

Economic Trends

February 2014 (January 21, 2014-February 11, 2014)

In This Issue:

Growth and Production

- Private Fixed Investment's Recovery: Not So Bad After All
- The Ups and Downs of Inventory Investment

Households and Consumers

- Consumer Spending Reflects New Priorities after the Recession

Inflation and Prices

- Cleveland Fed Estimates of Inflation Expectations

Labor Markets, Unemployment, and Wages

- Is a Neighborhood's Unemployment Rate Influenced by Its Metro Area?

Monetary Policy

- The Yield Curve and Predicted GDP Growth, January 2014

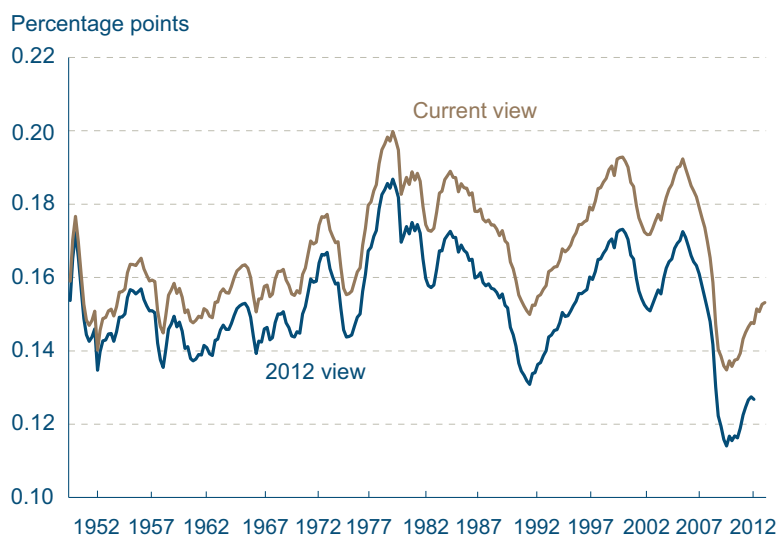
FEDERAL RESERVE BANK
of CLEVELAND

Private Fixed Investment's Recovery: Not So Bad After All

02.05.14

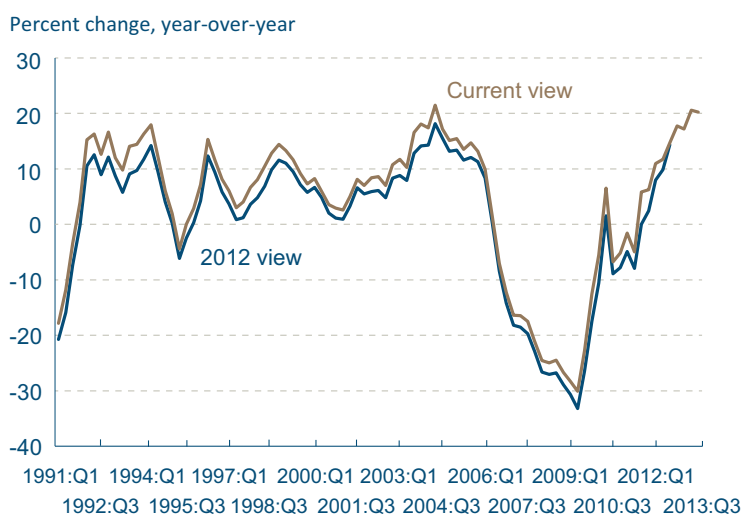
by Daniel Carroll

Private Fixed Investment and GDP



Sources: Bureau of Economic Analysis, Haver Analytics.

Real Residential Fixed Investment



Sources: Bureau of Economic Analysis, Haver Analytics.

A little over a year ago in these pages we documented the sluggish recovery of private fixed investment since the end of the recession. Up to that point, investment was not rebounding relative to GDP as quickly as it typically does during recoveries, and residential investment seemed to be the key factor holding the total down. But over the past 13 months new data has been released and a new component has been added to GDP—intellectual property—and both of these developments have changed our view of investment in the recovery. This article reexamines the path of private fixed investment and its relationship to GDP over the business cycle, taking these new developments into account.

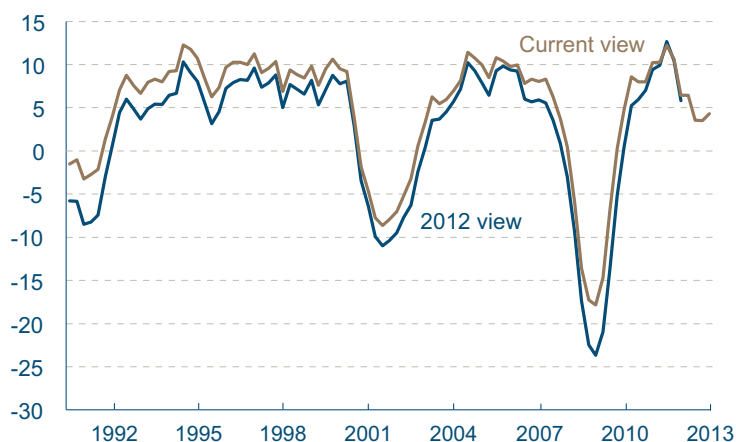
Back in November 2012, private fixed investment appeared to have stalled. In particular, the usual V-shaped response characteristic of the series in previous recoveries had not materialized. Including current data changes the picture. The V-shape appears, although there is still a long way to go to complete the pattern. Overall, private fixed investment now appears to have been recovering faster than GDP since 2010:Q4.

