

Economic Trends

March 2013 (February 15, 2013-March 18, 2013)

In This Issue:

Banking and Financial Markets

- Has the Appetite for Risk Returned?

Growth and Production

- The Recession and Recovery from an Industry Perspective

Households and Consumers

- Educational Attainment and Demographic Differences in Employment

Labor Markets, Unemployment, and Wages

- Improvements in High School Graduation Rates

Monetary Policy

- Does Nonfarm Payroll Growth Improve the Taylor Rule?
- Yield Curve and Predicted GDP Growth, February 2013

FEDERAL RESERVE BANK
of CLEVELAND

Has the Appetite for Risk Returned?

02.22.13

by Mahmoud Elamin and William Bednar

The year 2012 was a busy one for risky debt. The total value of the various forms of risky debt that were issued—corporate debt, asset-backed securities, collateralized debt obligations, and municipal debt in particular—grew substantially over the previous year, while yield spreads for these instruments decreased.

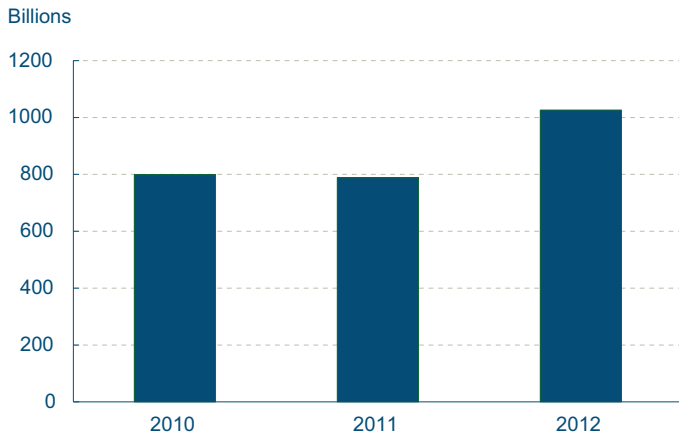
The drop in yields coupled with the increase in issuance signals that funds suppliers are willing to supply more funds at each yield. Fed policies might be one of the factors behind this increase in willingness, as one goal of the Fed's asset purchase policy is to increase credit to private-sector investments such as corporate debt. The increased issuance size coupled with decreasing yields made 2012 a borrower's market. Firms issued more debt to take advantage of the lower yields, while investors handed more of their funds to these firms, even though promised yields were lower.

There are two risk categories of corporate debt, and while both have grown, the riskier type has bounced back even stronger. Investment-grade corporate debt is the debt of companies that are deemed safer, and it is rated by S&P as BBB- and higher. Issuances of investment-grade corporate debt were almost flat from 2010 to 2011, but they increased 30 percent in 2012. On the other hand, high-yield corporate debt, the riskier type, decreased 15 percent from 2010 to 2011 but experienced a huge surge of 47 percent in 2012.

As for yield spreads, the spread for investment-grade debt over U.S. treasuries hovered close to 2 percent until July 2011, it peaked at about 3 percent in January 2012, and it declined to slightly lower than 2 percent later in the year. High-yield spreads were more volatile, fluctuating and bottoming out in the first half of 2011, surging by almost 60 percent in the second half of 2011 to about 8 percent, and experiencing a decline in 2012 to end close to the lows of 2011 by year-end. It is par-

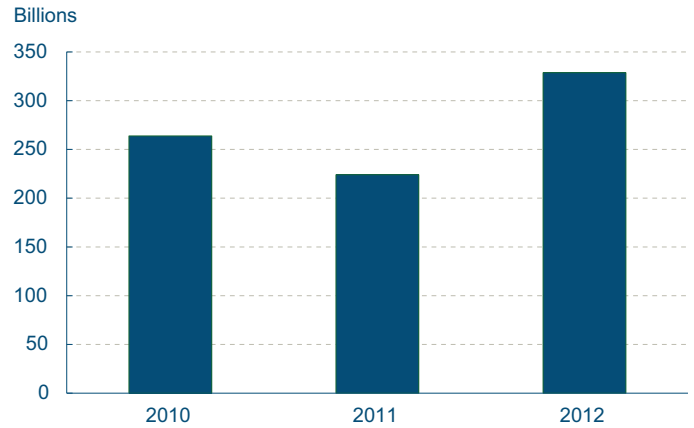
ticularly striking to note that yields were actually dropping in 2012, as issuances were increasing at this high pace.

Corporate Debt Issuance: Investment Grade



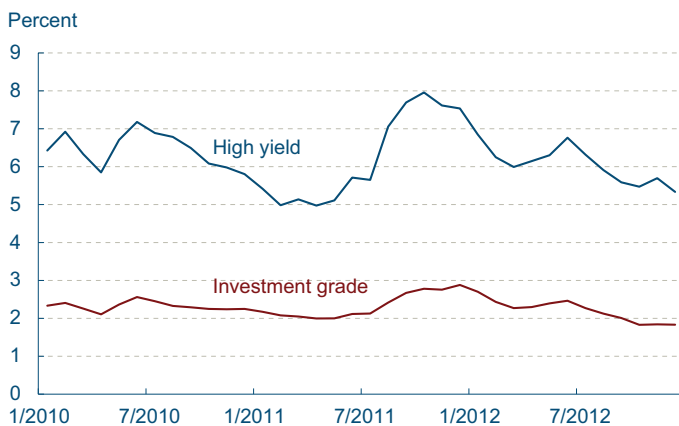
Source: SIFMA.

Corporate Debt Issuance: High Yield



Source: SIFMA.

Corporate Debt Effective Yield Spread



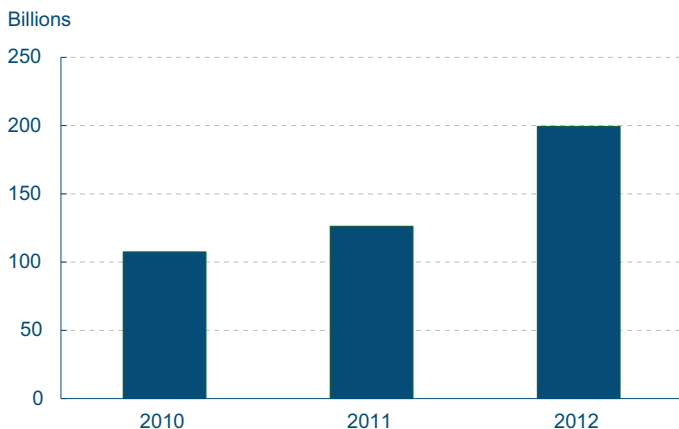
Sources: Bank of America Merrill Lynch; Haver Analytics.

Asset-backed securities (ABSs)—debt instruments backed by auto loans, credit card debt, home equity loans, and student loans—have been expanding since 2010. In 2011 they increased 17 percent over the previous year but they surged 58 percent in 2012. ABS yield spreads over treasuries declined until they bottomed in first half of 2011. They increased in the second half of 2011 but have been declining in 2012. It is again noteworthy to mention the declining yields with surging issuances.

Collateralized debt obligations (CDOs) are the notorious debt instruments that wreaked havoc during the crisis. CDOs are similar to ABSs, but they are usually backed by riskier debt. CDO issuances have been recovering at an increasing rate, going up in 2011 by 260 percent over 2010, and 45 percent in 2012 over 2011. Although these rates seem substantial, the level of CDO issuances is nowhere close to where it was before the last financial crisis hit.

