

# Economic Trends

October 2013 (September 6, 2013-October 17, 2013)

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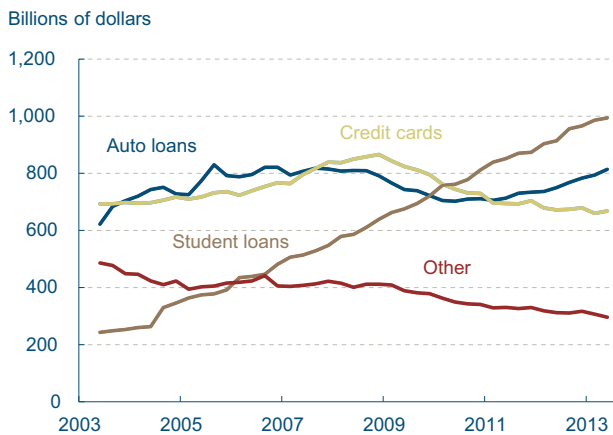
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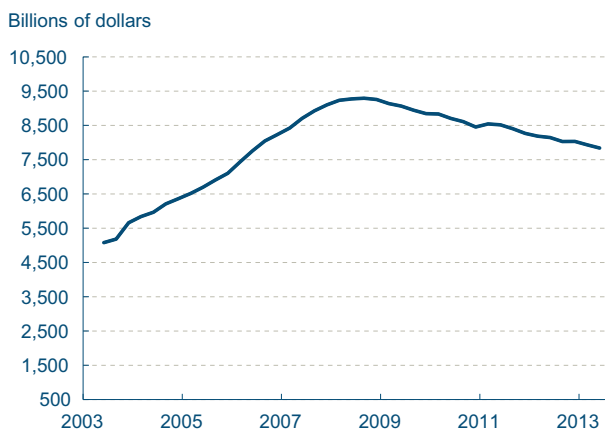
# Consumer Debt and the Housing Market

## Consumer Debt



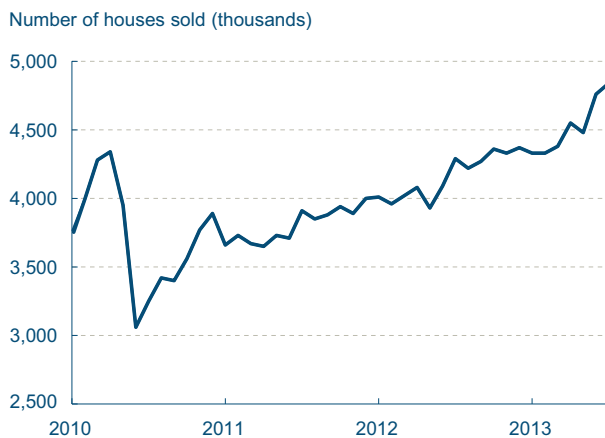
Source: Federal Reserve Bank of New York's Consumer Credit Panel/Equifax.

## Mortgage Debt



Source: Federal Reserve Bank of New York's Consumer Credit Panel/Equifax.

## Existing Single-Family Home Sales



Source: National Association of Realtors.

10.17.13

by Yuliya Demyanyk and Amy Higgins

Household debt has been shrinking since 2009, and the latest data show the trend continues. Total consumer debt outstanding fell from \$11.23 trillion dollars in the first quarter of 2013 to \$11.15 trillion in the second quarter (Equifax, FRB NY CCP). In contrast, however, two components of overall debt rose over that period: Auto loans went up from \$749 billion to \$800 billion, and student loans went up from \$986 billion to \$994 billion.

According to the Bureau of Economic Analysis, sales of light motor vehicles plummeted to their lowest level since the 1980s during the Great Recession. Newly originated auto loan balances also declined during the recession. Auto loans reached their lowest point in 2010:Q2, when they accounted for \$702 billion out of the \$11.9 trillion of total debt (Equifax, FRB NY CCP). Light vehicle sales and newly originated auto loan balances have made a U-shaped turnaround since the onset of the crisis, possibly due to historically low interest rates.

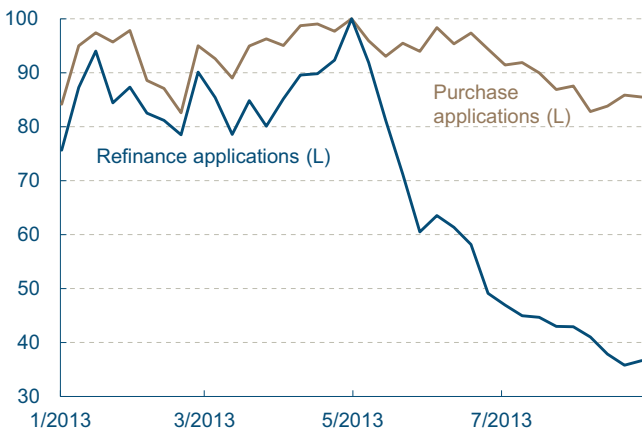
Meanwhile, credit card debt and other debt (non-mortgage, non-auto, and non-student loan) have been declining since the beginning of the financial crisis, reaching their lowest levels in 2013:Q1 (\$660 billion for credit cards) and in 2010:Q2 (\$296 billion for other debt). Student loans have followed a steady upward trend, even during the recession, and continue to grow.