Meanwhile, the new data show that residential investment rose substantially in 2013. Year-over-year growth by quarter exploded, hitting 20 percent for the first time since 2004:Q2. The sustained, positive pattern over 2013 was a welcome sight after five years of mostly negative growth. The rise in residential investment elevated total fixed investment, compensating for weaker growth in non-residential investment. Back in November 2012, nonresidential investment had been growing by double digits each quarter (year-over-year) from 2011:Q3 to 2012:Q2, and it appeared likely to continue, bolstering investment in the future. Since then, however, it has averaged just 4.9 percent.

In addition to new data, a change in the way non-residential investment is measured has altered the

Real Nonresidential Fixed Investment

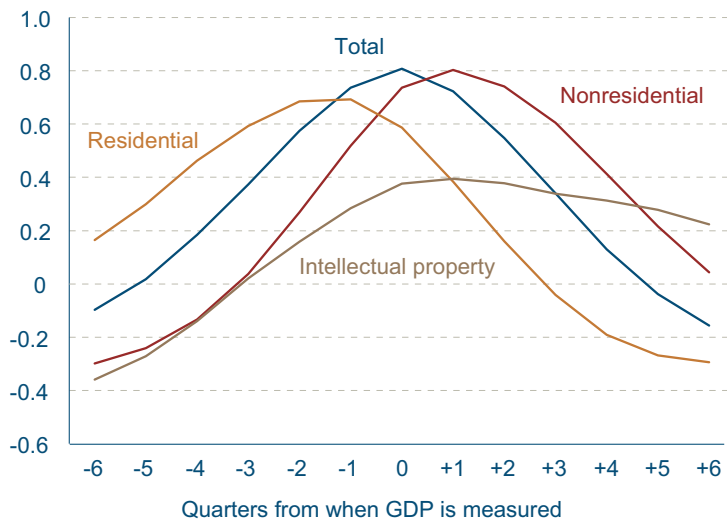
Percentage change (year-over-year)



Sources: Bureau of Economic Analysis, Haver Analytics.

Correlation between Private-Fixed-Investment Components and GDP

Correlation



Sources: Bureau of Economic Analysis, Haver Analytics.

picture considerably. During 2013, the Bureau of Economic Analysis added intellectual property to nonresidential fixed investment and adjusted the series all the way back to the beginning of the data. This change increased nonresidential investment by between 7 percent and 24 percent. It also resulted in a small rise in measured GDP, but because GDP is much larger than nonresidential investment the percentage increase was much smaller (between 2 percent and 4 percent). As a consequence, fixed investment as a fraction of GDP from 1950 to 2012 rose from 15.3 percent to 16.7 percent.

While the addition of intellectual property as a component of nonresidential fixed investment made a considerable impact on the size of investment relative to GDP, it had little effect on its business cycle properties. The correlation between fixed investment and GDP over the business cycle was reduced only slightly. This is due to the business cycle properties of intellectual property. While it shares the same qualitative pattern as nonresidential investment, it generally has a smaller quantitative relationship. As a result, the addition of intellectual property weakens the correlations of nonresidential fixed investment and total fixed investment with GDP only slightly.

The Ups and Downs of Inventory Investment

02.11.14

by Pedro Amaral and Margaret Jacobson

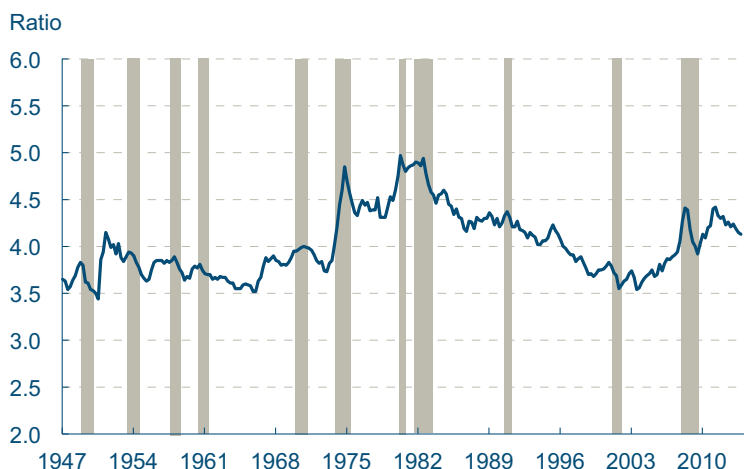
Real GDP grew at an annualized rate of 3.2 percent in the fourth quarter of 2013, according to the BEA's advance estimate. Since growth in the third quarter was 4.1 percent, it looks like the US economy finished the year growing at a very healthy pace. Unfortunately the same cannot be said for the early part of 2013, and overall, real GDP growth for 2013 was just 1.9 percent, which is significantly below the 2.8 percent logged in 2012.

The fourth-quarter increase was mainly due to growth in personal consumption expenditures, which, along with net exports, registered their largest contribution to GDP growth since the fourth quarter of 2010. On the negative side, federal government expenditures, which dropped by 1 percent on the quarter, were the main drag on real GDP growth.

Recently, investment in inventories, as measured by a statistic called the change in private inventories (CIPPI), has been strong. It accounted for almost 30 percent of GDP growth over the second half of 2013. An oft-overlooked component of GDP, CIPPI is extremely volatile and can account for large fractions of changes in real GDP. CIPPI is a measure of the value of the change in the real amount of inventories that the private business sector keeps in the course of its production and distribution activities. These inventories might be in the form of finished goods, goods in process, or raw materials and supplies. This variety means they are maintained by all sorts of businesses at different parts of the production chain, be it manufacturers, wholesalers or retailers.