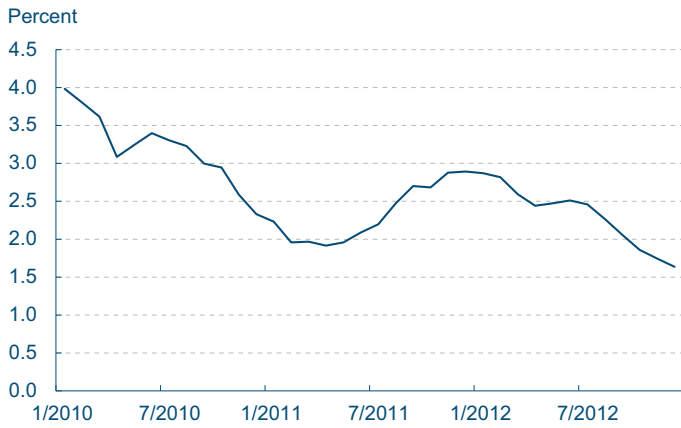
Municipal issuances declined strongly from 2010 to 2011, but grew about 28 percent from 2011 to 2012, a substantial increase. Issuances in 2012 are still below the 2010 levels though. The effective yield spread for municipal debt started low in the beginning of 2010 and grew strongly in the second half of 2010, peaking at the end of the year.

Asset-Backed Security Issuance



Source: SIFMA.

ABS Effective Yield Spread



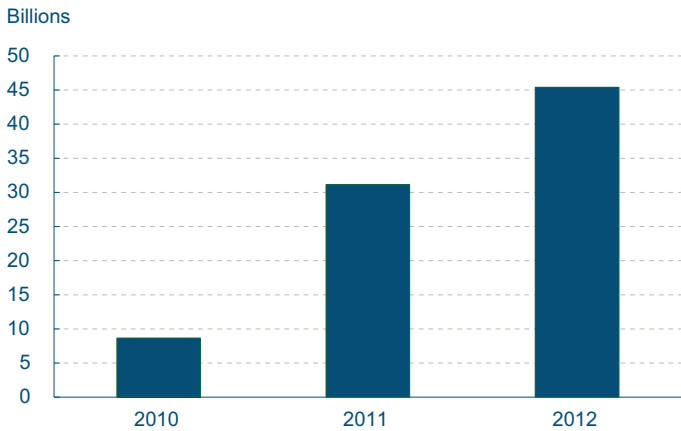
Sources: Bank of America Merrill Lynch; Haver Analytics.

The spread was elevated during 2011, but then it declined and remained at lower levels in 2012, dipping slightly towards the end of 2012.

We see a clear uptick in issuances of risky loans in 2012, concurrent with a drop in spreads over treasury yields.

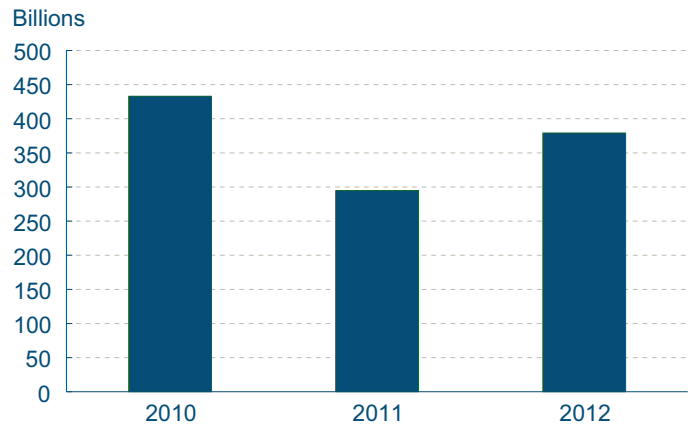
For further reading on the Fed's policy moves, visit <http://www.clevelandfed.org/research/commentary/2013/2013-02.cfm>.

Global CDO Issuance



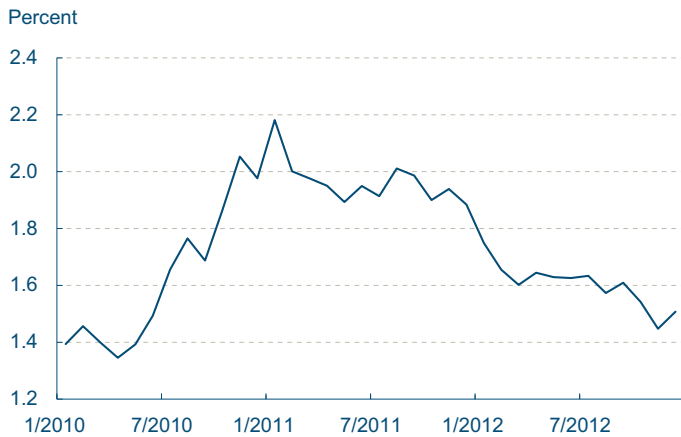
Source: SIFMA.

Municipal Security Issuance



Source: SIFMA.

Municipal Debt Effective Yield Spread



Sources: Bank of America Merrill Lynch; Haver Analytics.

The Recession and Recovery from an Industry Perspective

03.08.2013

by Pedro Amaral and Sara Millington

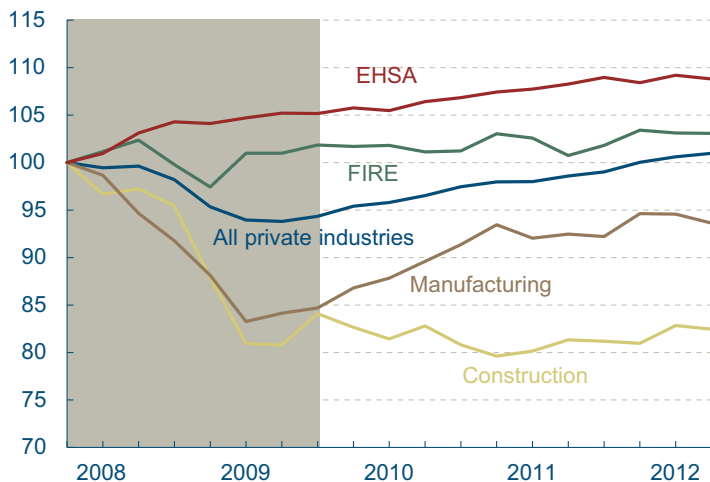
Real GDP grew at an annualized rate of 0.1 percent in the fourth quarter of 2012, according to the Bureau of Economic Analysis's revised estimate. Although this revision may confer the important psychological effect of keeping a streak of 14 consecutive quarters with positive growth alive (the BEA's first estimate indicated a 0.1 percent decrease in real GDP), the reality is that the U.S. economy stagnated in the last quarter of last year. This deceleration—growth in the third quarter of 2012 was a robust 3.1 percent—primarily reflected decreases in federal government spending, as military spending fell at an annualized rate of 22 percent, and private inventory investment.

If we compare the whole year of 2012 to 2011, the picture is only slightly rosier. While growth increased from 1.8 to 2.2 percent, this is very much on par with the average growth rate for the recovery, but well below that of previous ones. It is important to note that the acceleration in growth we experienced from 2011 to 2012 occurred even as the contribution of personal consumption expenditures, the most important component of GDP, actually diminished. Going forward, if we could only combine the sort of contribution we had from personal consumption expenditures in 2011 with the one we had from private domestic investment in 2012, maybe we could finally get a GDP growth rate in 2013 that would match a more normal recovery pace.

The overall growth rate of real GDP hides a fair amount of heterogeneity across industries. While the output of all U.S. domestic private industries just recently surpassed its 2007:Q4 peak, some industries remain well below that benchmark. Most notably, construction remains extremely depressed following the housing market collapse and has yet to see meaningful signs of a recovery. Another industry that still remains below the pre-recession peak is manufacturing. This industry has actually been staging a fairly speedy recovery, but it had a

Output

Index (2007:Q4=100)



Notes: Shaded bar indicates a recession. FIRE refers to finance, insurance, and real estate, and EHSA refers to education, health care, and social assistance.
Source: Bureau of Economic Analysis.

deeper hole to climb out of, having been battered more than the average during the recession.

