Economic Trends

May 2012 (April 12, 2012-May 8, 2012)

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FEDERAL RESERVE BANK
of CLEVELAND

Bank Capitalization

05.01.2012
by Ben Craig and Matthew Koepke

Over the last 20 years, the financial sector has become larger, more complex, and more interconnected. While this expansion has facilitated the development of new financial products and markets, it has also introduced new risks to the financial system and the economy in general. The housing crisis and the subsequent collapse of the large investment banks Bear Stearns and Lehman Brothers and the government takeover of insurer AIG clearly demonstrates how negative events can easily ripple through the interconnected financial system and cause great harm to the banking system and the broader economy. Going forward, capital regulation will likely play an important role in adding stability to the financial system.

Bank capital is a measure that appears on the liability side of the bank's balance sheet. One way to think about it is that capital is what is left over when you subtract other bank liabilities (such as deposits and loans made to the bank) from bank assets. One regulatory measure of capital is tier I capital, which is defined as the sum of common equity, noncumulative perpetual preferred stock, and minority interest. Tier II capital includes preferred shares not included in tier I capital, hybrid capital, term subordinated debt, general loan-loss reserves, and unrealized gains on equity securities. While regulators view large levels of tier I capital as an essential buffer against unexpected losses, the more risky tier II capital is generally viewed as a supplemental buffer.

FDIC-insured institutions fall under two regulatory capital requirements, the leverage-ratio and risk-based-capital requirements. Under the leverage ratio requirement, the FDIC requires banks to maintain a ratio of tier I capital to tangible assets of 4.0 percent. It is important to use tangible assets since this measure excludes intangible assets, such as goodwill, which cannot be easily valued upon liquidation.

In addition to the leverage ratio, banks are also required to maintain certain levels of tier I and tier II capital relative to risk-weighted assets. Risk-weighted assets allow banks to hold different levels of capital for various assets based on those particular assets' credit risk characteristic. Moreover, unlike the leverage ratio, risk-weighted assets also consider assets that banks take off their balance sheet, such as the unused portion of a line of credit. Two ratios are important: a tier I risk-based capital ratio, which is tier I capital divided by risk-weighted assets, and a total risk-based capital ratio, which is the sum of tier I capital and tier II capital divided by total risk-weighted assets.

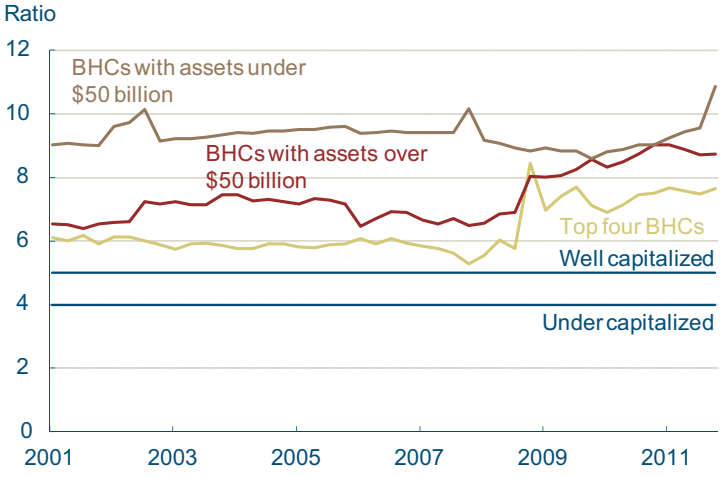
In order for a bank to be considered well capitalized in the United States, it must have a leverage ratio of 5.0 percent; a tier I risk-based capital ratio of 6.0 percent; and a total risk-based capital ratio of at least 10.0 percent. Regulators may permit banks or bank holding companies with high quality assets to have a leverage ratio of 3.0 percent. Conversely, a bank is considered undercapitalized if its leverage ratio or total risk-based-capital ratio falls below 4.0 percent or 6.0 percent, respectively.

Based on these measures of bank capitalization, the U.S banking industry has been well capitalized over the past decade. From March 2001 to December 2011, the average tier I capital ratio for the four largest bank holding companies rested above the well-capitalized threshold of 5.0 percent, averaging 6.4 percent from 2001 to 2011. Moreover, the average tier I leverage ratio for banks deemed systemically important (assets greater than $50 billion) was higher than the four largest bank holding companies, averaging 7.4 percent over the same period.

Additionally, bank holding companies were considered well capitalized under the broader measure of total capital. From 2001 to 2011, the four largest bank holding companies posted an average capital ratio of 12.8 percent, firmly above the well capitalized threshold of 10.0 percent. Systemically important bank holding companies managed to stay above the well capitalized threshold with a slightly lower average total capital to risk-weighted-assets ratio of 12.2 percent.

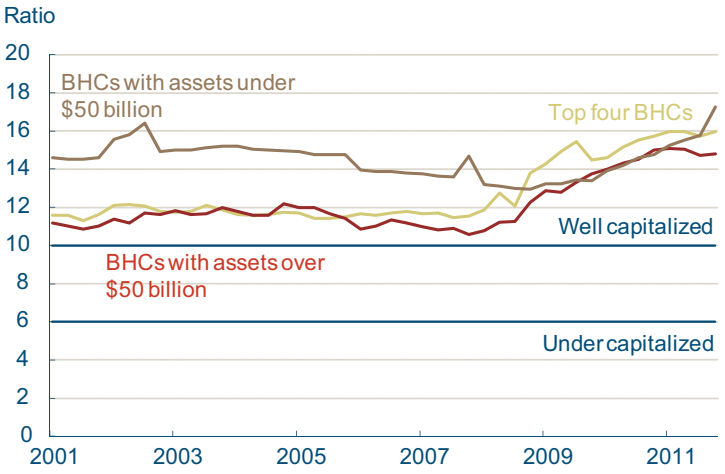
It is important to note that in response to the

Average Tier I Leverage Ratio



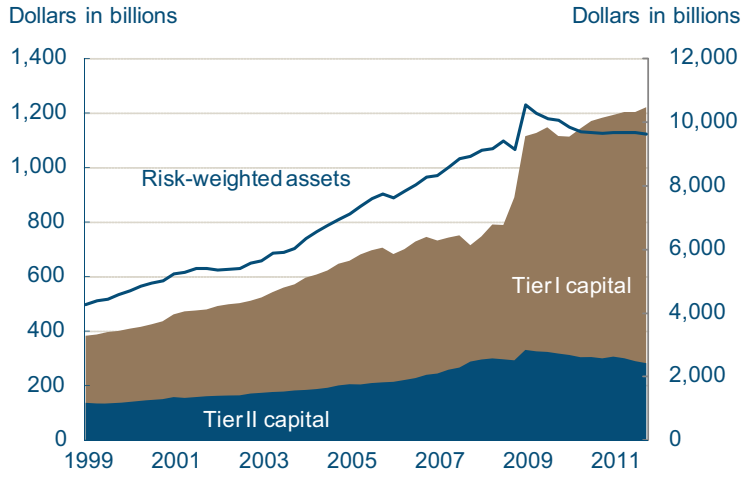
Source: Call Report.