Aggregate mortgage debt also continues to decline, despite growing numbers of existing home sales.

According to the National Association of Realtors (NAR), the number of existing single-family home sales increased from 4.34 million in 2013:Q1 to 4.47 million in 2013:Q2. Home-purchase applications have remained relatively stable, but refinancing applications are on a downward trend, most likely because of rising mortgage interest rates. The 30-year conventional-mortgage interest rate increased from 4.37 percent in July 2013 to 4.46 percent in August 2013. Interest rates are higher

## Mortgage Applications

Index, May 3, 2013=100



Source: Mortgage Bankers' Association.

## 30-Year Conventional Mortgage Rate

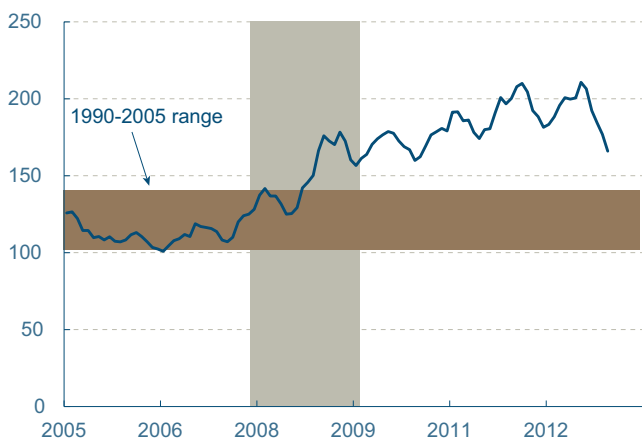
Percent



Source: Federal Reserve Bank of St. Louis, FRED.

## Housing Affordability Index

Index



Note: Shaded bar indicates a recession.

Sources: Federal Reserve Bank of Cleveland, National Association of Realtors.

than their record low in December 2012 but still low compared to historical values.

Even though mortgage interest rates and home values are rising, homes are currently more affordable than they were during the 1990s and early 2000s, which could encourage further growth in home sales. The NAR's Housing Affordability Index was 175.8 in 2013:Q2. An index value greater than 100 means that a family earning the median income has more than enough income to qualify for a mortgage loan on a median-priced home, assuming a 20 percent down payment.

Mortgage industry professionals expect the number of people buying homes to go up in the near future. According to Inside Mortgage Trends, the Mortgage Bankers Association projects that home sales will grow from \$503 billion in 2012 to \$615 billion in 2013, about \$700 billion in 2014, and \$990 billion in 2015. This expectation, combined with rising home values, is likely to encourage the adoption of a technological innovation: the mobile digital loan-processing application. Greater use of this tool is expected to simplify the mortgage borrowing process for individuals and lenders, which could facilitate doing business in an expanding market and help it grow further. If this trend materializes, the homeownership rate can be expected to rise in the near future.

## FHFA House Price Index: Purchases Only

SA, Q1-91 = 100



Source: Federal Housing Finance Agency.

## Short-and Long-Term Inflation Expectations

10.17.13

by William Bednar and Mehmet Pasaogullari

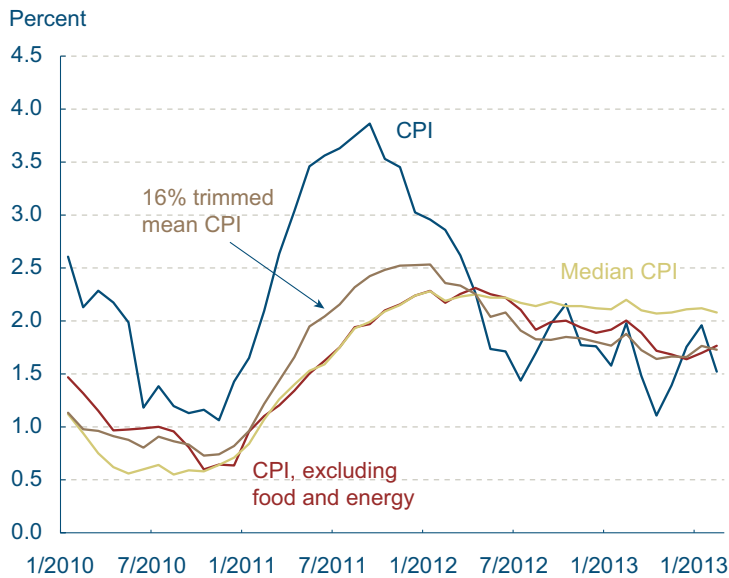
Consumer prices are rising slowly according to the latest data, although the disinflationary pressure seen in the spring has abated. Annual inflation was 1.5 percent in August 2013 as measured by the CPI and 1.8 percent as measured by the CPI excluding food and energy (usually referred to as the “core CPI”). Underlying inflation measures, such as the median and trimmed-mean CPI, have picked up, and the volatile energy component, coming in at -0.1 percent year-over-year in August, drove CPI inflation lower than core CPI inflation.