On the other extreme there are industries that seemingly breezed through the recession, like education, health care, and social assistance (EHSA). This industry certainly benefited from the fact that a lot of people who became unemployed decided to go back to school and that medical expenditures stay fairly constant even when incomes decline. Curiously, an industry that came under a lot of pressure during the recession, finance, insurance and real estate (FIRE), has fared substantially better than average and hardly experienced a decline during the whole recession episode.

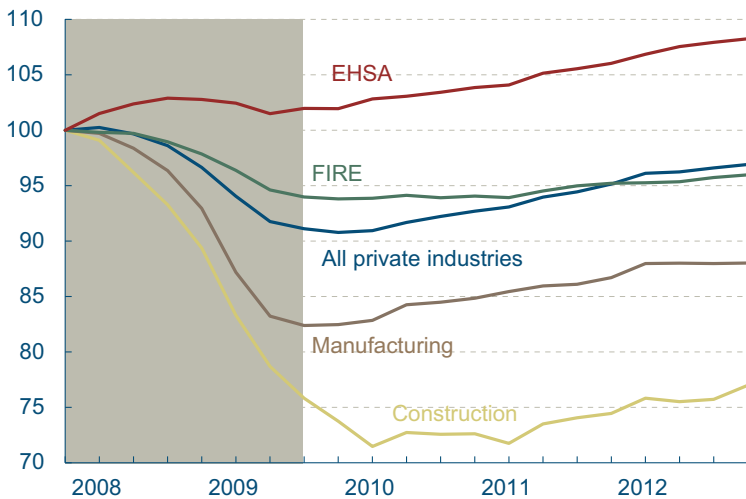
While both EHSA and FIRE have increased their production during the recovery, they have gone about it in slightly different ways. To see this, it helps to think of an industry's output as depending on the total hours of work it uses in production and how productive those hours are. In increasing its output, EHSA relied more on the former than on the latter. In contrast, FIRE was able to increase its output while reducing its total hours, achieving nearly 10 percent productivity gains.

Similarly, after being badly hit up until the recession's trough in the second quarter of 2009, manufacturing and construction have relied mostly on productivity gains to recover. In the case of manufacturing, productivity gains have helped the industry increase its output, while in the case of construction, they have helped to keep output constant in the face of a decline in total hours worked.

Total hours worked, in turn, are simply the product of the number of employees and the average hours each employee works: in economic jargon these are referred to as the extensive and intensive margin, respectively. In a typical recession, businesses make more use of the extensive margin than the intensive margin to adjust their labor input. That is, they let employees go rather than reduce hours. From peak to trough of the last recession, for example, businesses made only a 2 percent reduction in the average hours of their remaining employees. While by adjusting the intensive margin, employers economize on the hourly wage, they save on a variety

Total Hours

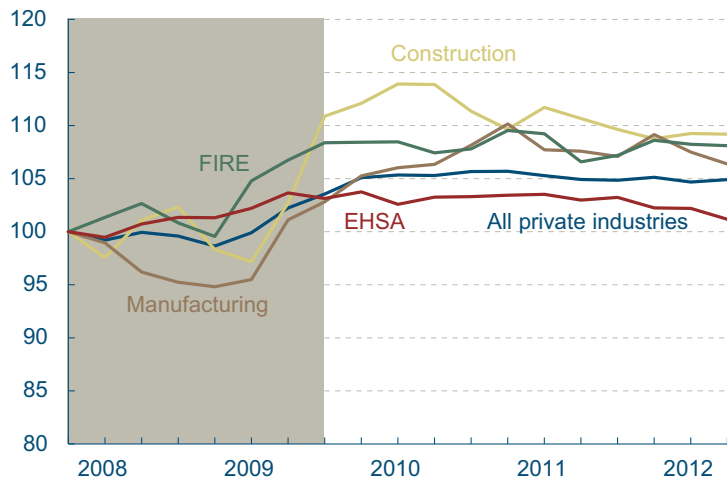
Index (2007:Q4=100)



Notes: Shaded bar indicates a recession. FIRE refers to finance, insurance, and real estate, and EHSA refers to education, health care, and social assistance. Sources: Bureau of Labor Statistics; Haver Analytics.

Productivity

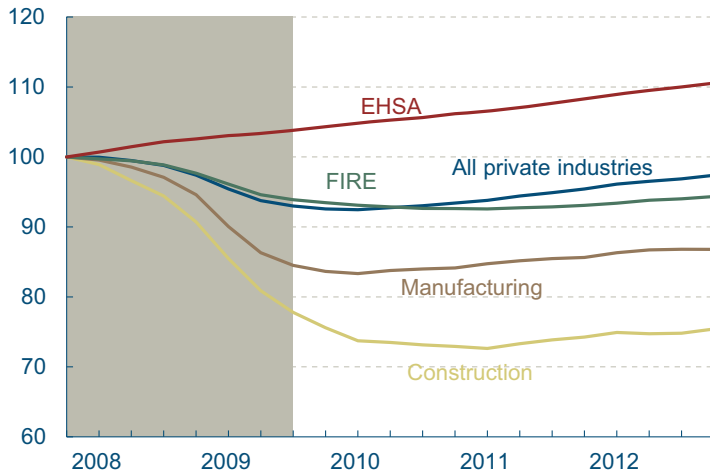
Index (2007:Q4=100)



Notes: Shaded bar indicates a recession. FIRE refers to finance, insurance, and real estate, and EHSA refers to education, health care, and social assistance. Sources: Bureau of Labor Statistics; Haver Analytics; author's calculations.

Total Number of Employees

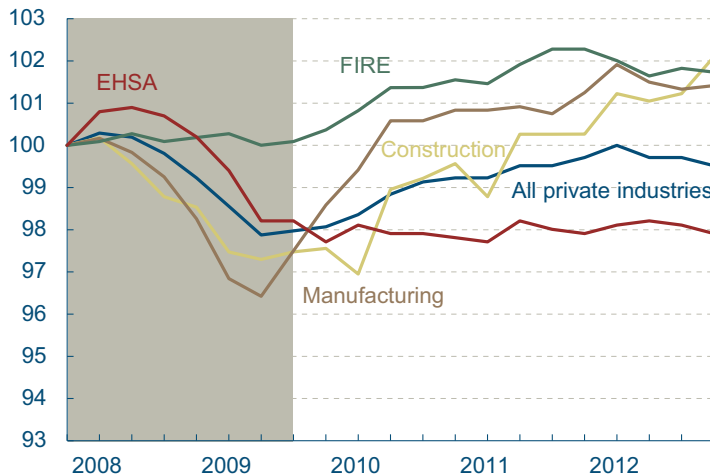
Index (2007:Q4=100)



Notes: Shaded bar indicates a recession. FIRE refers to finance, insurance, and real estate, and EHSA refers to education, health care, and social assistance.
Sources: Bureau of Labor Statistics; Haver Analytics.

Average Hours

Index (2007:Q4=100)



Notes: Shaded bar indicates a recession. FIRE refers to finance, insurance, and real estate, and EHSA refers to education, health care, and social assistance.
Sources: Bureau of Labor Statistics; Haver Analytics.

of fixed costs by firing an extra person. In the last recession, this tendency was mostly noticeable in FIRE, where average hours never fell.

A word of caution in interpreting these cross-industry differences: adjustments to labor input do not occur in a vacuum. They are ultimately a function of technological change and consumer preferences and depend (and in turn help determine) product and factor prices for each industry. Finally, they also depend on labor market conditions that are industry-specific. As an example, industries with higher unionization rates, everything else being the same, will tend to see relatively smaller decreases in the extensive margin, as firing costs are relatively higher.

The four industries we have highlighted here cover only 50 percent of total private production. But they serve to illustrate the different ways that U.S. industries adjusted their production and labor usage during the last recession.