Average Total Capital Ratio Leverage Ratio



Source: Call Report.

Total Capital



Source: Call Report.

financial crisis, banks began to increase their levels of capital to serve as a buffer against potential losses. From September 2008 to December 2011, the average tier I leverage ratio of all bank holding companies increased 190 basis points from 8.9 percent to 10.8 percent, and the average total capital ratio increased 430 basis point, from 12.9 percent to 17.2 percent.

The improvement in the tier I leverage ratio and the total capital leverage ratio can be attributed to an increase in both in tier I capital and a leveling off of risk-weighted assets. In response to the financial crisis of 2008, bank holding companies increased their tier I capital by 54.6 percent, from $790 billion in September 2008 to $1.2 trillion in December 2011. Meanwhile, over the same period, total risk-weighted assets rose only 16.5 percent. The combination of rising capital levels and falling risk-weighted assets resulted in better capitalized banks.

A Return to Lower Levels of Investment Activity

05.04.12

by Margaret Jacobson and Filippo Occhino

Economic growth continues to be modest compared to previous recoveries. Real GDP rose only at a 2.2 percent annual rate in the first quarter of 2012, according to the advance estimate from the BEA, and over the course of the recovery so far, it has grown just 2.43 percent annually. Going forward, it is forecasted to expand at rates lower than 3 percent for a long time. These rates are lower than is typical during expansionary periods, and they entail a gap between economic activity and trend growth that will persist into the future, rather than rapidly close as in previous recoveries. To shed some light on this puzzling feature of the current recovery, we take a longer-term perspective and examine the pattern of investment activity in the decades leading up to the current cycle.

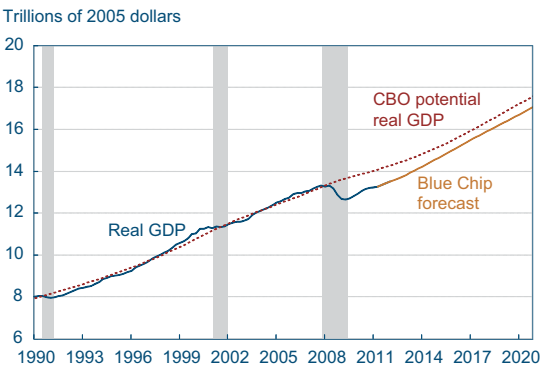
Average Growth Rates of Real GDP during Expansions

	1971:Q1–1973:Q3	1975:Q2–1979:Q4	1980:Q4–1981:Q2	1983:Q1–1990:Q2	1991:Q2–2000:Q4	2002:Q1–2007:Q3	2009:Q3–2012:Q1
Average growth rate	5.38	4.49	4.49	4.34	3.72	2.73	2.43

Source: Bureau of Economic Analysis.

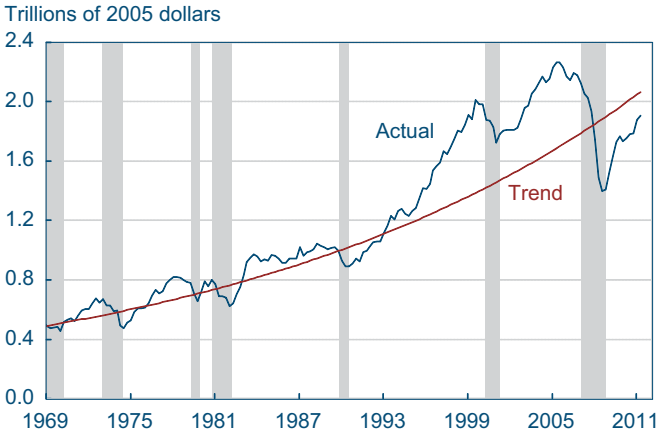
After growing 3.46 percent on average during the 1970s and 1980s (more precisely, between the peaks of the 1969–1970 and 1990–1991 cycles), investment accelerated during the 1990s and remained elevated until the 2007 recession. Between 1995 and 2007, investment exceeded the level consistent with a 3.46 percent constant growth rate by about 20 percent to 40 percent. Relative to real GDP, investment measured in real terms rose from 12 percent to record-high levels above 17 percent. Several factors contributed to this period of high investment activity, including the introduction and spread of new information and communication technologies, which raised the productivity and return of investment; the steep decline of the relative cost of investment goods; and the greater supply of funds made available by the larger flow of foreign capital entering the U.S.

Real Gross Domestic Product



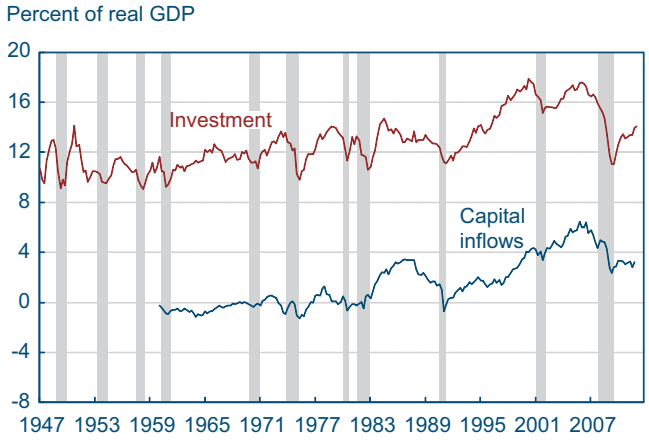
Note: Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis; Blue Chip; Congressional Budget Office.

Real Investment



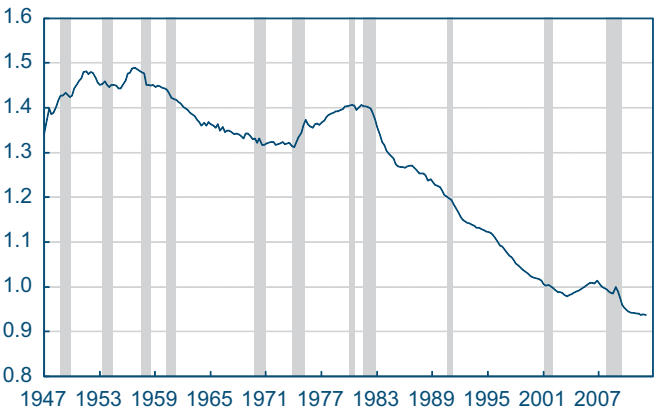
Notes: Trend computed using a 3.46 percent constant growth rate. Shaded bars indicate recessions.
Sources: Bureau of Economic Analysis; authors' calculations.