Different forces may affect the inventory levels of different types of businesses. To decide the optimal level of inventory of a particular good, a business will consider the fixed cost of obtaining the good, the cost of storing it, and either the expected utilization rate in production (if it's an intermediate good) or the future demand (if it's a final good).

Inventory-to-Sales Ratio

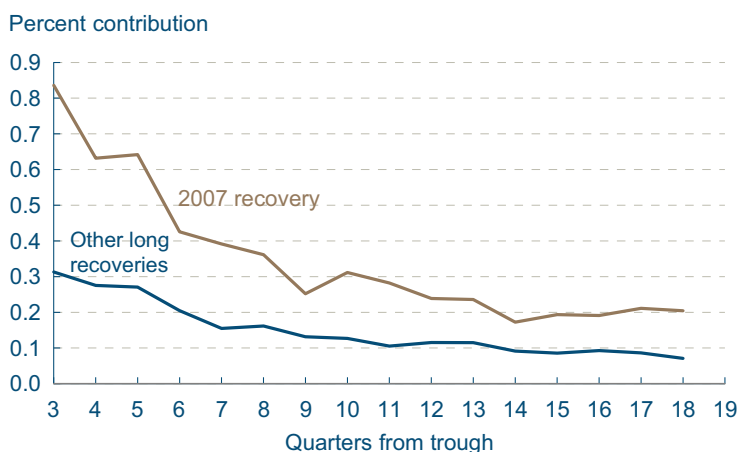


Notes: Inventories are for nonfarm businesses. Sales are final sales of goods and structures. Shaded bars indicate recessions.
Source: Bureau of Economic Analysis

Economists pay attention to total inventories as a proportion of total sales as a way to gauge whether businesses are keeping too much or too little in their inventories. Net additions may mean that businesses expect a stronger future demand, or simply that inventories have been depleted too much and the current level is not optimal. The Bureau of Economic Analysis computes the ratio of the stock of all inventories kept by private businesses to that of total sales, the resulting number being a measure of the number of months it would take to go through the accumulated inventories.

During the most recent recession the inventory-to-sales ratio took a big hit, as businesses slowed production and started going through their inventories at a faster rate than sales decreased. As the recovery started, most of the growth in real GDP was fueled by advances in CIPI. As fast as growth in CIPI has been in the second half of 2013, it was much faster at the start of the recovery. Three quarters into the recovery, CIPI was accounting for nearly 85 percent of GDP growth. Its contribution has since declined and settled at about 20 percent of real GDP growth for the 18-quarter recovery as a whole. This is an extraordinarily high figure given that in the average 18-quarter recovery CIPI has only accounted for roughly 7 percent of GDP growth and it normally constitutes less than 1 percent.

Cumulative Contribution of Change in Private Inventories to GDP Growth



Note: Other recoveries include those following the 1960, 1973, 1981, 1990, and 2001 recessions.
Sources: Bureau of Economic Analysis, authors' calculations.

How can a component this small account for so much GDP growth? What is crucial to note is that because GDP is a flow, it is the change in inventories (CIPI) that contributes to GDP, not the stock of inventories itself. Therefore it is the change in CIPI (the change in the change of inventories) that contributes to GDP growth. The following example illustrates how these changes, while small in the context of overall GDP, can be quite volatile and contribute substantially to GDP growth.

Suppose that inventories last quarter dropped by half a percent of last quarter's GDP, meaning that CIPI was -0.5 percent of GDP, and that this quarter inventories do not change at all, meaning that CIPI is zero this quarter. Also, suppose that overall GDP growth was 1.5 percent from the last to the current quarter. In this purposely simplistic case—but entirely plausible in its magnitudes—CIPI

A Simplified Illustration of the Impact of CIPI on GDP Growth

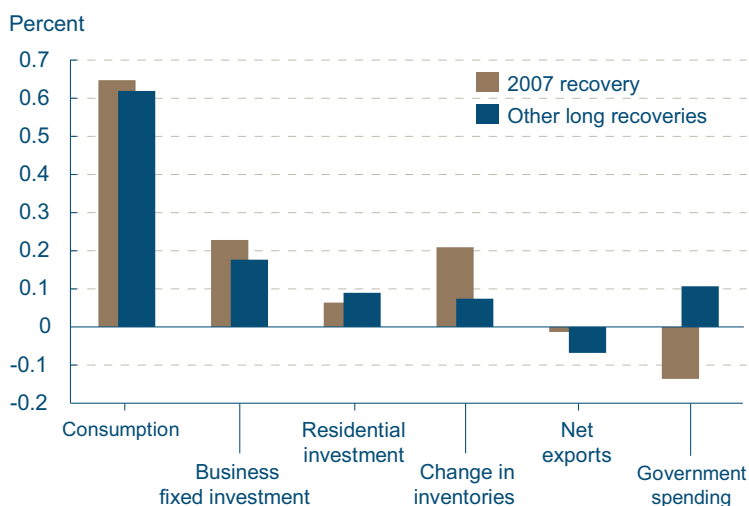
	Quarter 1	Quarter 2	Change
GDP	100	101.5	1.5
CIPI	0.5	0.0	0.5
Other GDP components	-100.5	101.5	1.0

growth is positive and it accounts for a third of the growth in GDP even though the stock of inventories did not change this quarter!