To gauge where households, professional forecasters, and market participants expect inflation to be in the future, we look at recent survey and market-based measures of inflation expectations. These measures are among the most successful predictors of future inflation.

The two surveys we use are the University of Michigan’s Survey of Consumer Attitudes and Behavior (UM survey) and the Philadelphia Fed’s Survey of Professional Forecasters (SPF). The UM survey is monthly and the SPF is quarterly. The most recent UM survey was released in September, and the most recent SPF was released in August for the third quarter of 2013. The UM Survey does not specify a particular basket for its questions on inflation expectations, whereas professional forecasters are asked their opinions on the CPI and the core CPI. Note that we report the median responses. The market-based measures we’ll look at are the breakeven inflation rates calculated from TIPS and nominal Treasuries and inflation swap rates (find an update on inflation expectations based on the Cleveland Fed’s model here).

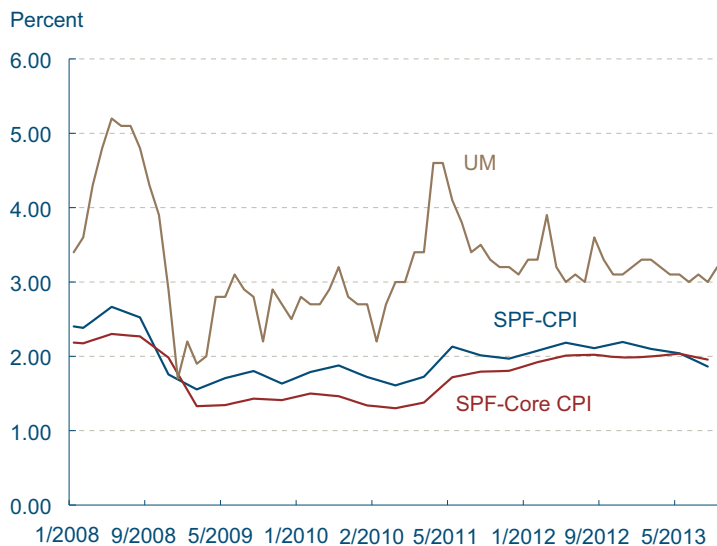
UM Survey participants expect CPI inflation to be 3.2 percent in one year, as of September 2013. The UM one-year-ahead expectation has been stable throughout 2013, compared to earlier periods. In contrast, SPF participants expect CPI inflation to be 1.86 percent in one year, as of August 2013.

### Annual Inflation



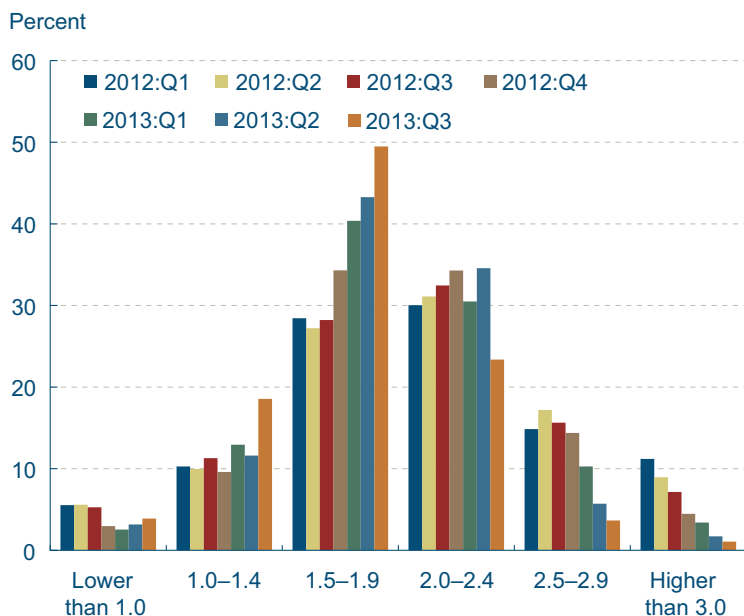
Sources: Bureau of Labor Statistics, Federal Reserve Bank of Cleveland.