Educational Attainment and Demographic Differences in Employment

03.18.13

by Dionissi Aliprantis and Nelson Oliver

It is well-known that employment outcomes such as unemployment rates and employment-to-population ratios vary markedly across demographic groups. Differences in unemployment rates are especially pronounced across age and racial groups. For example, in January 2013 the unemployment rate for African Americans was approximately double that of whites.

Unemployment Rate in January 2013 (percent, seasonally adjusted)

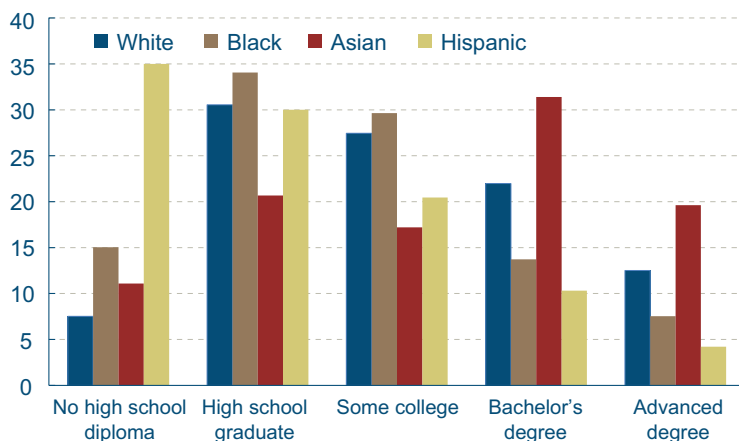
All	Gender		Age					Race			Ethnicity
	Male	Female	16-24	25-34	35-44	45-54	55+	White	African American	Asian	Hispanic
7.9	8.0	7.8	16.8	7.7	6.5	6.0	6.0	7.0	13.8	6.3	9.7

Source: Bureau of Labor Statistics.

It is also well-known that employment outcomes depend significantly on educational attainment, and that levels of educational attainment vary across race and ethnicity. For example, in 2012, 35 percent of Hispanics had not completed high school, compared with 8 percent of whites. (Note that Hispanic represents an ethnic category, so that both African-American and white racial categories include some Hispanics, while the Hispanic group contains individuals who identify as neither African American nor white.)

Educational Attainment, 2012

Percent of population 25 and older

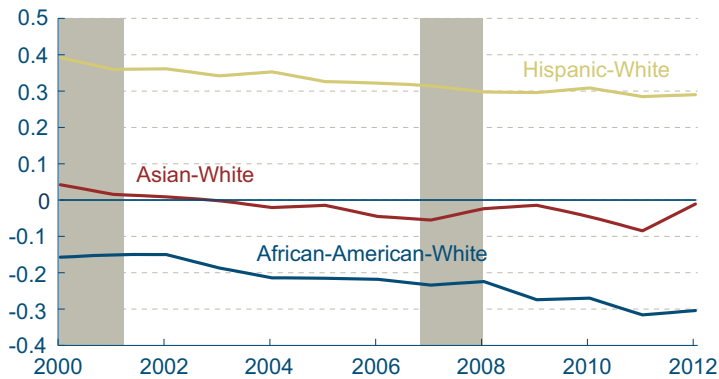


Source: U.S. Census Bureau.

We examine recent data on employment-to-population ratios and find that although educational attainment explains much about labor market outcomes by race and ethnicity, it does not explain everything. We look at the percent differences in these ratios for three groups relative to whites, compared at the same level of educational attainment. (A value of zero means the ratios are identical, positive values mean a group has a higher ratio than whites, and negative values the opposite.) We find that differences in labor market outcomes across race and ethnic groups remain even at similar levels of educational attainment. Whites and Asians have very similar employment ratios at all levels of educational attainment, Hispanics have much

Employment Levels for High School Dropouts

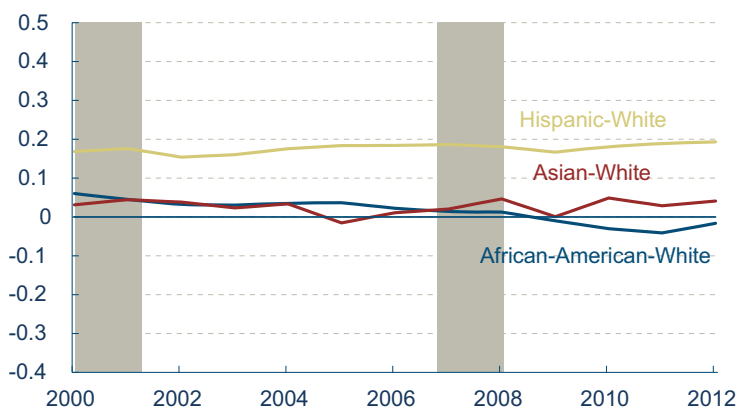
Percent difference in employment-to-population ratios



Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics.

Employment Levels for High School Graduates

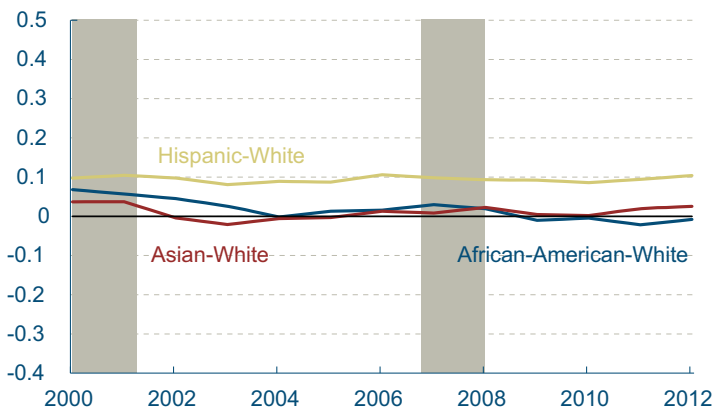
Percent difference in employment-to-population ratios



Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics.

Employment Levels for Those with Some College Education

Percent difference in employment-to-population ratios



Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics.

higher employment ratios of African Americans has declined at the top and low ends of educational attainment.

Between 2000 and 2007, Hispanics and African Americans with bachelor's degrees (BAs) were more likely to be employed than whites. The Great Recession has had an uneven effect on these racial patterns. We can see a clear shift down, for instance, in the employment of African-American BA holders relative to white BA holders since the Great Recession began. While these figures have been annualized, it appears that African Americans and white BA holders are now employed at more similar rates than before the recession.

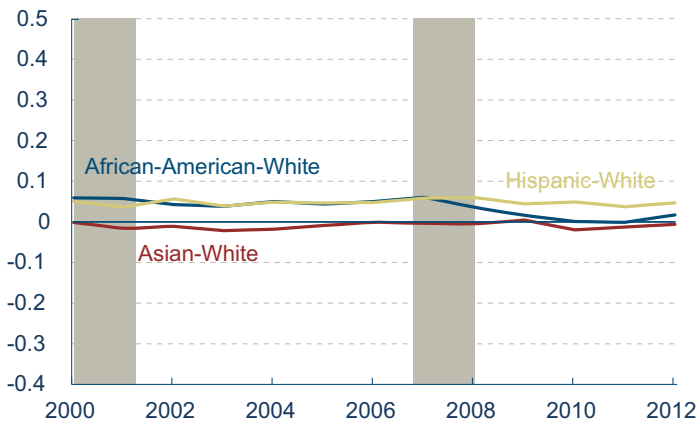
For those with some college, Hispanics also have a higher overall employment-to-population ratio than whites. (Some college includes associates degrees, technical or professional accreditation, one or more college courses, etc.) African Americans with some college tended to be employed more on average over the period leading up to the recent recession.

The relative employment of African Americans with high school diplomas to whites with high school diplomas seems to have undergone a sustained decline since 2000, and this decline appears to only have been accelerated by the Great Recession. In 2000, the employment-to-population ratio of African American high school graduates was 6 percent higher than for whites, and by 2011 this figure had fallen to 4 percent less than whites.