Investment and Capital Inflows



Notes: Investment is Real Gross Private Domestic Investment. Capital inflows are measured using the deficit of the Current Account. Shaded bars indicate recessions.
Source: Bureau of Economic Analysis.

Ratio of Investment and GDP Price Indexes



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

The higher level of investment had a positive impact on aggregate demand and economic activity. And by deepening the capital stock, it raised labor productivity and economic growth. After averaging 1.6 percent between 1987 and 1995, productivity growth accelerated to 2.6 percent. Of this productivity acceleration, capital deepening was a major contributor, raising the growth of labor productivity by about 0.6 percentage points during 1995–2010 relative to the previous 1987–1995 period.

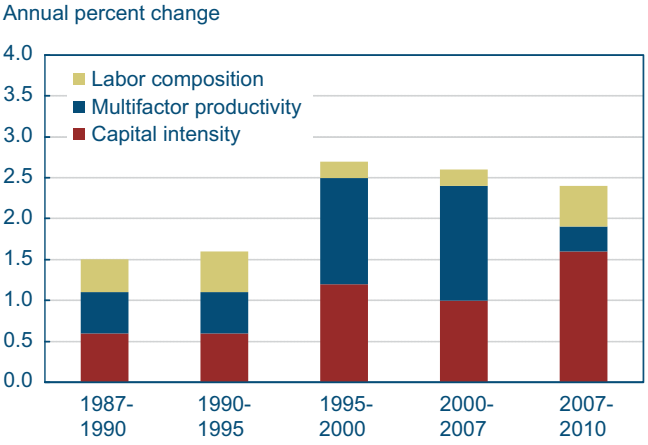
When the 2007 recession hit the economy, investment dropped. Since then, it has recovered, but only partially, and it is still well below its pre-recession peaks. What level of investment activity should we expect going forward?

One reason investment activity is weak is that there is a large overhang of unused and underutilized structures, resulting from past high investment levels, which is depressing investment in residential and nonresidential structures. As the overhang will be absorbed over time, this effect will fade away, and investment will pick up.

However, investment activity is not likely to return to the high levels that it reached during the 1995–2007 period. The current level of investment activity, both relative to its trend and relative to real GDP, is broadly in line with the levels that were typical before the investment acceleration of the 1990s. This suggests that some of the factors that raised investment activity during that period have attenuated, and investment activity has stably returned to lower, more typical levels.

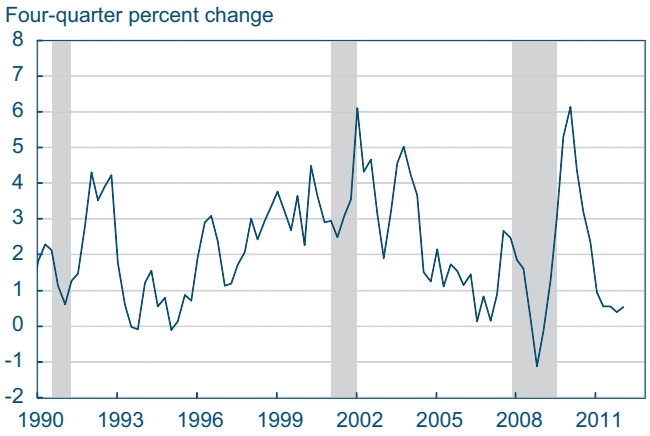
This pattern of investment activity has implications for economic activity and growth. Since a lower investment level weighs on aggregate demand and economic activity, it can partly explain why the forecasted path of real GDP has shifted downward and remains well below any measure of trend that is based on pre-recession levels. It also suggests that the strong contribution of capital deepening to labor productivity growth may weaken over time, leading to a slowdown of labor productivity and economic growth.

Contributions to Productivity Growth in the Nonfarm Business Sector



Source: Bureau of Labor Statistics.

Productivity Growth in the Nonfarm Business Sector



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

Strategically Distressed

05.01.2012
by Yuliya Demyanyk and Matthew Koepke

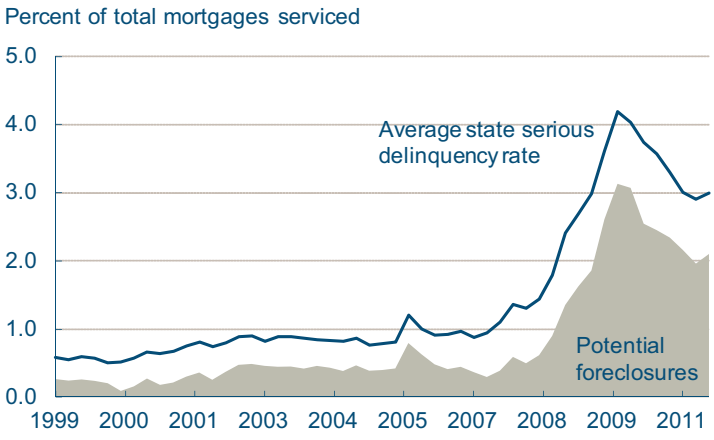
It has been over two-and-a-half years since the National Bureau of Economic Research called an end to the recession that began in late 2007. Nonetheless, the recession's negative effects on the U.S. housing market remain.

One potential headwind facing the housing market is foreclosures. The majority of foreclosures are initiated by banks after a borrower has missed three or more payments, a situation called serious delinquency. Borrowers who are seriously delinquent but who have not yet been foreclosed on may receive a mortgage modification from their bank or continue to live in the home without making payments until the bank forces them out.

Since the recession began in 2007, the percentage of mortgages that may enter foreclosure has ballooned. The rate of potentfial foreclosures can be determined by subtracting the average foreclosure rate from the average serious delinquency rate from the previous period. Data from the Mortgage Bankers Association shows that 2.0 percent of mortgages serviced (900,000 mortgages) may enter foreclosure or need to receive a mortgage modification.

