census of Governments; American Community Survey; and authors' calculations.

Correlation between Manufacturing Subcategory's Share of Employment and Poverty Rate

Manufacturing subcategory	Correlation	
	2007	2012
Wood products	0.152*	0.129*
Apparel	0.129*	0.129*
Food	0.126*	0.105*
Textile mills	0.086*	0.077*
Paper	0.064*	0.056*
Textile product mills	0.046*	0.055*
Beverage and tobacco products	0.021	0.036*
Leather and allied products	0.019	0.028
Petroleum and coal products	0.036*	0.018
Furniture and related products	0.019	0.016
Transportation equipment	0.022	0.015
Nonmetallic mineral products	0.033	0.015
Primary metals	0.025	0.009
Plastics and rubber products	0.017	0.002
Electrical equipment, appliances, and components	0.008	-0.015
Chemical	-0.008	-0.018
Machinery	-0.009	-0.048*
Fabricated metal products	-0.021	-0.050*
Miscellaneous	-0.075*	-0.056*
Printing and related support activities	-0.124*	-0.111*
Computer and electronic products	-0.227*	-0.213*

Notes: An asterisk indicates significance at the .05 level. Observations are 3,132 counties. Calculations are weighted by population.
Sources: County Business Patterns; Census of Governments; American Community Survey; and authors' calculations.

are generally located in lower-poverty areas. One of the notable changes in manufacturing since 2007 is that the positive correlation between poverty and petroleum and coal products manufacturing has declined. The shift in this mining-related manufacturing is similar to the poverty-correlation declines discussed above in the mining industry.

If we focus in on the counties that had the largest and smallest increases in poverty, we can see interesting differences in their job growth. Counties with the greatest increases in poverty experienced job losses in construction that average over 2 percent of their 2007 labor force. Their equivalent losses in manufacturing were over 1.5 percent. Two industries in which job gains were similar in the worst- and best-performing counties were education and healthcare.

The counties that kept their poverty rates down are distinguished by smaller job losses or larger job gains in every category. The top-performing counties had notably higher job growth in accommodation and food service and mining. The counties that experienced small increases or declines in their poverty rate added more than twice as many workers in social assistance and welfare compared to the counties that had the greatest increases in poverty rates.

Yield Curve and Predicted GDP Growth, August 2014

Covering July 26, 2014–August 22, 2014
by Joseph G. Haubrich and Sara Millington

Overview of the Latest Yield Curve Figures

Since last month, the yield curve continued to get flatter, pivoting downward around the short end. The three-month (constant maturity) Treasury bill rate stayed fixed at 0.03 percent (for the week ending August 22), even with July and June's levels. The ten-year rate (also constant maturity) decreased to 2.41 percent, down from July's 2.49 percent and June's 2.63 percent. The pivot dropped the slope to 241 basis points, 5 basis points below July's 246 and 19 basis points below June's 260. By recent standards, the yield curve remains steep.

Despite the flatter slope, predicted future growth showed no appreciable change. Projecting forward using past values of the spread and GDP growth suggests that real GDP will grow at about a 1.5 percentage rate over the next year, even with July's forecast and just up from the 1.4 percent forecast in June. The influence of the past recession continues to push towards relatively low growth rates. 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.

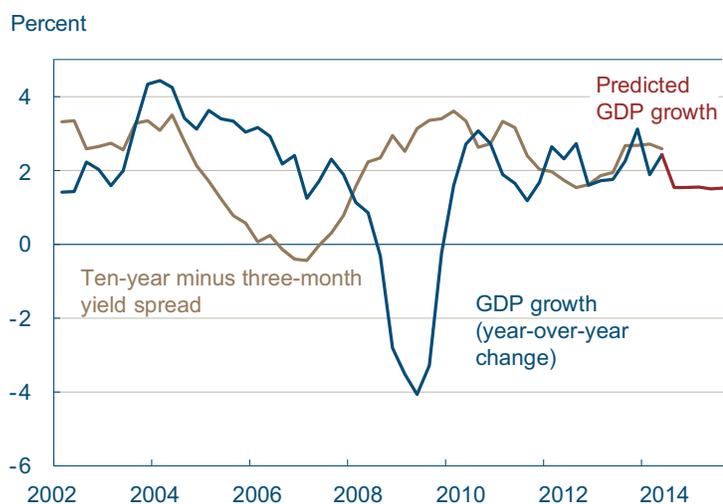
The flatter slope did increase the probability of a recession, though only slightly. Using the yield curve to predict whether or not the economy will be in a recession in the future, we estimate that the expected chance of the economy being in a recession next August at 2.76 percent, up a bit from July's reading of 2.46 percent and June's probability of 1.99 percent. So although our approach is somewhat pessimistic with regard to the level of growth over the next year, it is quite optimistic about the recovery continuing.