Meanwhile, African American high school dropouts were 16 percent less likely to be employed than white high school dropouts in 2000, and this ratio has been further declining since then. The long-run decline appears to have only been accelerated by the recent recession. Hispanic high school dropouts have also undergone a long-run decline in their employment ratio relative to whites since 2000. This decline, however, does not appear to have been strongly influenced by either the 2001 recession or the Great Recession. Though the employment-to-population ratios of Asians and whites are very similar in each educational category, the difference between the two is greatest for high school dropouts.

Employment Levels for Those with Bachelor's Degree or Higher

Percent difference in employment-to-population ratios



Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics.

If educational attainment alone determined employment, then whites and Hispanics would have very different overall employment ratios. However, despite having very different shares of individuals in each educational category, whites and Hispanics have very similar overall employment-to-population ratios (59.4 percent and 59.5 percent, respectively, in 2012). Factors other than educational attainment are affecting white and Hispanic employment outcomes within each educational category, leading to the similarity in overall outcomes.

In the case of African-Americans, their employment-to-population ratio has declined relative to the other groups. What is particularly surprising is that this relative decline occurred at both ends of the educational spectrum. The difference in outcomes could reflect differences in labor markets—weaker performance in inner-city labor markets—or perhaps differences in the demographic composition within the educational groupings or differences in the workforce experiences within the groups. In short, in order to more fully understand the drivers of changes in the employment-to-population ratios, one would need to examine the underlying data that would allow one to control for differences in location and within-group demographics.

Does Nonfarm Payroll Growth Improve the Taylor Rule?

02.25.13

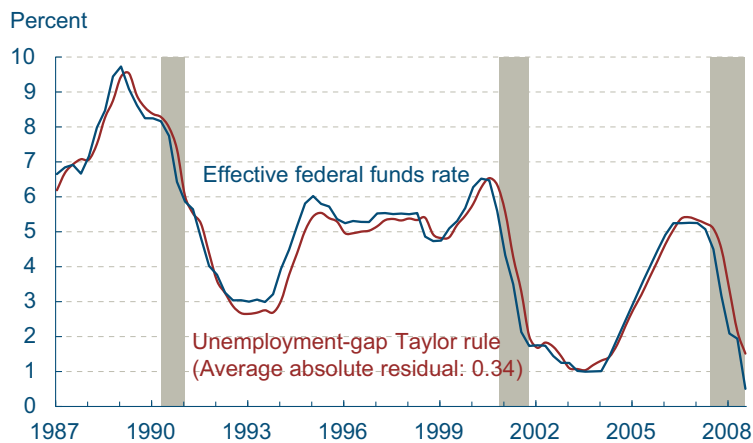
by Charles T. Carlstrom, Saeed Zaman, and Samuel B. Chapman

There has been a lot of interest in financial circles in finding a guidepost or rule of thumb that reflects how monetary policymakers decide how to set interest rates. Given that the federal funds rate—the short-term interest rate set by the Federal Open Market Committee (FOMC)—has been at zero for a while, such a rule may not seem useful today. But presumably it will be once the rate is above zero, and it is interesting to see what the rule suggests about when the rate will increase. Some versions of the rule predict an earlier increase than the FOMC’s current projections, and we explain why this would be so.

There are many variations of this so-called “Taylor rule” out there, but one variation that is commonly used and is consistent with the FOMC’s dual mandate of price stability and maximum employment is one that has the Federal Reserve responding positively to increases in core inflation above its target and negatively to increases in unemployment above the long-run normal level of unemployment. This version of the rule is usually expanded to include the previous quarter’s federal funds rate to reflect the likelihood that the FOMC adjusts the fed funds rate gradually toward its desired target.

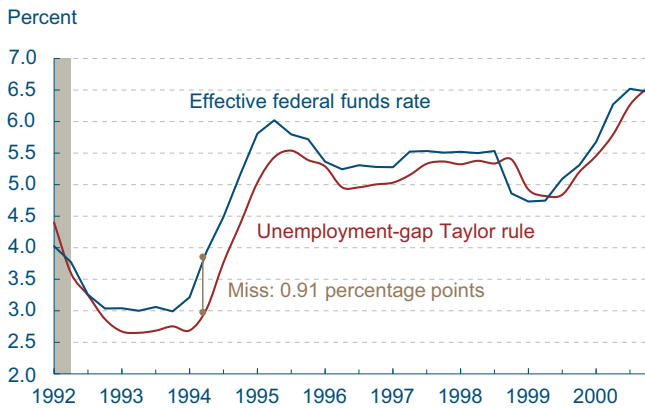
When this version of the rule is estimated with data from 1987-2008, it seems at first glance to do a decent job of tracking the actual federal funds rate. But looks can be deceiving. It misses the actual funds rate by an average of 34 basis points. That is not much better than a simple, naïve rule that assumes today’s funds rate is merely yesterday’s funds rate—the average absolute miss for this simple rule and the same data is 37 basis points. In the end, the common version of the Taylor rule basically just predicts that the funds rate will be where it was last quarter. This implies there can be significant misses with it.

Estimated Taylor Rule: Unemployment-Gap and Partial-Adjustment Version



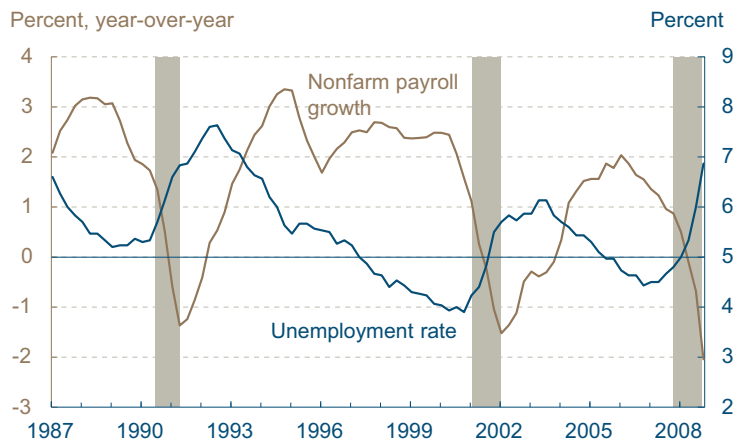
Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics, Board of Governors of the Federal System, authors’ calculations.

Estimated Taylor Rule (Unemployment-Gap and Partial-Adjustment Version), Zoom to 1992–2000



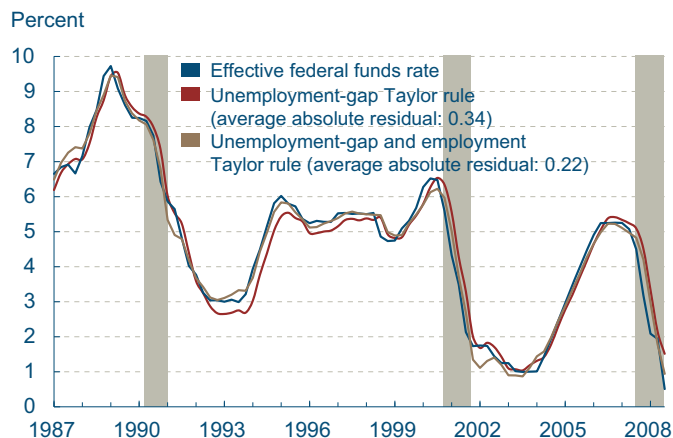
Note: Shaded bar indicates a recession.
Source: Bureau of Labor Statistics, Board of Governors of the Federal System, authors' calculations.

Unemployment Rate and Nonfarm Payroll Growth



Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics.

Comparison of Estimated Taylor Rules



Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics, Board of Governors of the Federal System, authors' calculations.

Zooming in over the time period 1992–2000, we can see clearly an example of such a miss. In mid-1994, for example, the miss was quite large—about 91 basis points.