### Survey-Based One-Year-Ahead Inflation Expectations



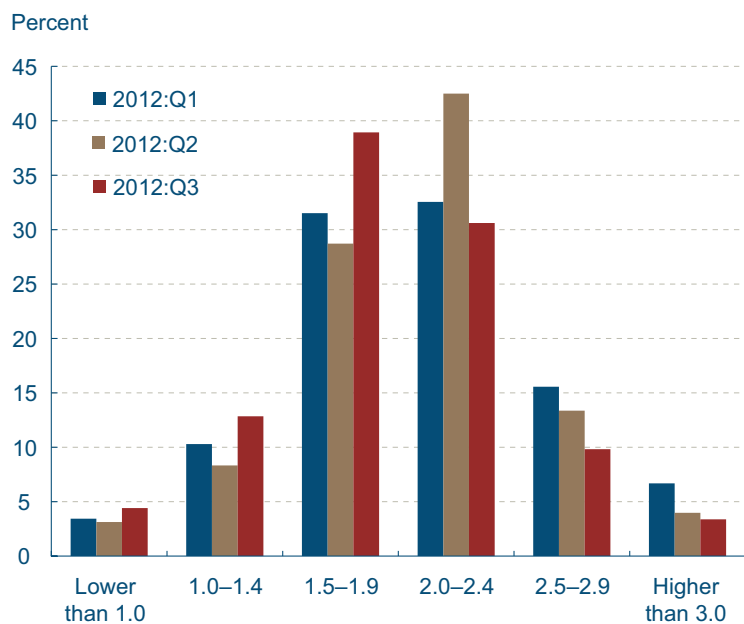
Sources: Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia), University of Michigan.

## Core CPI Probabilities, 2013:Q4



Source: Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia).

## Core CPI Probabilities, 2014:Q4



Source: Survey of Professional Forecasters (Federal Reserve Bank of Philadelphia).

The SPF one-year-ahead expectation has declined considerably since the last quarter of 2012; it was 2.19 percent in November 2012. SPF expectations for the core CPI have also been quite stable, ranging between 2.0 percent (February 2013) and 1.96 percent (August 2013).

The SPF also asks respondents to assign probabilities to particular ranges of annual core CPI inflation for the end of the current year and the next year. The numbers in 2013:Q4 show that the distribution has shifted to the left over time, meaning that respondents think that core CPI inflation in 2013:Q4 will be lower than they initially thought. As of 2013:Q3, they assigned about a 50 percent probability on average to the range of 1.5 percent to 2.0 percent. A similar shift to the left is also seen for 2014:Q4 annual core CPI inflation; the 1.5-2.0 percent range is now seen as the most likely, with a probability of 39 percent, whereas the higher 2.0-2.5 percent range was seen as the most likely outcome in the 2013:Q2 survey.

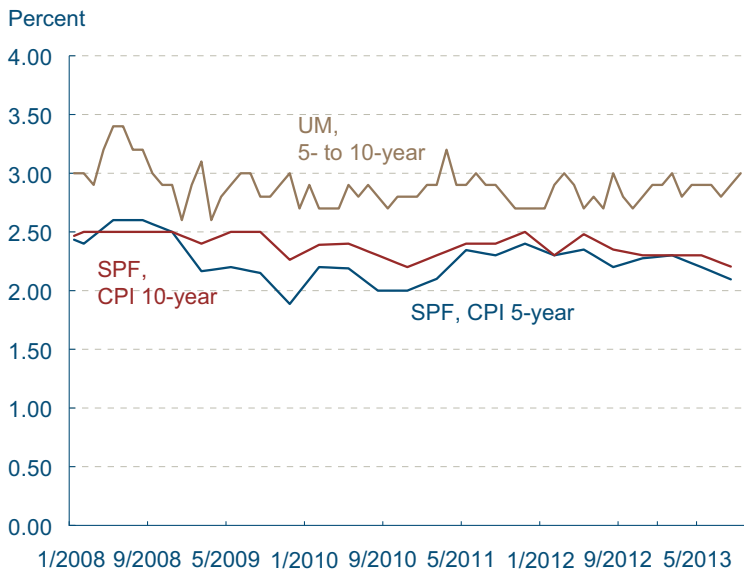
The long-term inflation expectation of UM Survey participants hovered around 2.9 percent throughout 2013 and hit 3.0 percent in September. The SPF long-term measures, on the other hand, have been following a declining trend, with 5-year inflation expectations falling 0.2 percentage points in 2013 to 2.1 percent, while the 10-year expectation dropped 0.09 percentage points to 2.21 percent.

Moving to market-based expectations, we see that these measures declined considerably from the beginning of 2013 until the middle of June. For example, the 5-year breakeven inflation rate dropped 50 basis points to 1.62 percent on June 24, 2013, and the 10-year inflation swap rate declined 40 basis points to 2.34 percent. Both measures had picked up to some extent by early August, but they have since dropped back down to levels considerably lower than where they were in the beginning of the year. For example, as of September 17, the 10-year swap rate was 2.16 percent, 32 basis points lower than it was on January 2.