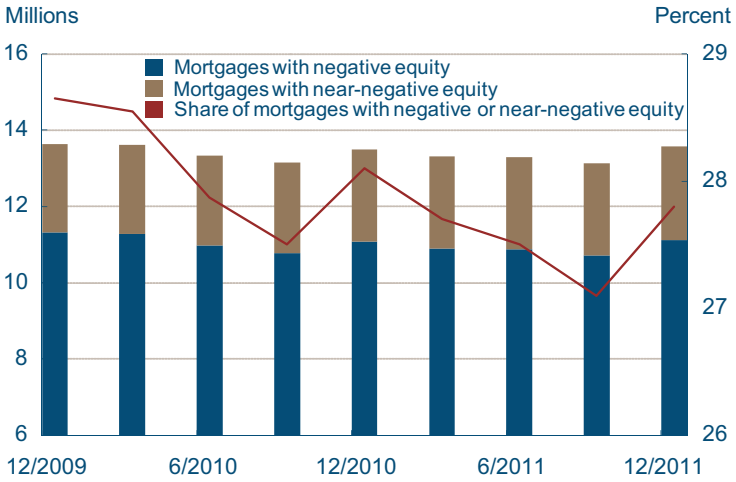
Another potential problem facing the housing market is borrowers who strategically default on their mortgages. Strategic defaults occur when a borrower, who is current his mortgage, defaults because the value of the mortgage is higher than the value of the home. According to an April survey by FICO, 45.5 percent of risk professionals expect strategic defaults to be higher in 2012 compared to 2011. Moreover, nearly half of risk professionals believe that the current generation of home owners does not consider their mortgage to be their most important credit obligation. If risk managers are correct, this attitude would have negative implications for the housing market. According to CoreLogic, the number of home owners with negative equity or near negative equity on their mortgages remains largely unchanged since the height of the

Potential Foreclosures (Average)



Source: Mortgage Bankers Association.

Number of Mortgages with Negative Equity or Near-Negative Equity



Sources: CoreLogic; Bloomberg.

housing crisis in December 2009. Furthermore, after declining for three consecutive quarters, the share of mortgages with negative or near negative equity rose to 27.8 percent, the highest level since December 2010.

According to Inside Mortgage Trends, the possibility of a large wave of strategic defaults has driven the debate as to whether Fannie Mae and Freddie Mac should offer principal write-downs in addition to their current practice of principal forbearance. Principal write-downs would allow mortgage servicers to reduce the principal of the mortgage to a level the homeowner would be more likely to afford. Principal forbearance, on the other hand, postpones principal payments for a period of time, which means the unpaid principal is still a part of the mortgage obligation but it is due to be paid later. There are concerns, however, that allowing principal write-downs could increase the number of strategic defaults, as consumers who are current on their mortgages would become noncurrent in order to obtain a principal write-down.

Interestingly enough, despite the headwinds facing the U.S. housing market, mortgage banking appears to be extremely profitable again. According to the most recent issue of Inside Mortgage Trends, a survey of the eight largest bank-held mortgage operations shows that first-quarter profit in 2012 was over three times the profit recorded in the first quarter of 2011. The increase in profits came despite the fact that mortgage originations fell 1.3 percent to $234.9 billion compared to the fourth quarter of 2011. Given the large levels of borrowers with negative equity and the large number of potential foreclosures, it is difficult to determine if mortgage banking will be as profitable going forward.

Is the Renminbi Challenging the Dollar's Reserve Status?

04.25.2012
by Owen F. Humpage and Margaret Jacobson

Since its inception in 1999, the euro has gained ground against the dollar as an official reserve—a currency that foreign governments hold to facilitate their transactions in foreign-exchange markets. The dollar emerged after World War II with key official reserve status, but persistent trade deficits since 1982, coupled with a broad-based depreciation of the dollar after 2002, encouraged a marked shift out of dollars and into euros.

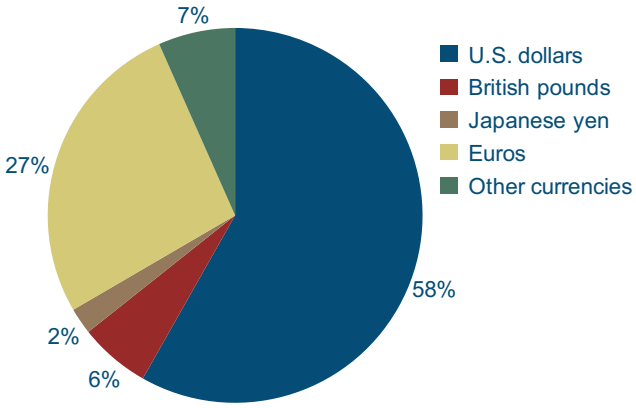
Most of the reshuffling has occurred within the developing countries, which hold particularly large portfolios of foreign-currency reserves. The Great Recession and the European sovereign debt crisis have recently stalled the euro's ascent as the key reserve currency, but not the diversification out of dollars. The intriguing, but unanswered, question is: what currencies are now replacing the dollar, the euro, and the other traditional reserve currencies in these portfolios?

Although it has lost ground, the dollar remains the world's key international reserve currency. At the end of last year, it constituted 58 percent of developing countries' official reserves, according to preliminary IMF data. The euro remained a distant second, at 27 percent of the total, with the British pound and Japanese yen making up 6 percent and 2 percent, respectively. After accounting for all of the traditional reserve currencies, however, the IMF lumped 7 percent of foreign-currency reserves in an "other currencies" category—an eye popping amount. Usually, this "other currencies" category amounts to only 1 percent or 2 percent of the total.

A currency's ranking as an official reserve typically parallels its broader—public and private—use in the foreign-exchange market. Every day, foreign currencies equivalent to roughly $4 trillion change hands. Of these transactions, 84 percent involve U.S. dollars. The euro accounts for slightly less than half of that, even after double counting trades of euros against dollars.

Foreign-Exchange Reserves, 2011

Percent of developing country total



Notes: Data have been adjusted to a constant dollar exchange rate. 2011 is a preliminary calculation.
Sources: IMF COEFER database; authors' calculations.

The sticking power of the dollar as the world's key currency, despite the arrival of competitors, stems from its widely established use. International trade in both standardized commodities and products that sell in highly competitive markets—including many financial instruments—is typically denominated in dollars, because a common currency facilitates price comparisons. In contrast, international trade in heterogeneous manufactured goods, where price competition is less important, tends to be denominated in the exporter's currency. Even so, importers—or their banks—will often acquire an exporter's currency by first trading their home currency for U.S. dollars and then trading dollars for the exporter's currency. The world has found significant cost savings from these arrangements.

The dollar has maintained this role because of the size, sophistication, and relative stability of the U.S. economy. The United States is one of the largest and most broad-based of exporters and importers in the world. With all this trading, a lot of dollars will naturally change hands. As a consequence, foreign traders often finance a large portion of their business in U.S. dollars, so they maintain accounts in dollars, seek loans in dollars, and undertake myriad other financial arrangements in dollars.