In the end, the common version of the Taylor rule basically just predicts that the funds rate will be where it was last quarter. That is, the Taylor rule is always a step behind the actual funds rate. We can modify the rule to account for this fact by including a leading indicator of the unemployment rate. One decent candidate is nonfarm payroll growth

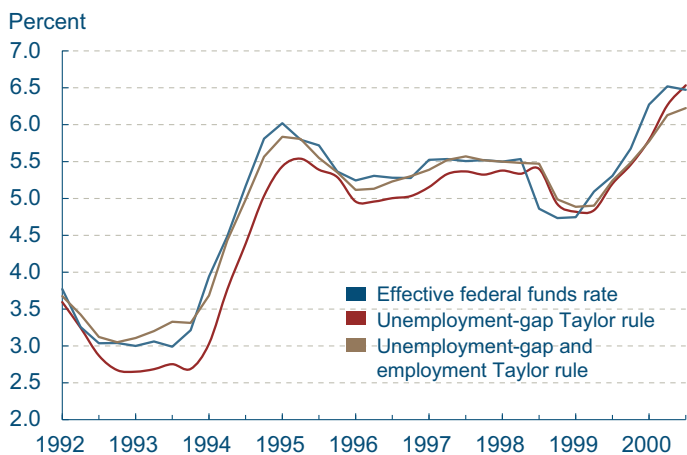
To say nonfarm payroll growth is a leading indicator is to say nonfarm payroll employment typically rises before the unemployment rate drops. In fact, increases in payroll growth appear to lead to a fall in unemployment about two quarters later. For example, the unemployment rate reached its nadir in 2006:Q4, three quarters after the peak in payroll growth (2006:Q2).

When nonfarm payroll growth is added to the Taylor rule above, the new rule does a much better job of capturing the movements of the actual fed funds rate. The predicted path of the rate is still a little behind the actual funds rate, but it is much better than it was with just the unemployment gap. In fact, the modified rule enhances the “fit” substantially. Before, the average absolute miss was 34 basis points; now it is 22 basis points. This is a sizable improvement, given that it eliminates more than one-third of the original miss.

It is worth noting that there are time periods, such as 2007–2008 (going into the financial crisis), when both rules display large misses. Such periods illustrate that Fed does not mechanically follow any rule. Instead, especially when unusual developments are taking place or are anticipated, it will deviate from its usual behavior.

For comparison purposes, the chart below zooms into the same 1992–2000 period discussed earlier. Focusing on the 1994–1996 time period, it is quite obvious that the Taylor rule with payroll growth and the unemployment gap does substantially better than the rule with only the unemployment gap. In fact, the problem of the Taylor rule being a step behind the actual funds rate is largely eliminated. A

Comparison of Estimated Taylor Rules, Zoom to 1992–2000



Source: Bureau of Labor Statistics, Board of Governors of the Federal System, authors' calculations.

review of FOMC minutes around this time period shows clearly that the Committee was closely monitoring labor markets, and FOMC participants explicitly mentioned nonfarm payroll employment and the unemployment rate as their rationale for policy moves. Furthermore, the strong gains posted in payroll employment throughout this period coincided with fed funds rate increases.

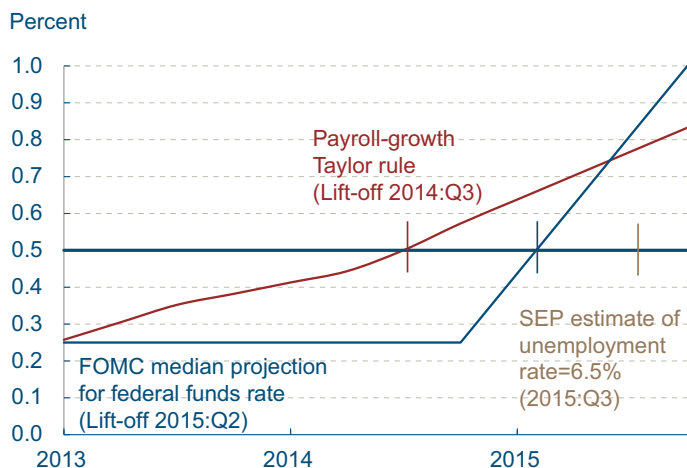
Given that this new Taylor rule does a better job of estimating past values of the federal funds rate, the next step naturally is to use it to project the future path of the federal funds rate. To produce the future federal funds rate path, we use the most recent economic projections of FOMC participants (December 2012), which are reported in the Survey of Economic Projections (SEP). Specifically, we use their projections for the core personal consumption expenditures price index (for inflation), the unemployment rate, and the long-run normal level of unemployment. Since the SEP does not include a forecast for nonfarm payroll growth, we use the forecast for it from Macroeconomic Advisors (MA), a private forecasting firm.

We compare the federal funds rate path and the liftoff dates implied by our modified Taylor rule with median fed funds rate projections from the December 2012 SEP. We define liftoff as the date at which the projected fed funds rate exceeds 50 basis points.

According to the fed funds rate path estimated with our modified Taylor rule, the first fed funds rate increase would occur in the third quarter of 2014, about four quarters earlier than the median fed funds rate projection from the December 2012 SEP.

The quite different exit dates at first glance seem surprising. But they could be explained two different ways. For one, some other Taylor-type policy rules imply a later liftoff than does our adjusted policy rule. With these rules, liftoff is closer to the date suggested by the FOMC's December projections. Alternatively, one way the Committee can stimulate the economy today is by promising that the funds rate will stay at zero longer than it would typically, where "typically" would be the Taylor

Comparison of Lift-off Dates Predicted by Payroll-Growth Taylor Rule and FOMC



Note: Since the long-run federal funds rate may have changed over the period since the Taylor rule was estimated, we instead use the median projection of the long-run federal funds rate from the *Summary of Economic Projections*, December 2012.

Sources: Bureau of Labor Statistics; Bureau of Economic Analysis; Board of Governors of the Federal System, *Summary of Economic Projections*, December 2012; authors' calculations.

rule projection. By promising to keep rates low longer, they can lower long-term interest rates and stimulate the economy. The recent FOMC meeting statement (January 2013) reaffirms this point: “To support continued progress toward maximum employment and price stability, the Committee expects that a highly accommodative stance of monetary policy will remain appropriate for a considerable time after the asset purchase program ends and the economic recovery strengthens.” Furthermore, according to a recent speech by FOMC Governor Janet Yellen, keeping interest rates lower than the prescriptions of the well-known Taylor rule or its variants would be optimal in terms of economic outcomes.

For further reading on the Taylor rule, read the *Economic Commentary* “The Taylor Rule: A Guidepost for Monetary Policy?” at <http://www.clevelandfed.org/research/commentary/2003/0703.pdf>.

For the complete text of FOMC Governor Janet Yellen’s speech, visit <http://www.federalreserve.gov/newsevents/speech/yellen20121113a.htm>.