If CIPI is contributing so much above its typical contribution, which GDP categories have not been proportionately contributing as much in this recovery compared to previous ones? While government spending growth was responsible for 10 percent of GDP growth on average in recoveries that lasted at least as long as the current one, it has actually been a drag on growth in the current one.

Note, finally, that these observations are not a statement about whether CIPI, or any other GDP component for that matter, is growing faster or slower in this recovery. We are only commenting on each category's relative contribution to overall GDP growth, and in that regard CIPI seems to be the most improved.

Cumulative Contribution of GDP Components 18 Quarters after Business Cycle Trough



Note: Other recoveries include those following the 1960, 1973, 1981, 1990, and 2001 recessions.

Sources: Bureau of Economic Analysis, authors' calculations.

Consumer Spending Reflects New Priorities after the Recession

02.05.14

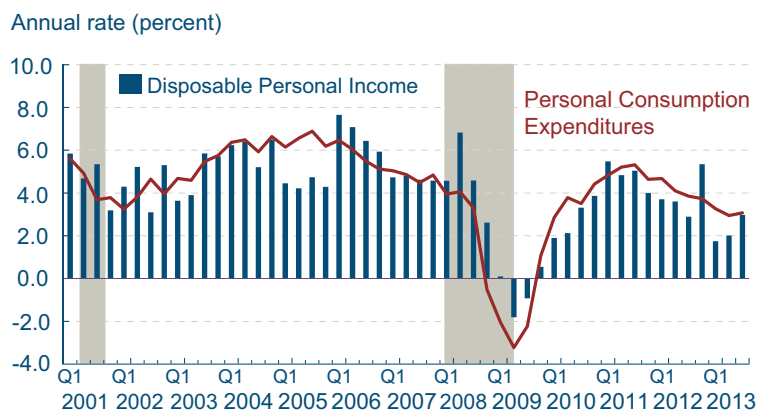
by LaVaughn Henry

Accounting for approximately 70 percent of the nation's GDP, personal consumption expenditures represent the backbone of the American economy. During the current economic recovery, personal consumption has continued to expand despite modest and erratic income growth, high unemployment, higher taxes, and higher energy and food prices. Factors contributing to the consumer's resiliency are many, with strong financial asset market performance, recently improving housing market conditions, and a slowly improving labor market all working to support growth in personal consumption.

At the end of the recession, personal consumption expenditures resumed growing at a positive average annual rate of 3.8 percent. Between the end of the prior recession and the beginning of the recent recession, it averaged 5.3 percent. During both recovery periods, disposable personal income grew at relatively slower rates, 3.3 percent and 5.1 percent, respectively. Additionally, the current recovery period has been characterized by slower growth in household asset values than in previous recoveries, and until recently, muted growth in house prices. However, despite consumers being somewhat constrained in their ability to draw from expanding income and wealth sources during the recovery, the growth in their consumption remains stronger than one might expect.

Since household asset values resumed their growth during the third quarter of 2009, they have increased an average of 5.5 percent through the third quarter of 2013. This compares unfavorably to the average annual growth rate of 8.4 percent experienced between the first quarters of 2002 and 2008. Much of the recovery that has occurred can be attributed to continued growth in equity prices. For example, since the end of the financial crisis of 2008-2009, equities have more than doubled in value. However, while this has benefitted the consumption of some households, it has not done

Growth in Disposable Personal Income and Consumption Expenditures



Note: Shaded bars indicate recessions.
Source: Bureau of Economic Analysis.

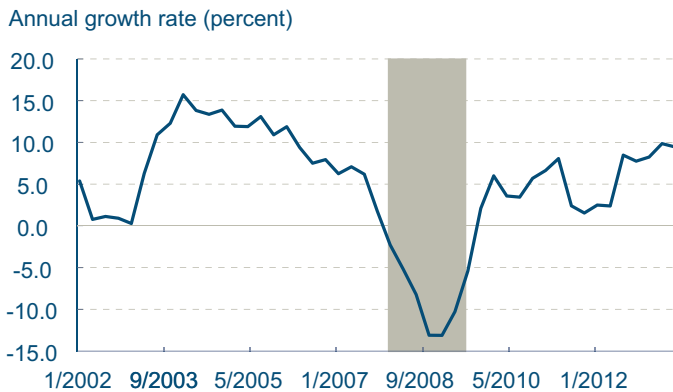
so for the majority. By the end of 2010, only 20.4 percent of households held stocks or mutual fund shares as an asset class in their portfolio, and this was down from the 25.1 percent that held equity shares in 2005.

By comparison, the average American household is much more likely to have equity in their home than they are to own stocks. At the end of 2010, 65.9 percent of households had equity in their homes, with a median value of \$80,000, as compared to the 20.4 percent holding equity shares with a median value of \$18,300. Thus, the average household's consumption is much more likely to respond to growth in house prices, which would increase the value of their equity, than they are to growth in stock prices. Unfortunately, home prices did not begin to appreciate until fairly late in the recovery, and the ability of homeowners to access the equity in their homes through equity borrowing has been much reduced relative to pre-recession levels.

While improvements in the values of both asset classes have, to differing degrees, helped to support growth in personal consumption expenditures, there have also been shifts in the composition of the average household's asset portfolio that have likely worked to slow growth in consumption. Most notably, consumers have been using their income to partially pay down debts built up before the recession while at the same time they have also been saving more in relatively illiquid savings accounts such as 401ks and IRAs. On net, as they have saved more, growth in their current consumption is below what it otherwise would have been.