A strong, open, and liquid U.S. financial system accommodates their needs. U.S. financial markets have always been innovative and relatively free of cumbersome regulations. They offer many different types of financial instruments and well-developed secondary markets, all of which enhance the liquidity of dollar-denominated assets. The expansion of dollar trade and the growth of U.S. financial markets foster and complement each other.

To be sure, the euro enjoys many of these same attributes, and that is why it is rapidly gaining reserve currency status. Euro area gross domestic product and population are on par with that of the United States, implying a domestic euro market comparable to the domestic dollar market. In addition, euro area trade with the rest of the world last year was slightly larger than U.S. foreign trade. European financial markets are comparable to the U.S.

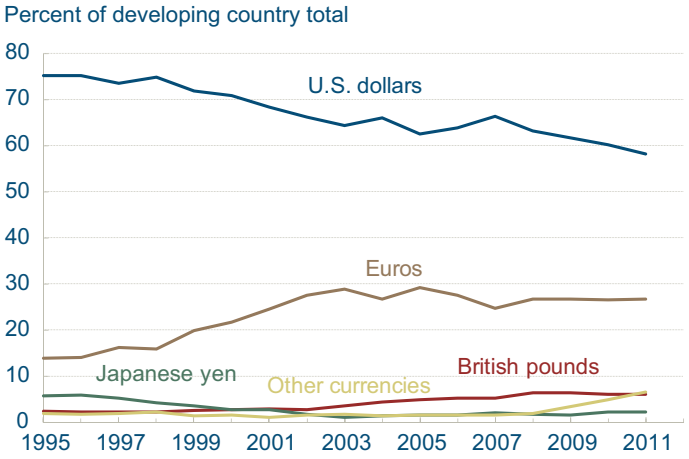
market save the notable lack of a single European government security. Still, a lot of euros naturally change hands.

The dollar's continued dominance owes much to the inertial effects of its network benefits. As more and more people came to use dollars in international commerce over the years—as the global network expanded—the benefits of using the dollar in exchange rose. Moreover, once the network benefits became substantial, people were prone to continue using it, even after a viable competitor—like the euro—existed. Making a jump from the dollar to a new international currency requires a substantial portion of people to switch in close concert; otherwise the network benefits are lost. This does not mean that a competitor, like the euro, will not gain ground on the dollar, but it suggests that the diversification process will probably remain slow.

In 1998, the year before Europe launched the euro, its constituent currencies collectively accounted for 16 percent of developing countries' official foreign currency reserves, compared with 75 percent for the dollar. At the end of 2006, just prior to the Great Recession, the euro and dollar shares had changed to 28 percent and 64 percent, respectively. Since then, the euro share has fallen to 27 percent. The dollar, however, has not benefited from the euro's decline. Its share fell 6 percentage points to 58 percent. A rise in the "other currencies" category gained almost as much as the dollar lost. The IMF does not report the currencies in the category, but the Chinese renminbi seems a likely candidate. China's economy is developing, and the country is important in global trade. The Chinese government would like to promote the use of the renminbi, at least regionally.

Although the dollar has lost ground relative to other currencies in the collective portfolio of developing countries, it has not done so in an absolute sense. Developing countries are not dumping dollars; they held more dollar reserves at the end of 2011 than in any previous year. As their portfolios have been expanding, however, developing countries have been acquiring euros and the mysterious "other currencies" much faster than they have been adding dollars.

Official Foreign-Exchange Reserves



Notes: Data have been adjusted to a constant dollar exchange rate. 2011 is a preliminary calculation.
Sources: IMF COEFER database; authors' calculations.

Where all this is headed is anybody's guess, but it seems clear that the dollar will share its status as key international reserve currency with the euro and, maybe, some other currency.

Labor Markets: Glass Half Empty…Glass Half Empty

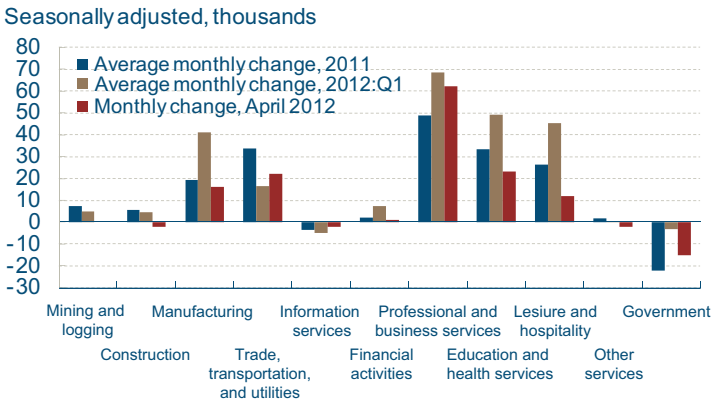
05.08.2012
By Timothy Dunne and Kyle Fee

The April 2012 employment report offered a mixed bag of results. Payroll employment growth was modest, with the economy adding 115,000 jobs in April. The private service sector provided the bulk of the gains in April (+116,000), while the government sector continued to shed employment (–15,000). Since late 2008, state and local government employment has declined by 650,000 or 3.3 percent. The goods sector was mixed, with construction employment essentially holding steady (–2,000) and manufacturing increasing employment by 16,000. Inside the manufacturing sector, gains were led by the fabricated metals, machinery, and transportation industries, which have accounted for most of the rise in manufacturing employment over the last year. On the positive side, February and March were revised up slightly, a total of 53,000 jobs.

Average weekly hours in private industry held steady at 34.5 hours a week, as did average hourly earnings (+one cent). Year-over-year, average hourly earnings in the private sector have risen by a scant 1.8 percent—unadjusted for inflation. Weekly earnings showed a similar increase. On balance, like March's report, April's payroll employment gains were seen as rather tepid—losing some of the momentum observed at the end of 2011 and early 2012.