Taken together, these measures suggest that investors expect lower inflation in the medium and long term. The short-term expectations measures are mixed; SPF expectations for the CPI one year

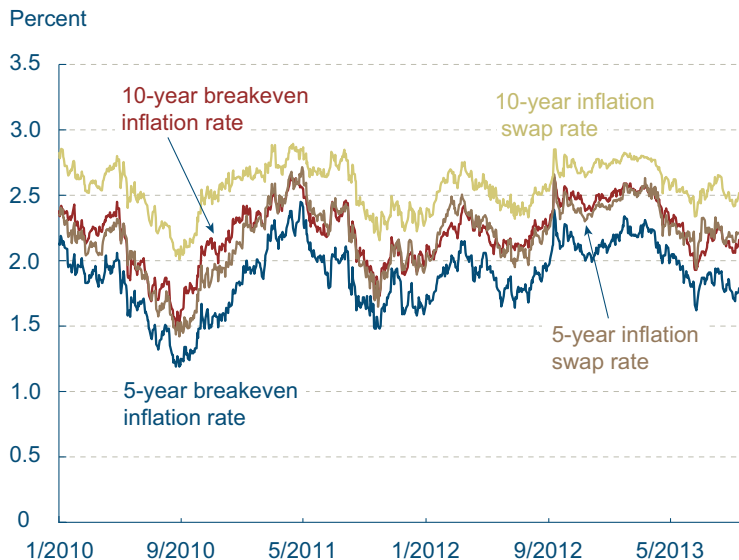
## Survey-Based Medium and Long-Term Inflation Expectations

ahead have signaled a disinflationary outlook, while expectations for other measures, such as SPF 1-year core CPI expectations and UM 1-year inflation expectations, have been more stable.



Source: Survey of Professional Forecasters (FRB Philadelphia), University of Michigan.

## Market-Based Inflation Expectations



Source: Bloomberg.

# The Yield Curve and Predicted GDP Growth, September 2013

Covering August 16, 2013–October 4, 2013  
by Joseph G. Haubrich and Margaret Jacobson

## Highlights

	September	August	July
Three-month Treasury bill rate (percent)	0.02	0.05	0.03
Ten-year Treasury bond rate (percent)	2.64	2.73	2.54
Yield curve slope (basis points)	262	268	251
Prediction for GDP growth (percent)	1.2	1.1	0.9
Probability of recession in one year (percent)	2.12	2.23	2.6

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

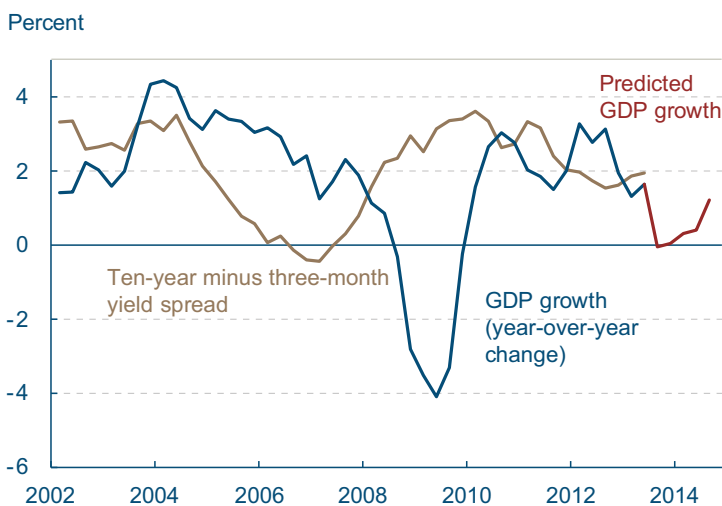
## Overview of the Latest Yield Curve Figures

The yield curve has moved down, both in level and slope, as both long and short rates have fallen since August. The three-month Treasury bill rate fell to 0.02 percent (for the week ending October 4), down from August's 0.05 percent and even below July's 0.03 percent. The ten-year rate moved to 2.64 percent, down 9 points from August's 2.73 percent, but still above July's 2.54 percent. The slope decreased to 262 basis points, again between August's 268 basis points and July's 251 basis points.

The steeper slope had a small but noticeable impact on projected future growth. Projecting forward using past values of the spread and GDP growth suggests that real GDP will grow at about a 1.2 percentage rate over the next year, just up from August's rate of 1.1 percent and up a bit from July's 0.9 percent. 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 October is 2.12 percent, down from the August estimate of 2.23 percent, and even further below the July estimate of 2.58 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.

## 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, 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.

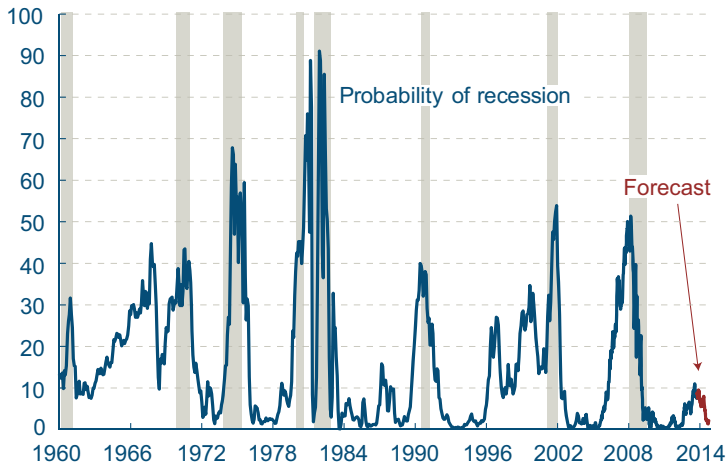
### Predicting the Probability of Recession