Highlights

	August	July	June
Three-month Treasury bill rate (percent)	0.03	0.03	0.03
Ten-year Treasury bond rate (percent)	2.41	2.49	2.63
Yield curve slope (basis points)	238	246	260
Prediction for GDP growth (percent)	1.5	1.5	1.4
Probability of recession in one year (percent)		2.46	1.99

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.

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. 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.

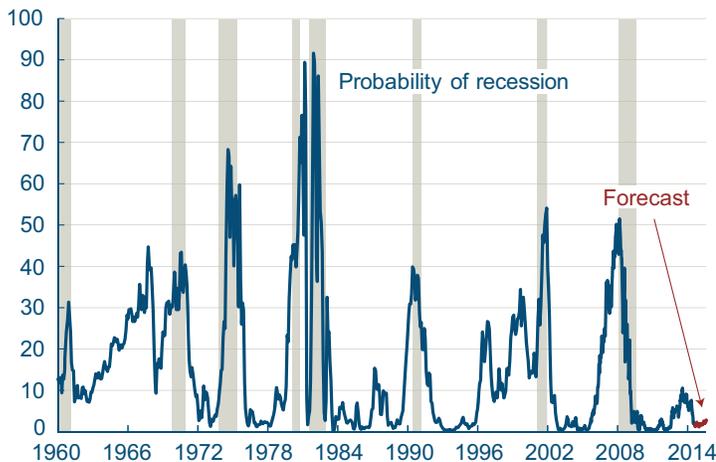
Predicting the Probability of Recession

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.

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 dif-

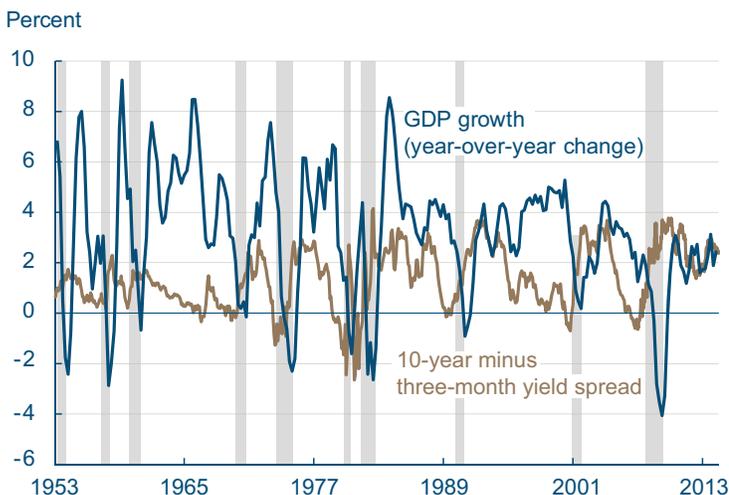
Recession Probability from Yield Curve

Percent probability, as predicted by a probit model



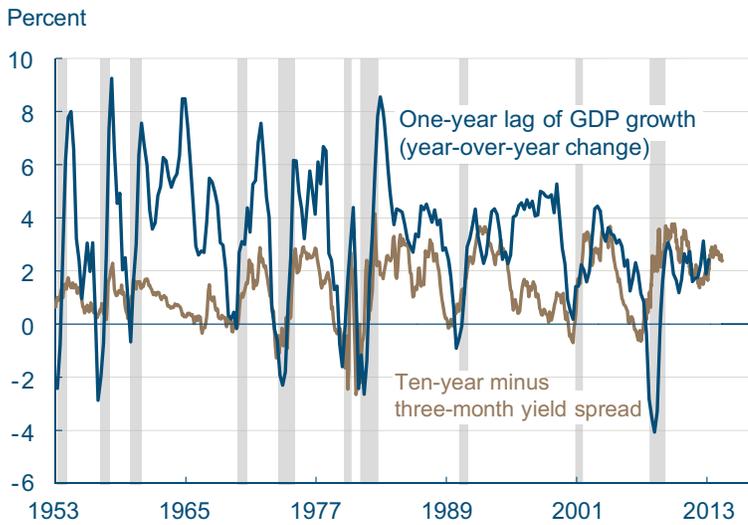
Note: Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System, authors' calculations.

Yield Curve Spread and Real GDP Growth



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

Yield Spread and Lagged Real GDP Growth



ferent 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.

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