Yield Curve and Predicted GDP Growth, February 2013

Covering January 19, 2012–February 22, 2013
by Joseph G. Haubrich and Patricia Waiwood

Highlights

	February	January	December
Three-month Treasury bill rate (percent)	0.13	0.08	0.07
Ten-year Treasury bond rate (percent)	2.00	1.87	1.69
Yield curve slope (basis points)	187	179	162
Prediction for GDP growth (percent)	0.4	0.6	0.6
Probability of recession in one year (percent)	6.4	7.1	8.6

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

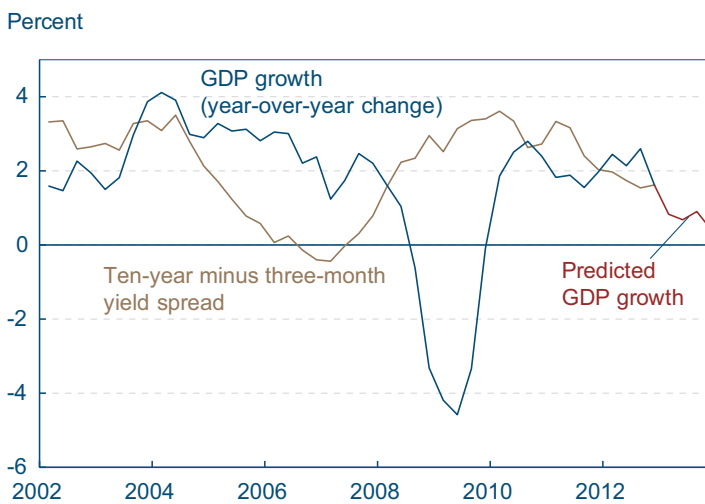
Overview of the Latest Yield Curve Figures

Over the past month, the yield curve has moved up, getting somewhat steeper in the process, as long rates moved more than short rates. The three-month Treasury bill rose to 0.13 percent (for the week ending February 22), up from January's 0.08 percent and nearly double December's 0.07 percent. The ten-year rate moved up to 2.00 percent, a rate not seen since last April, and was above January's 1.87 percent and December's 1.69 percent. The slope increased to 187 basis points, up from January's 179 basis points and December's 162 basis points.

The steeper slope was not enough to have an appreciable change in projected future growth, however. Projecting forward using past values of the spread and GDP growth suggests that real GDP will grow at about a 0.4 percent rate over the next year, down a bit from January and December. The strong influence of the recent recession is still leading towards relatively low growth rates. Although the time horizons do not match exactly, the forecast comes in on the more pessimistic side of other predictions, but like them, it does show moderate growth for the year.

The slope change had a bit more impact on the probability of a recession. 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 February is 6.4 percent, down from January's 7.1 percent, and below December's value of 8.6 percent. So although our approach is somewhat pessimistic as regards the level of growth over the next year, it is quite optimistic about the recovery continuing.

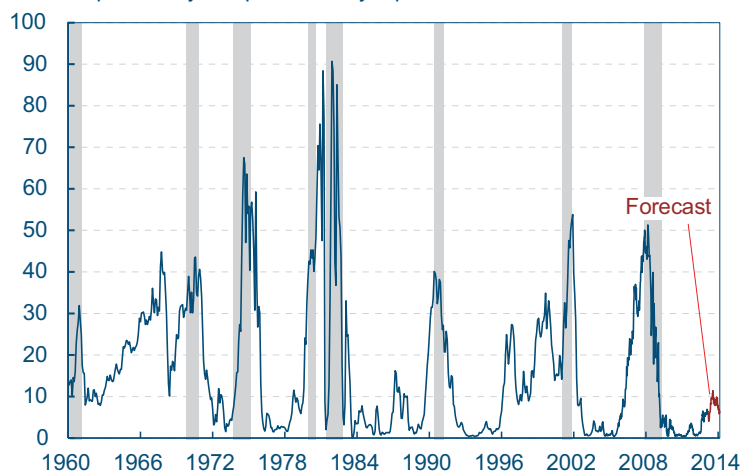
Yield Curve Predicted GDP Growth



Sources: Bureau of Economic Analysis, Federal Reserve Board, authors' calculations.

Recession Probability from Yield Curve

Percent probability, as predicted by a probit model



Note: Shaded bars indicate recessions.

Sources: Bureau of Economic Analysis, Federal Reserve Board, 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, 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.

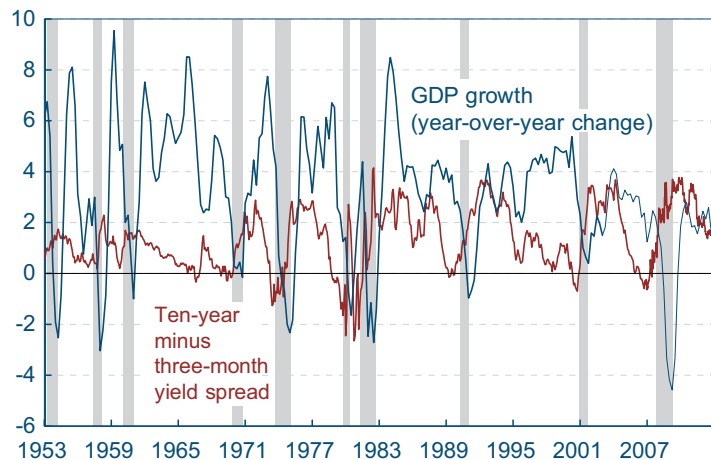
Predicting the Probability of Recession

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.

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 materi

Yield Curve Spread and Real GDP Growth

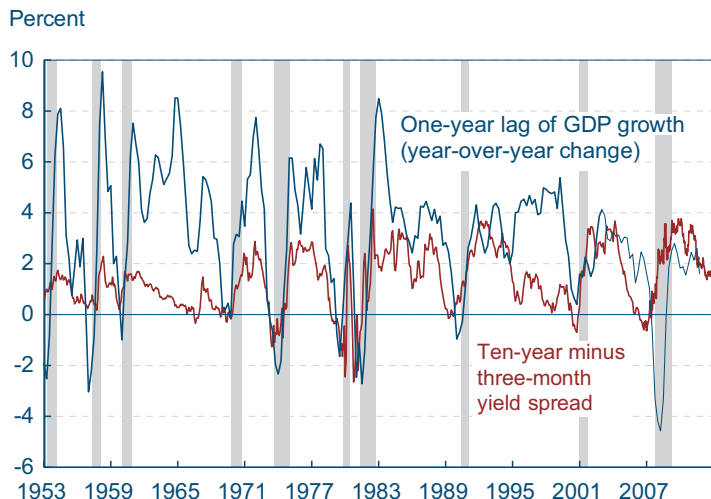
Percent



Note: Shaded bars indicate recessions.

Source: Bureau of Economic Analysis, Federal Reserve Board.

Yield Spread and Lagged Real GDP Growth



Sources: Bureau of Economic Analysis, Federal Reserve Board.

ally 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.

For more on the yield curve, read the *Economic Commentary* “Does the Yield Curve Signal Recession?” at <http://www.clevelandfed.org/Research/Commentary/2006/0415.pdf>.

For more on the Federal Reserve Bank of New York’s estimate for recession, visit http://www.newyorkfed.org/research/capital_markets/ycfaq.html.

Improvements in High School Graduation Rates

03.01.13

by Jonathan James

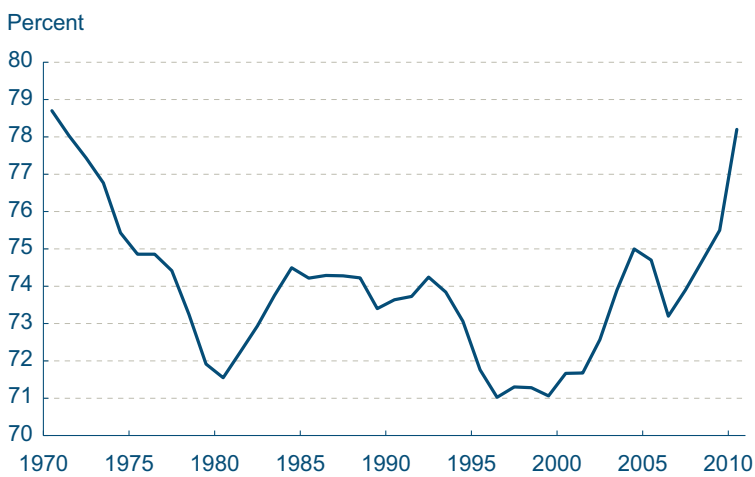
In January the Department of Education reported more positive news on one of the key indicators of the health of public high schools. During the 2009-2010 academic year (the most recent year for which national figures are computed), the estimated average freshman graduation rate (AFGR) reached a 40-year high of 78.2 percent. This is up 2.7 points from 75.5 percent during 2008-2009. While this is welcome news, the big picture remains that the dropout situation in many public high schools persists at epidemic levels, leaving plenty of room for future progress.