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

## Recession Probability from Yield Curve

Percent probability, as predicted by a probit model

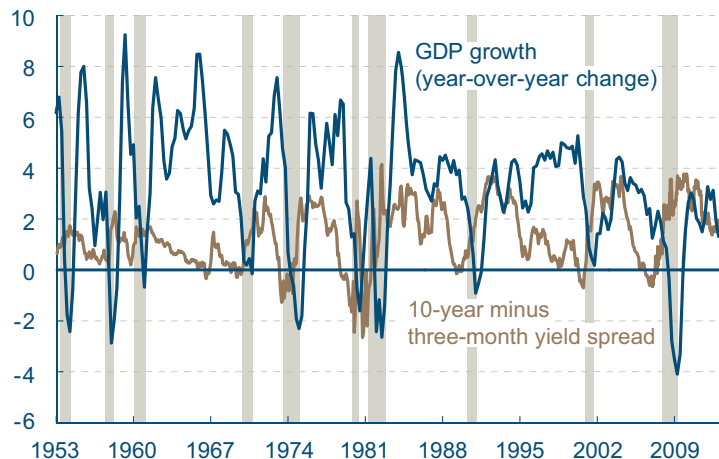


Note: Shaded bars indicate recessions.

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

## Yield Curve Spread and Real GDP Growth

Percent

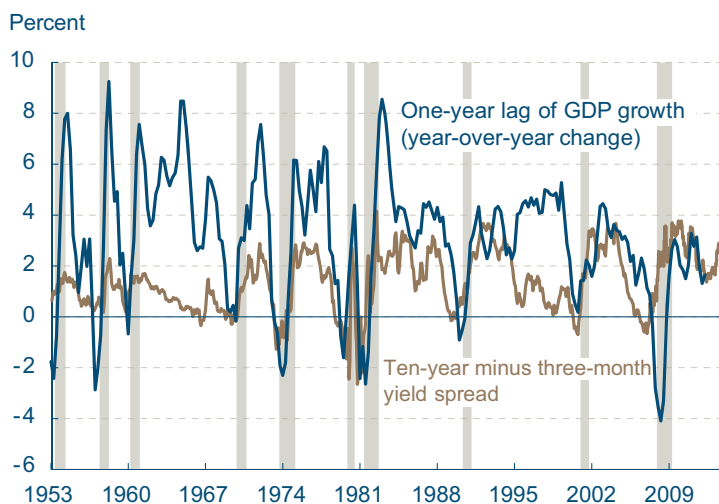


Note: Shaded bars indicate recessions.

Source: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System.



## Yield Spread and Lagged Real GDP Growth



Note: Shaded bars indicate recessions.

Sources: Bureau of Economic Analysis, Board of Governors of the Federal Reserve System.

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.

# STEM and Healthcare Employment Trends in Ohio, Pennsylvania, Kentucky, and West Virginia

09.24.13

by Stephan Whitaker and Chris Vecchio

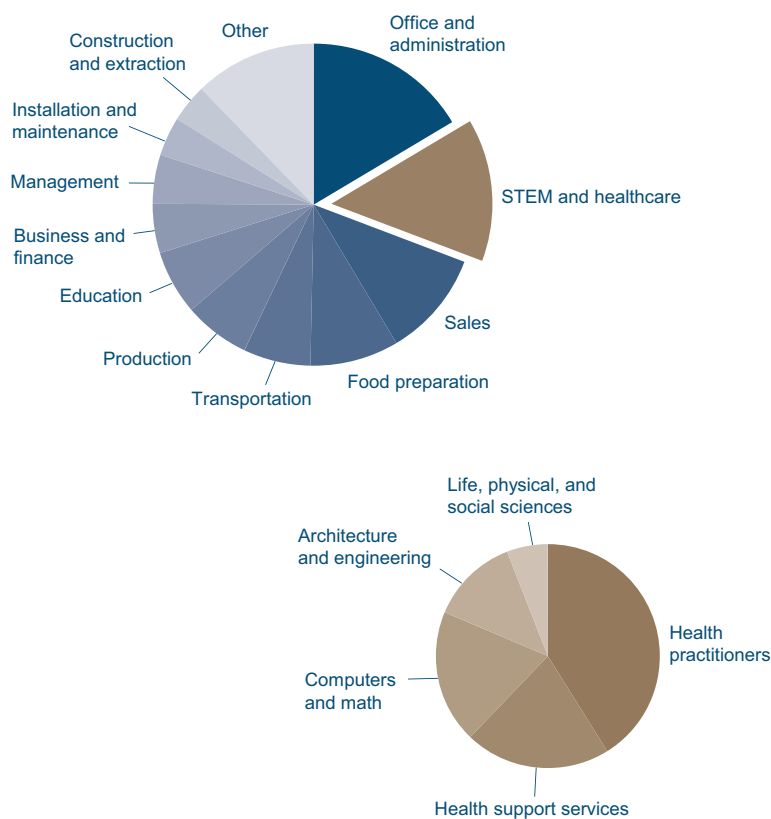
For decades, Americans have looked toward a future in which growing numbers of jobs in health-care and science, technology, engineering, and mathematics (STEM) would be needed to replace heavy industry as an economic driver. Business owners, politicians, and economic policymakers have sought ways to accelerate the transition in some cases and ease it in others. Below we assess trends in these fields in the Fourth District.