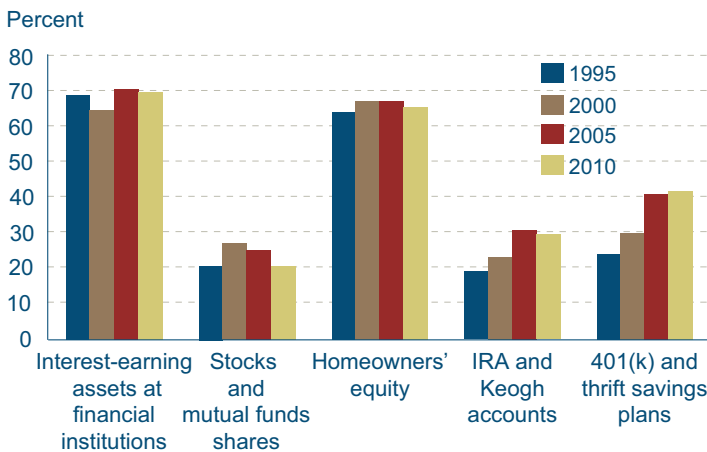
As personal consumption has recovered, there have also been shifts in the types of things that households are consuming. Most notably, the consumption of durable goods has picked up at a relatively faster rate than either nondurables or services. Prior to the recession, durable goods consumption grew 3.8 percent a year on average, but since the end of the recession it has grown 4.7 percent. The durable category showing the greatest strength is motor vehicles and parts, which increased from an average annual growth rate of 3.8 percent before the recession to 7.7 percent after. This growth is the joint result of pent-up demand for new autos—the average

Growth in Household Asset Values



Note: Shaded bar indicates a recession.
Source: Board of Governors of the Federal Reserve System.

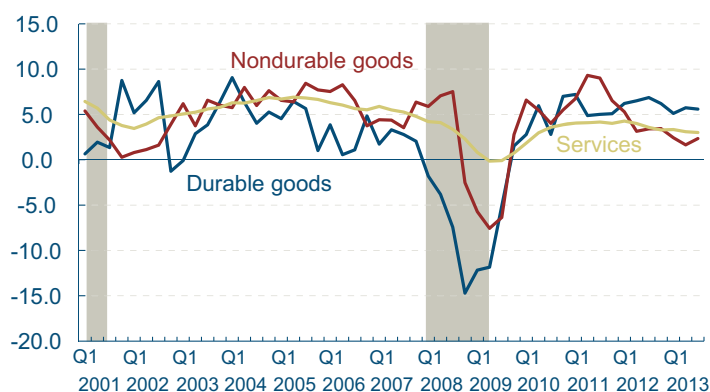
Asset Ownership Rates for Households, by Selected Characteristics



Source: Survey of Income and Program Participation, US Bureau of the Census.

Compositional Trends in Personal Consumption Expenditures

Annual growth rate (percent)



Note: Shaded bars indicate recessions.
Source: Bureau of Economic Analysis.

age of cars on the road has increased to 11.4 years from a pre-recession average of 9.2 years—and continued historically low interest rates on new and used auto loans. By way of comparison, households’ consumption of services grew 5.6 percent a year on average before the recession and declined to 3.2 percent during the recovery period.

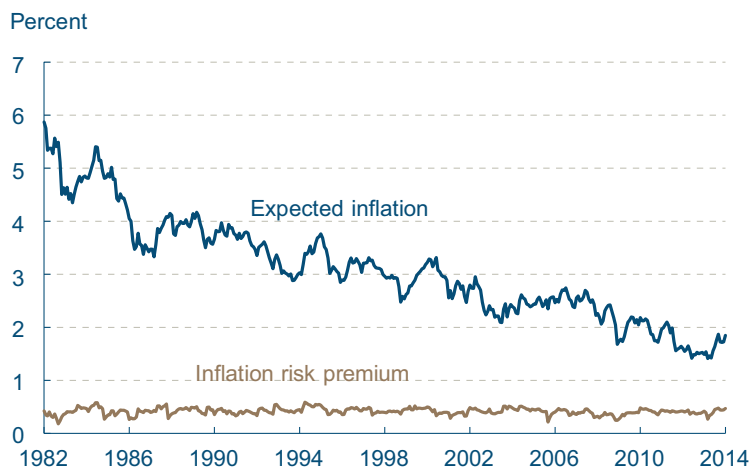
The average American household is facing a very different landscape than it was prior the Great Recession of 2008-2009. Fiscal restraint and uncertainty, slowly declining yet still-elevated rates of unemployment, modest growth in disposable personal income, and modest growth in household asset values have all combined to slow the rate of increase in personal consumption expenditures during the recovery.

However, while these forces have slowed the growth, they have not reversed it. Consumers are spending more, but more notably, their consumption preferences have also appeared to change. Consumers appear to be more focused on consuming based on need versus want; durables that yield value over the long term such as cars, furniture, and other household equipment, have eclipsed growth in temporary service-based consumption such as food services and accommodations. Whether or not these compositional preference shifts remain or reverse throughout the recovery period remains to be seen, but if they do remain, they will have implications for future trends in labor, production, and the overall growth in the economy.