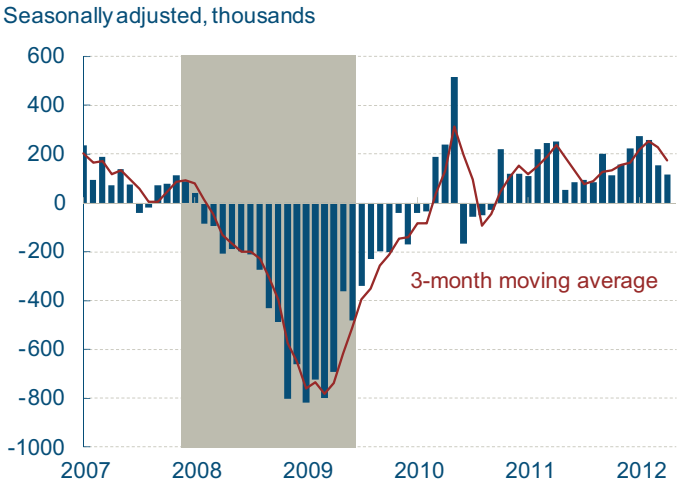
The household survey reflected a mixed picture, as well. The unemployment rate continued to slowly decline, coming in at 8.1 percent for April. On a year-over-year basis, the unemployment rate has come down 0.9 percentage points. However, looking below the headline number, the results were pretty weak. The number of unemployed persons did fall by 173,000, but so did the reported number employed by a similar amount (169,000), and the labor force contracted. Both the employment-population ratio and the labor force participation

Payroll Employment Monthly Change



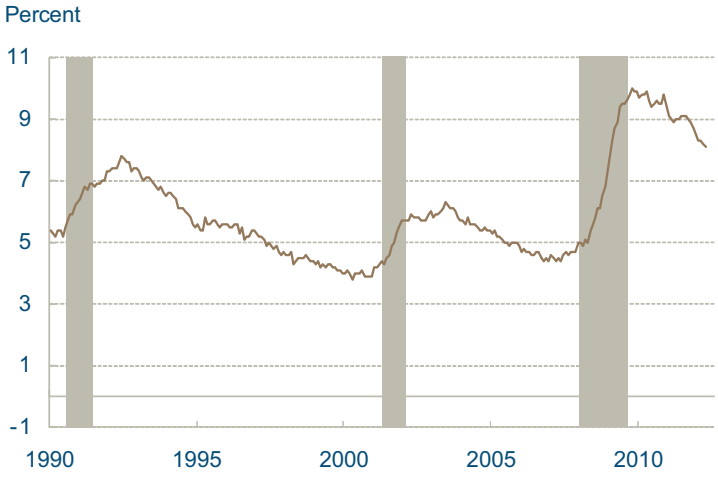
Sources: Bureau of Labor Statistics.

Payroll Employment Monthly Change



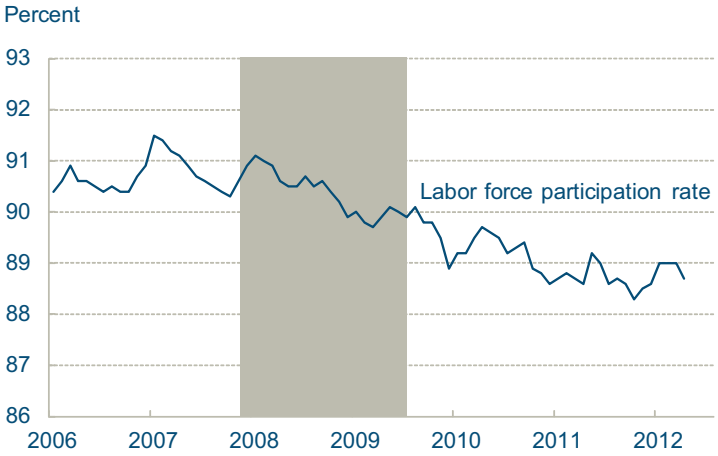
Note: Shaded bar indicates a recession.
Source: Bureau of Labor Statistics.

Unemployment Rate



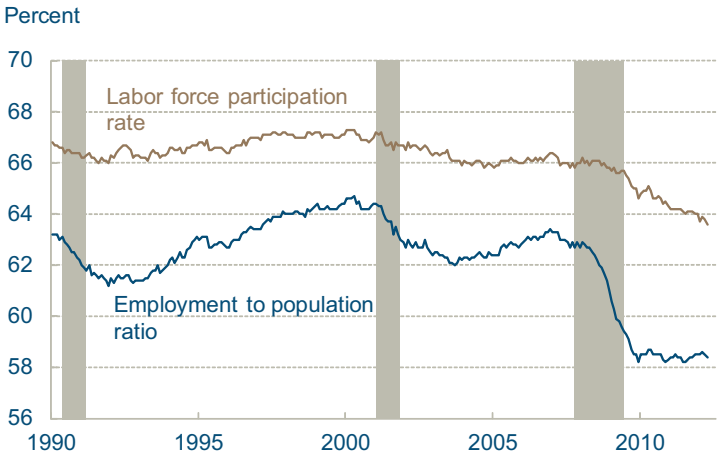
Note: Shaded bars indicate recessions.
Source: Bureau of Labor Statistics.

Other Labor Force Indicators, Males Ages 25-54



Note: Shaded bar indicates a recession.
Source: Bureau of Labor Statistics.

Other Labor Force Indicators



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

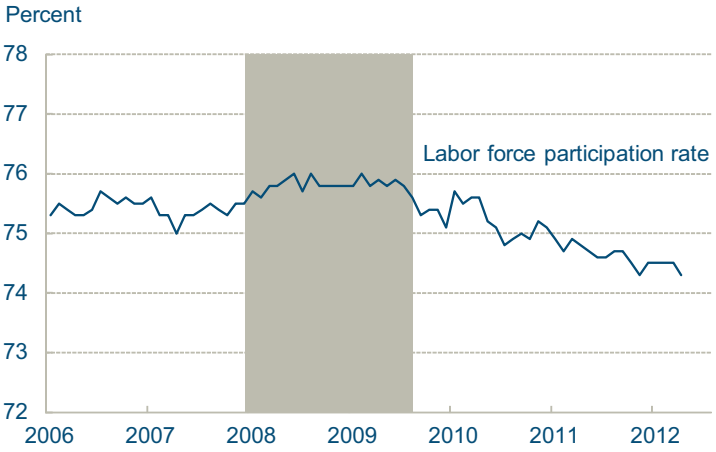
rate shrank in April and now stand at 58.4 percent and 63.6 percent, respectively. These measures of labor utilization are at or near decadal lows.

Over the course of the last four years, the size of the labor force has essentially remained constant, even as the civilian noninstitutional population (16 years and older) has grown by over 9 million individuals. That means that any potential rise in the labor force due to population growth has been completely offset by the decline in the labor force participation rate. Some of the decline in labor force participation has been expected, as the baby-boomer generation moves into the retirement. However, the recent magnitude of the decline is surprising and reflects in part the weak state of the current labor market.