Like the nation at large, the metropolitan areas of the Fourth Federal Reserve District—Ohio, and parts of Pennsylvania, Kentucky, and West Virginia—have seen growth in STEM and healthcare fields in recent years. A high and growing share of the District’s labor force is employed in these occupations. Unfortunately, employment growth in these fields during the recovery has not been able to offset job losses in office administration, production, and transportation during the recession.

Nationwide, 14.3 percent of the labor force is employed in STEM and healthcare fields. While that may not seem like a lot, workers in these fields are outnumbered only by office/administrative workers. There are more employees in STEM and healthcare than there are in production, construction, and extraction combined. Most of the workers in the STEM/healthcare category are health care practitioners and health support workers (62 percent), while STEM fields account for 38 percent of the total.

Historically, recessions have slowed or stopped some labor market trends while simultaneously accelerating others. The growth of STEM and healthcare employment was one trend slowed by the last recession. Growth went from over 10 percent between 2003 and 2007 in the United States to under 5 percent between 2008 and 2012. However, the trend toward STEM and healthcare work occupying a growing share of the US labor force has accelerated.

Shares of Employment by Occupation Category, 2012



Source: Occupational Employment Statistics, Bureau of Labor Statistics.

## Growth of Total STEM and Healthcare Employment in Fourth District MSAs

MSA	STEM and healthcare as a percent of total employment	Growth in STEM and healthcare, percent	
	2012	2003-2007	2008-2012
Dayton	18.43	-3.28	5.50
Lima	17.31	-25.69	6.86
Cleveland	16.65	7.86	11.64
Akron	16.24	14.61	12.57
Columbus	16.23	22.90	5.68
Pittsburgh	15.74	18.66	-0.60
Canton-Masillon	15.28	5.92	3.85
Lexington	15.26	11.92	1.96
Cincinnati	15.04	26.34	4.19
<b>United States</b>	<b>14.28</b>	<b>10.66</b>	<b>4.80</b>
Youngstown	13.96	2.39	5.28
Erie	13.77	16.07	-3.67
Toledo	13.67	21.10	-11.18
Wheeling	12.87	3.13	-3.71

Source: Occupational Employment Statistics, Bureau of Labor Statistics.

## Growth of STEM and Healthcare Employment Relative to Other Fields in Fourth District MSAs

MSA	Change in STEM and healthcare's share of total employment, percent	
	2003-2007	2008-2012
Dayton	1.36	1.97
Lima	0.23	2.68
Cleveland	1.32	2.55
Akron	1.05	2.61
Columbus	1.74	1.16
Pittsburgh	1.85	-0.03
Canton-Masillon	1.14	1.40
Lexington	1.90	0.72
Cincinnati	0.69	1.33
<b>United States</b>	<b>0.62</b>	<b>1.15</b>
Youngstown	-0.23	1.49
Erie	1.60	-0.29
Toledo	1.94	-0.51
Wheeling	-0.37	-0.65

Note: The change in STEM and healthcare as a percent of total employment is calculated as  $(\text{STEM\_Healthcare\_employment}_{2012} / \text{Total\_employment}_{2012}) - (\text{STEM\_Healthcare\_employment}_{2008} / \text{Total\_employment}_{2008})$  and the equivalent for the earlier period.  
Source: Occupational Employment Statistics, Bureau of Labor Statistics.

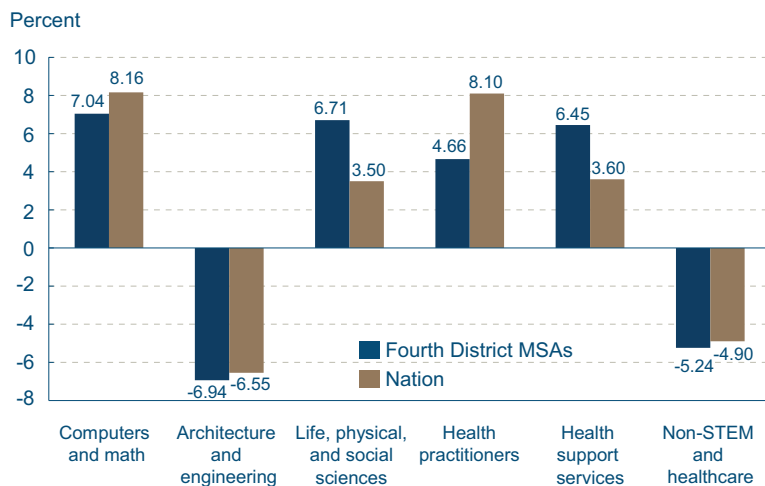
In the Fourth District, most metropolitan statistical areas (MSAs) have higher STEM and healthcare employment shares than the national average. However, growth has slowed since 2008 in all MSAs except Dayton, Lima, Cleveland and Youngstown. Though Dayton and Lima experienced declines in their STEM and healthcare workforces between 2003 and 2007, they have reversed these in the recovery.