Cleveland Fed Estimates of Inflation Expectations

News Release: January 16, 2014

Ten-Year Expected Inflation and Real and Nominal Risk Premia

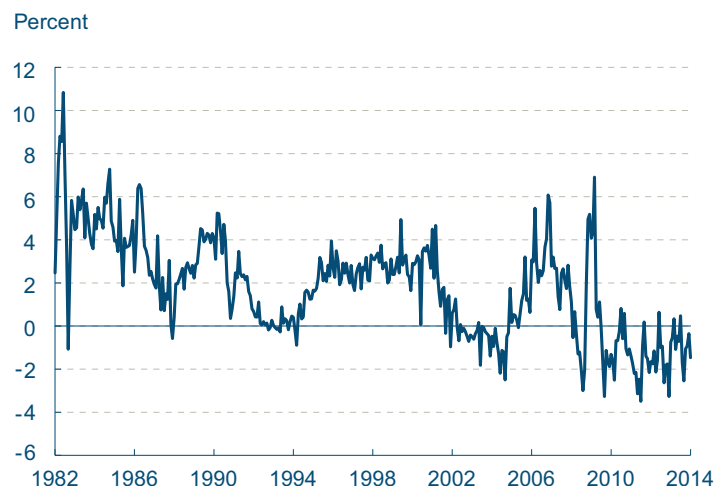


Source: Haubrich, Pennacchi, Ritchken (2011).

The latest estimate of 10-year expected inflation is 1.85 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.

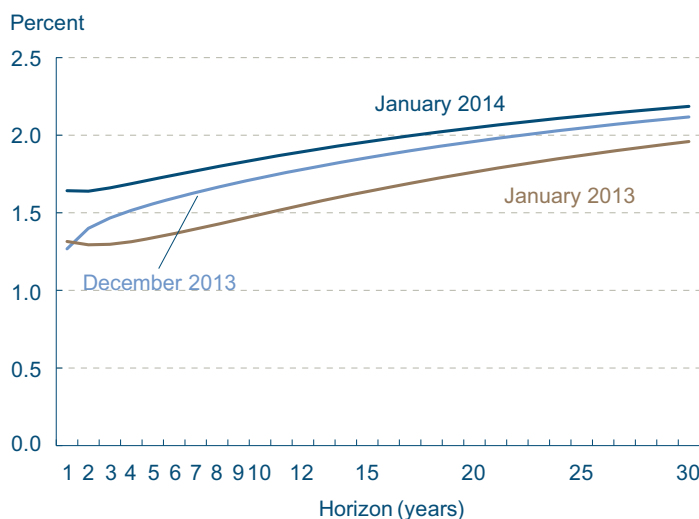
The Cleveland Fed's estimate of inflation expectations is based on a model that combines information from a number of sources to address the shortcomings of other, commonly used measures, such as the "break-even" rate derived from Treasury inflation protected securities (TIPS) or survey-based estimates. 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 (2008).

Expected Inflation Yield Curve



Source: Haubrich, Pennacchi, Ritchken (2011).

Is a Neighborhood's Unemployment Rate Influenced by Its Metro Area?

02.12.14

by Dionissi Aliprantis, Kyle Fee, and Nelson Oliver

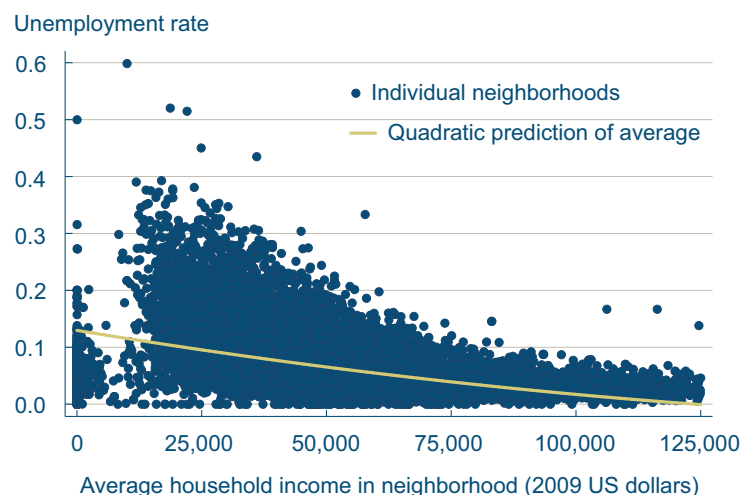
When people compare employment conditions around the country, they usually think in terms of large regions like the Midwest and the West Coast or cities like Cleveland and Pittsburgh. But employment conditions vary widely within major metropolitan area as well. Even if a metro area experiences rising average levels of employment and income, the changes in specific neighborhoods in that metro area may be well above or below that average.

We looked at unemployment and income data by neighborhood in the 100 largest metropolitan statistical areas (MSAs) in the United States to see if we could identify any factors that help explain the differences that are observed across neighborhoods. The MSAs selected were the 100 largest in terms of population in 1980, and the factors we considered come from Census data gathered on neighborhoods, or census tracts, between 1980 and 2008. All dollar measurements are expressed in terms of 2009 real dollars, so they are comparable over time.

In general, high-income neighborhoods have much lower unemployment rates than low-income neighborhoods, as one might expect. The chart below shows the strength of the relationship in 1980. The typical unemployment rate found in low-income neighborhoods would rarely be found in a high-income neighborhood, while neighborhood unemployment rates of over 50 percent can be found in some low-income neighborhoods.