Importantly, the recent progress is part of a decade-long trend in improving graduation rates. The trend is due in part to the No Child Left Behind Act, passed in the early 2000s, which began forcing states to better measure and improve their graduation rates. These efforts, along with others, have resulted in substantial progress, taking the AFGR from nearly all-time lows in the late 1990s to nearly all-time highs in the current release.

Breaking down these trends by race and ethnicity shows that while all groups saw improvements on average, the greatest gains were attributed to groups with historically low on-time graduation rates. The AFGR for Hispanic students was up nearly 8 percentage points from two years earlier, and the estimated graduation rate for black students was up nearly 5 percentage points over the same period. White students experienced the smallest gains, with a 2 percent increase in the last two years.

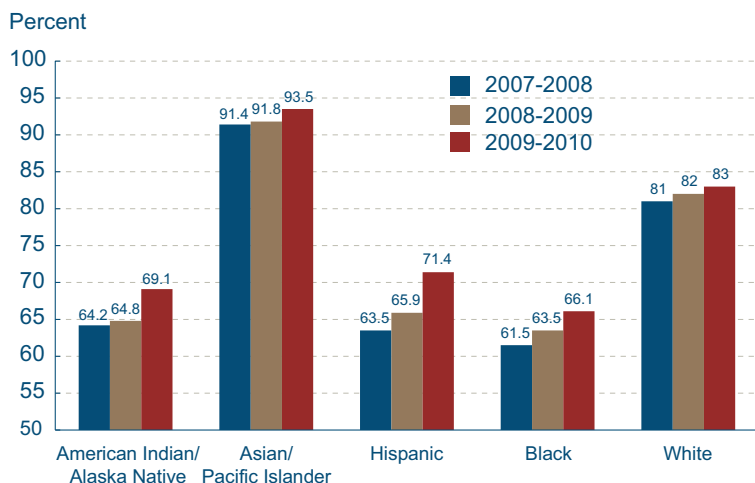
An important question that remains is whether we can expect these trends in the graduation rate to continue. Part of the answer to this question will depend on the effect of future changes in how the graduation rate is measured. A major challenge in the past has been that each state used a different method to measure high school graduation rates. This made comparing graduation rates across states, as well as constructing a national rate, very difficult.

Average Freshman Graduation Rate



Source: National Center for Education Statistics.

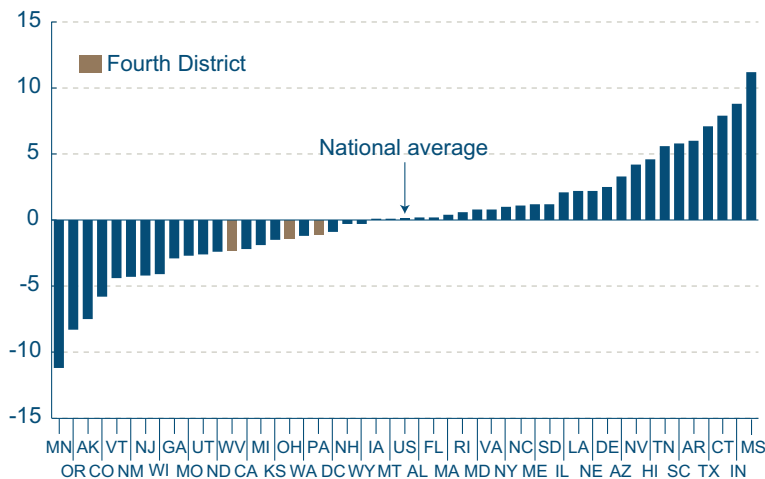
Average Freshman Graduation Rate



Source: National Center for Education Statistics.

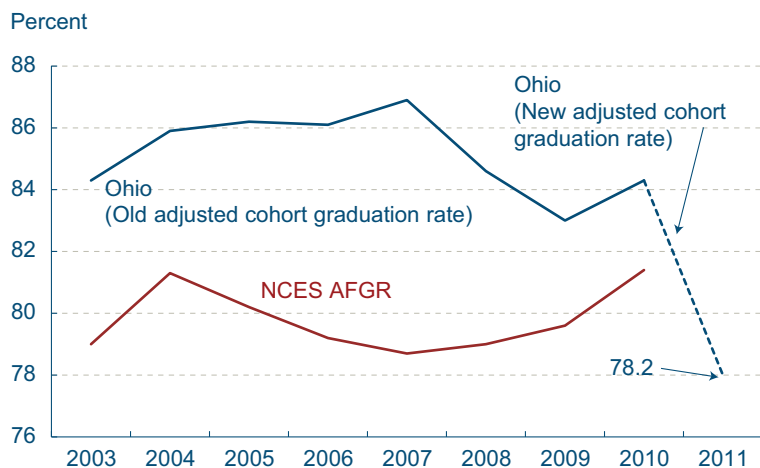
Comparison of AFGR 2009-2010 to Preliminary ACGR 2010-2011

Difference in measured graduation rates



Note: Excludes Idaho, Kentucky, and Oklahoma who have not yet reported.
Source: National Center for Education Statistics.

Ohio Department of Education Graduation Rate Estimates



Sources: National Center for Education Statistics; Ohio Board of Education.

As states continued to construct their own graduation rates, in 2001 the Department of Education began using the AFGR as a benchmark measure of the high school graduation rate. It was considered the most reliable estimate given the available data reported by each individual state, and it could also be computed all the way back to the late 1960s.

However, beginning in the 2010-2011 academic year, all state education agencies will now be required to report graduation rates based on a more rigorous and uniform standard. The measurement is defined as the adjusted cohort graduation rate (ACGR), and it is designed to be a more accurate estimate of the on-time graduation rate than the AFGR. The goal of the ACGR is to fully track a cohort of ninth graders who are entering high school for the first time, adding and subtracting dropouts and transfers, and calculating the fraction earning a regular diploma after four years.

The Department of Education released preliminary data for the 2010-2011 academic year at the state level using this new measure. A comparison of the two measures for 2009-2010 illuminates two facts. First, on a national scale, the previous measure (the AFGR) is a fairly accurate estimate of the more refined measure. This is because on average, the AFGR is an overestimate of the graduation rate in some states and an underestimate in others, and these misestimates tend to offset each other. As a result, we would expect future national estimates under the new standard to be similar to current estimates and hopefully similar to current trends.

The second point however is that while the AFGR may be reliable on a national level, it may not provide a good estimate for any given state. Consequently, under the more rigorous standard, compared to methods previously used, many states may experience large changes in their estimated graduation rates. One example is Ohio. Prior to 2010 the state reported an estimate of the graduation rate based on its own adjusted cohort formula. Between 2002 and 2009 this number was around 85 percent. However, in the 2010-2011 academic year, under the more accurate, uniform standard, the estimated on-time graduation rate is actually lower—78.2 percent.

Looking forward, an improved measure of the graduation rate will not only provide us with a more accurate picture of the dropout problem, it will also reveal the areas that are in most need of improvement. With such information, in conjunction with the trending improvements in graduation rates, we are hopefully positioned to continue to make substantial progress on one of the major challenges facing the education system.

Economic Trends is published by the Research Department of the Federal Reserve Bank of Cleveland.

Views stated in *Economic Trends* are those of individuals in the Research Department and not necessarily those of the Federal Reserve Bank of Cleveland or of the Board of Governors of the Federal Reserve System. Materials may be reprinted provided that the source is credited.

If you'd like to subscribe to a free e-mail service that tells you when *Trends* is updated, please send an empty email message to **econpubs-on@mail-list.com**. No commands in either the subject header or message body are required.

ISSN 0748-2922