We can see this by looking at the labor force participation rate for prime-age workers, 25 to 54 years old. The labor force participation rate for prime-age workers should be less sensitive to schooling and retirement decisions, which often affect the labor force participation rates of younger and older cohorts. Even for males aged 25-54, we saw steady declines in participation rates not only during the recession, but also during the recovery. A recent Chicago Fed Letter by Daniel Aaronson, Jonathan Davis, Luojia Hu reports that only one-quarter of the decline in labor force participation rates in the period from 2008 to 2011 can be explained by demographic factors.

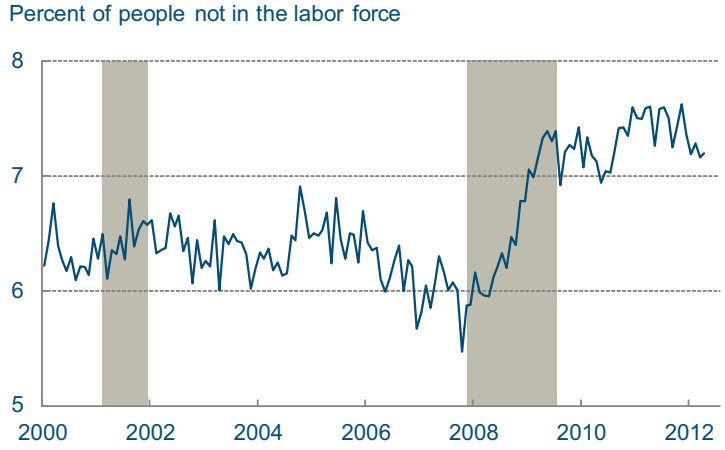
We can get a sense of how unexpected the recent path of the labor force participation rate was by comparing it to recent projections by the Bureau of Labor Statistics (BLS) and the Congressional Budget Office (CBO). In January of 2012, the BLS projected that the labor force participation rate would decline from 64.7 percent in 2010 to 62.5 percent in 2020—a decrease of 2.2 percentage points over 10 years. Less than two years into the projection, labor force participation has already fallen by half of the projected amount—1.1 percentage points. The CBO provides annual projections from 2011 through 2021. For 2012, the CBO projected the labor force participation rate would be 64.6—a full percentage point above the current rate. Moreover, the CBO did not expect the

Other Labor Force Indicators, Females Ages 25-54



Note: Shaded bar indicates a recession.
Source: Bureau of Labor Statistics.

Not in Labor Force: "Currently Want a Job"



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

labor participation rate to reach its current level of 63.6 percent until 2017, and the CBO's projections do incorporate business cycle conditions.

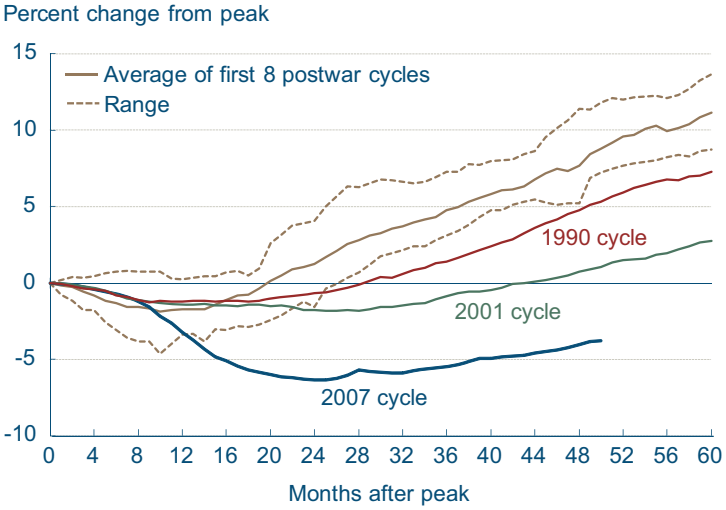
Each of these projections shows that the current labor force participation rate is well below the trend rate predicted from these official agency models, and it is likely the case that cyclical factors continue to play an important role in explaining the gap. In fact, a recent Kansas City Fed Economic Review article by Willem Van Zandweghe estimates that cyclical factors explain about a half of the decline in the labor force participation rate between 2007 and 2011. This suggests that if the economy improved, individuals that are not in the labor force (not counted in the unemployed) would re-enter the workforce—putting some upward pressure on unemployment rates, but also expanding the labor force.

And there is evidence that the number of individuals not in the labor force but available for work has increased. The Bureau of Labor of Statistics estimates that the number of individuals who are not in the labor force but want a job is roughly 6.3 million or 7.2 percent of the total number of people not in the labor force. This is up by roughly 1.5 million from before the recession. Still, the pace of economic growth will need to accelerate from the first quarter's rate of 2.2 percent in order to generate the rise in labor demand needed to induce more individuals to re-enter the workforce.

Slow Employment Recoveries, Monetary Policy, and Expected Inflation

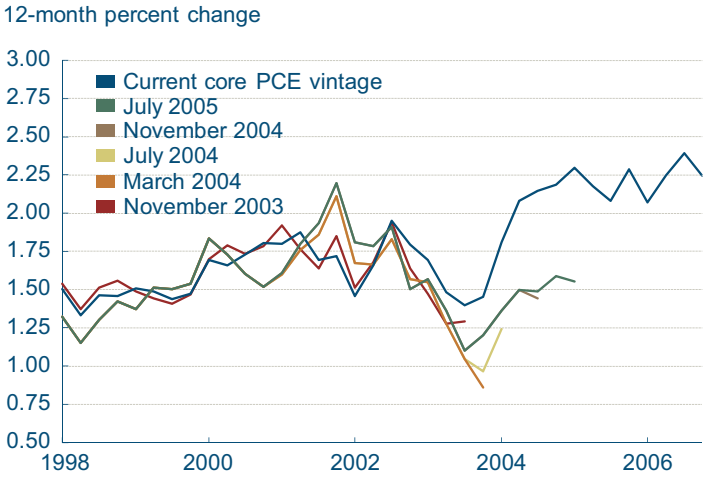
04.25.2012
by John B. Carlson and John Lindner

Postwar Payroll Employment Cycles



Source: Bureau of Labor Statistics.

Core PCE Vintages



Source: Bureau of Labor Statistics.

Since the early 1990s, employment growth has been persistently slow coming out of recessions. This phenomenon, often described as a "jobless" recovery, has become increasingly severe over the past two decades, posing new challenges for monetary policy. Achieving maximum employment, along with price stability, is one of the two policy objectives mandated by Congress for the Federal Reserve.