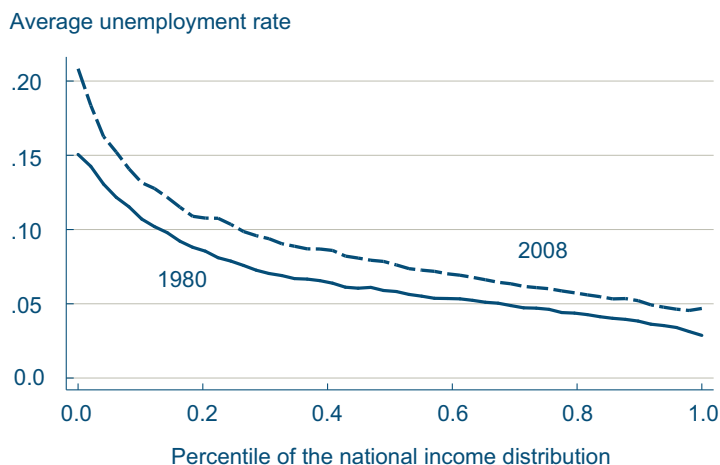
Given the strong association between a neighborhood's income and its unemployment rate in 1980, we might expect the effects of negative changes in the labor market to be concentrated in low-income neighborhoods. Contrary to this expectation, we find that unemployment rates increased on average in all neighborhoods between 1980 and 2008, regardless of their income. Neighborhoods in the 25th percentile of the national distribution of household income saw their unemployment rate

Neighborhood Unemployment Rate, 1980



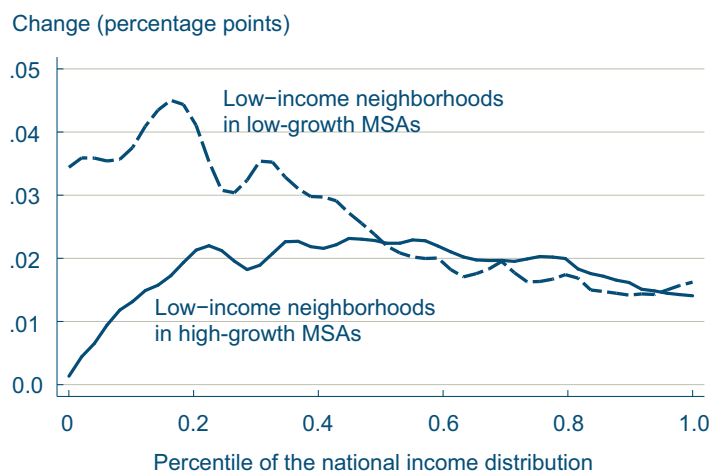
Sources: US Census Bureau, Bureau of Economic Analysis.

Neighborhood Unemployment Rates of All MSAs



Source: American Community Survey (2006–2010), US Census Bureau.

Change in Neighborhood Unemployment Rate, 1980–2008



Note: High-growth metro areas are those in the top 25 of metro areas in terms of percent growth in average household income between 1980 and 2008. Low-growth metro areas are those in the bottom 25 in terms of this measure.

Source: American Community Survey (2006–2010), US Census Bureau.

increase by 2.8 percentage points, while neighborhoods in the 75th percentile of household income saw theirs increase by 1.9 percentage points.

We looked more closely at low-income neighborhoods—those in the bottom quartile, or fourth, of neighborhoods in 1980 in terms of average household income—to see why some did better than others. We find that changes in neighborhood unemployment rates were related to the characteristics of the larger metro area of which the neighborhoods were a part in 1980, such as the metro area's average household income or its share of residents with a bachelor's degree (BAs). Being in a metro area that was in the top quarter of all metro areas in terms of average household income decreased a low-income neighborhood's unemployment growth by about 1 percentage point on average (relative to those in the bottom quarter). Likewise, the share of residents with a BA had the same impact.

Income growth in the metro area over the last three decades is very predictive of unemployment growth in its low-income neighborhoods over the same period. Low-income neighborhoods experienced much larger growth in unemployment rates if they were located in a metro area with low income growth relative to those low-income neighborhoods that were located metro areas with high income growth. High-income neighborhoods, on the other hand, were immune from this effect; they experienced similar unemployment changes regardless of the type of metro area in which they were located.

What might explain the relationship between growth in a low-income neighborhood's unemployment rate and the income growth of its metro? We speculate that low-income neighborhoods in high-growth MSAs may have experienced an influx of new residents with low unemployment rates, or alternatively, low-income neighborhoods in low-growth metros could have experienced a loss of residents with low-unemployment rates. Another explanation could be that the sectors employing residents in low-income neighborhoods are especially sensitive to the performance of the metro area as a whole.

Yield Curve and Predicted GDP Growth, January 2014

Covering December 14, 2013–January 17, 2014
by Joseph G. Haubrich and Sara Millington

Highlights

	January	December	November
Three-month Treasury bill rate (percent)	0.04	0.07	0.08
Ten-year Treasury bond rate (percent)	2.86	2.86	2.74
Yield curve slope (basis points)	282	279	266
Prediction for GDP growth (percent)	1.3	1.2	1.2
Probability of recession in one year (percent)	1.48	1.50	1.86

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

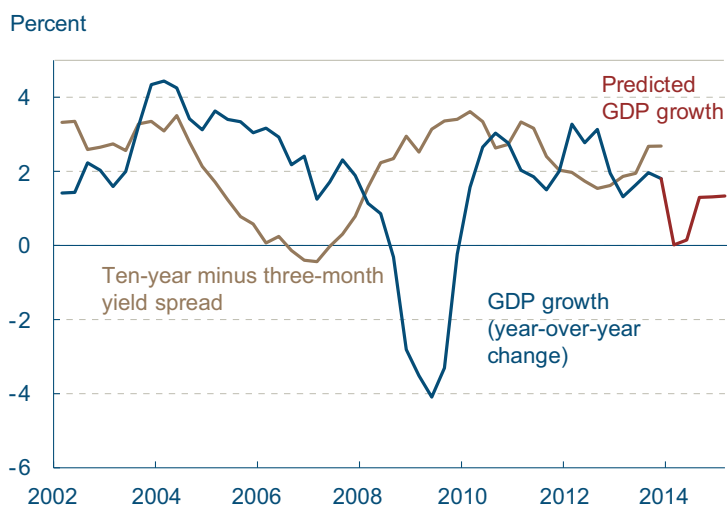
Overview of the Latest Yield Curve Figures