Whether growth in STEM and healthcare positions translate into increases in their share of total employment also depends on the trends in all other types of employment. Since the recession, seven of the thirteen MSAs in the Fourth District have witnessed faster increases in the STEM and healthcare share of their total employment. Lima, Cleveland, and Akron each substantially increased their STEM and healthcare employment after the recession, and they have seen this category account for more than 2 additional percentage points of their total labor forces. The shift toward a local economy driven by STEM and healthcare jobs is amplified by job losses in non-STEM, non-healthcare occupations. Akron, Cleveland, and Dayton each lost approximately 8 percent of their non-STEM, non-healthcare jobs after the recession. Lima lost 12 percent of its non-STEM, non-healthcare jobs.

With respect to particular types of jobs, every category of STEM and healthcare added positions between 2008 and 2012 with the exception of architecture and engineering. Architecture and engineering employment has come down from a high associated with the housing boom, particularly in the subcategory of civil engineers. Growth in some categories was higher in the Fourth District than in the nation—health support and life, physical, and social sciences. Meanwhile, growth in the number of health practitioners (4.7 percent) has been modest in the District relative to the national trend (8.1 percent).

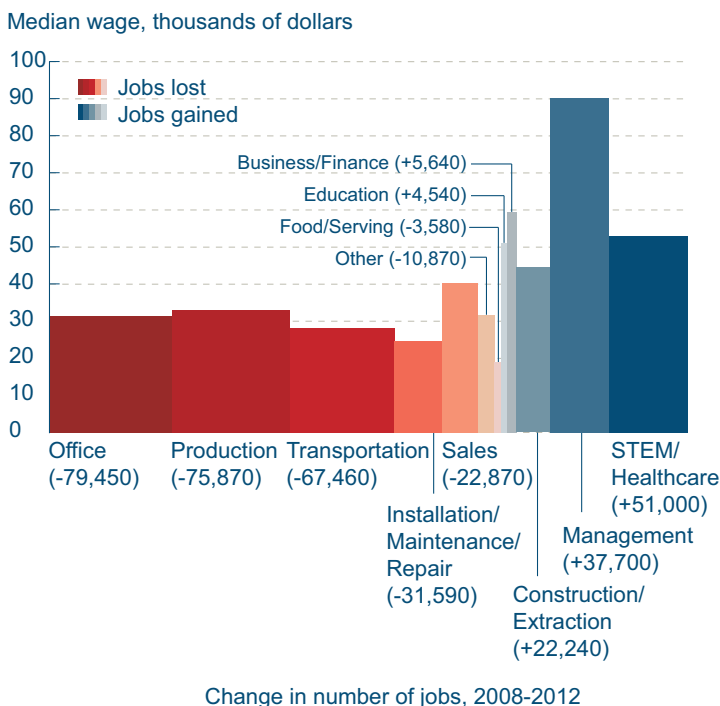
A key to the promise of economic progress through STEM and healthcare employment growth is that these higher-skilled positions are better paying than most other occupations. In the Fourth District, the median wage of STEM and healthcare jobs is third highest (\$52,944) relative to eleven other broad oc-

## Percentage Changes in STEM/Healthcare Employment by Occupation Category, 2008-2012



Source: Occupational Employment Statistics, Bureau of Labor Statistics.

## High-Paying and Low-Paying Job Losses and Gains in Fourth District MSAs



Source: Occupational Employment Statistics, Bureau of Labor Statistics.

occupational categories. Occupations in management and business and finance are higher paying. The median wage of education occupations is similar (\$51,234).

While higher-paying jobs are being created, even more lower-paying jobs are being lost. This outcome can be seen in the figure below, which charts the change in employment in various occupational categories from 2008-2012 against each category's median wage in the Fourth District. Change in employment in a category is reflected in the width of the bar and the median wage in the height of the bar. The higher-paying occupational categories, including STEM and healthcare, have added approximately 125,000 positions in the District. The lower-paying occupations, including office/administration, production workers, and transportation, have shed approximately 288,000 positions.

The recent shift toward more STEM and healthcare occupations appears to be a partial success story. The growth of STEM and healthcare occupations has been substantial, and the pay is relatively good for the people securing these positions. However, in terms of the number of workers employed or total income earned (which supports consumer demand in the local economy), STEM and healthcare jobs are far from replacing the lost positions in office, production, and transportation occupations. Considering the experience of this recovery, policymakers may need to re-evaluate their focus on job creation in STEM and healthcare fields. Two key questions are whether STEM and healthcare occupations can ever be numerous enough to replace positions lost in other fields, and what barriers need to be overcome to achieve greater STEM and healthcare job creation.

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