The yield curve became slightly steeper over the past month, with the three-month (constant maturity) Treasury bill rate dropping to 0.04 percent (for the week ending January 17), down from December's 0.07 percent and November's 0.08 percent. The ten-year rate (also constant maturity) held steady at 2.86 percent, though up from November's 2.74 percent. The slope increased to 282 basis points—a mere three basis points above December's 279 basis points, but up a bit from November's 266 basis points.

The steeper slope had a negligible 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 1.3 percentage rate over the next year, just barely above the 1.2 percentage rate seen in November and December. The influence of the past recession continues to push toward 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 slope change had only a slight 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 January at 1.48 percent, down a hair from December's number of 1.50 percent and below November's 1.86 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.

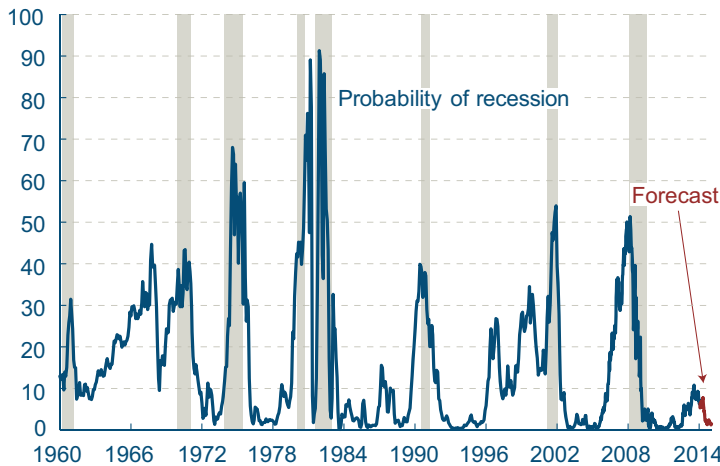
Predicting the Probability of Recession

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

Recession Probability from Yield Curve

Percent probability, as predicted by a probit model

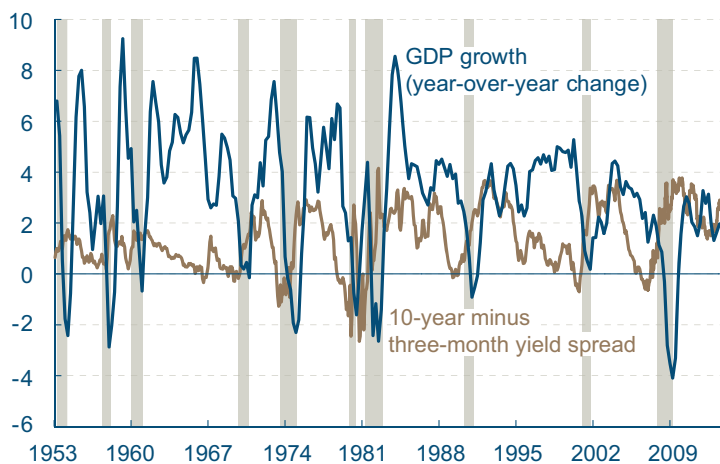


Note: Shaded bars indicate recessions.

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

Yield Curve Spread and Real GDP Growth

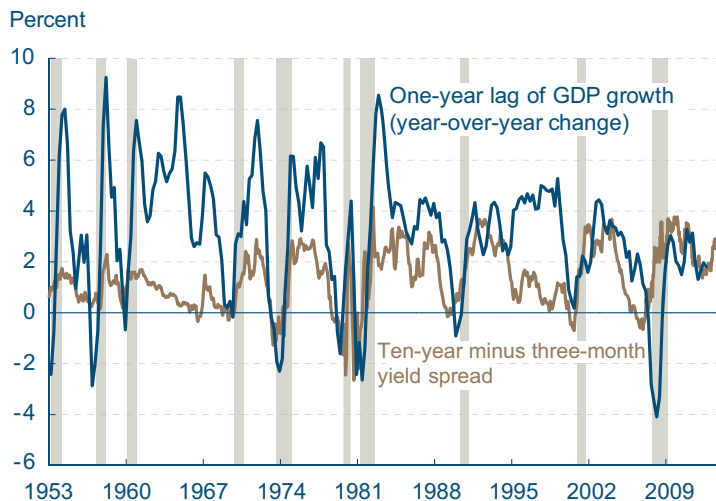
Percent



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.

determinants of the yield spread today are materially different from the determinants that generated yield spreads during prior decades. Differences could arise from changes in international capital flows and inflation expectations, for example. The bottom line is that yield curves contain important information for business cycle analysis, but, like other indicators, should be interpreted with caution. For more detail on these and other issues related to using the yield curve to predict recessions, see the Commentary “Does the Yield Curve Signal Recession?” Our friends at the Federal Reserve Bank of New York also maintain a website with much useful information on the topic, including their own estimate of recession probabilities.

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