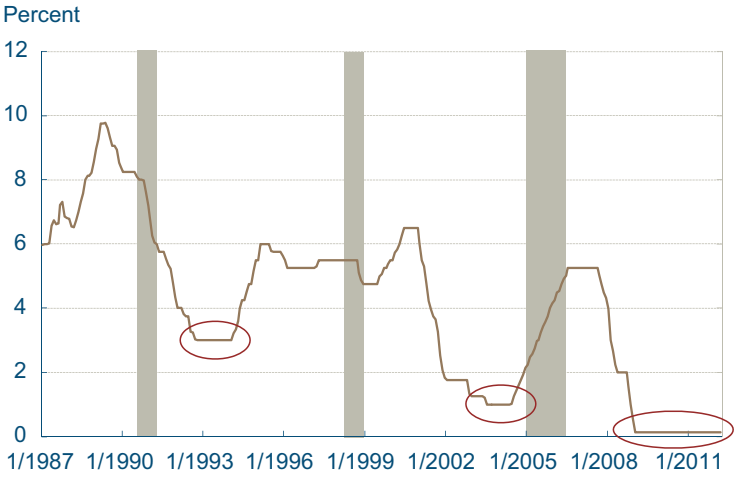
Not surprisingly, the jobless recovery phenomenon has prompted somewhat unprecedented interest rate policies from the Fed. These policies have been characterized by long periods of constant and increasingly lower levels of the federal funds rate following each of the last three recessions.

Each of the low-interest-rate periods has posed unique challenges for the communication of policy actions, especially at the onset of policy tightening. It is useful to review some key attributes that characterize the three policy episodes.

Just prior to and following the previous three recessions, the Fed aggressively lowered interest rates and held the fed funds rate at a low level for a period of several months. The recession in 1990-1991 induced a decline in the fed funds rate from over 9 percent to 3 percent, where it remained for 17 months. That stretch of 3 percent interest rates came to a sudden end in February 1994, when market participants were surprised by 50 basis point increase in the fed funds rate. Bond prices fell sharply after investors failed to anticipate the Fed's series of policy firming moves, which were deemed necessary to contain inflationary pressures.

During and after the 2001 recession, the Fed also reduced the fed funds rate significantly, this time from 6.5 percent to 1 percent. The 1 percent interest rate was held for an entire year. Given the surprise the markets experienced in 1994, the Federal Open Market Committee (FOMC) introduced forward-looking language in its policy statements

Target Federal Funds Rate



Note: Shaded bars indicate recessions.
Source: Federal Reserve Board.

prior to the first firming move to reduce the potential for a disorderly surprise.

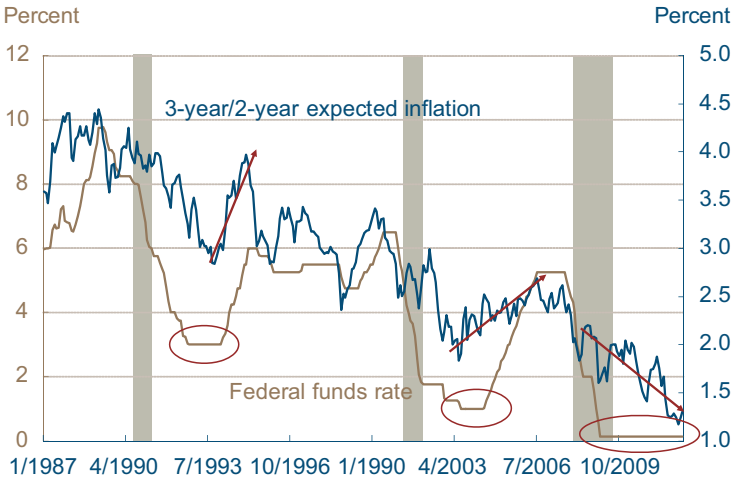
Many analysts have criticized the FOMC for keeping interest rates too low for too long during this episode. One factor that misled policymakers during this period was the FOMC's preferred measure of underlying inflation. The Fed had adopted the core PCE as its key measure of inflation, but estimates of PCE inflation are subject to revisions, and in this case the revisions were quite substantial. As a result, the FOMC was gauging its policy actions on measures that suggested inflation rates were lower and falling faster than the subsequently revised numbers now indicate. Perhaps had policy firming been initiated sooner, the housing market bubble would have been less severe and less damaging to the economy.

The most recent policy episode has been the most extreme of the three, reflecting the worst recession since the Great Depression. As a consequence, the fed funds rate was reduced to almost 0 percent in December 2008 and has been held there since. What is unique about this recent experience is that policy easing was constrained by the zero lower bound. To address this constraint, the FOMC adopted several innovative policies, including the large-scale asset purchase program (LSAP). This is uncharted territory, however, leaving many policy analysts concerned that policy will be too accommodative for too long. Today's policy announcement suggests that current policy is expected to persist until late 2014.

Clearly on the employment side, employment growth remains subpar and justifies continuation of the accommodative policy stance. On the inflation front, however, some policy analysts are concerned that the recent sharp rise in oil prices, in conjunction with the accommodative policy stance, could lead to a potentially sharp increase in inflation down the road.

One particularly policy-relevant indicator developed at the Cleveland Fed is the 3-year, 2-year forward expected inflation rate. This measure looks two years ahead and estimates what the average annual inflation rate is expected to be over the subse-

Target Federal Funds Rate and Expected Inflation



Note: Shaded bars indicate recessions.
Sources: Federal Reserve Board; Federal Reserve Bank of Cleveland.

quent three years. For example, the 3-year, 2-year forward expected inflation rate for April 2012 estimates the average annual inflation rate from April 2014 to April 2017. This indicator is relevant to policy for two reasons. First, monetary policy actions are known to operate on inflation with a lag of roughly two years. Second, the inflation goal of the FOMC is meant to be achieved over the long-run, so inflation should be examined over a period of time longer than one year.

Examining the 3-year, 2-year forward expected inflation rate and the federal funds rate together, one can see a very rough relationship between the two measures. This co-movement should not be surprising, as mandate-consistent monetary policy would imply that deviations in inflation expectations from the inflation goal would require corrective policy actions.

The increase in expected inflation that started in 1994 was accompanied by a similarly large increase in the fed funds rate. This was also true of the rate increases that began in 2004. In both cases, the increase in the fed funds rate was preceded by the increase in inflation expectations as well. This suggests that the federal funds rate increases that began in 1994 and 2004 were as least partly justified by this inflation indicator. Currently, one can clearly see that the trend in the policy-relevant inflation expectation measure continues to decline well after the recession. The expected inflation series seems to see oil-induced inflationary pressures as temporary, and further suggests that current policy does not pose a threat of an imminent acceleration in inflation.

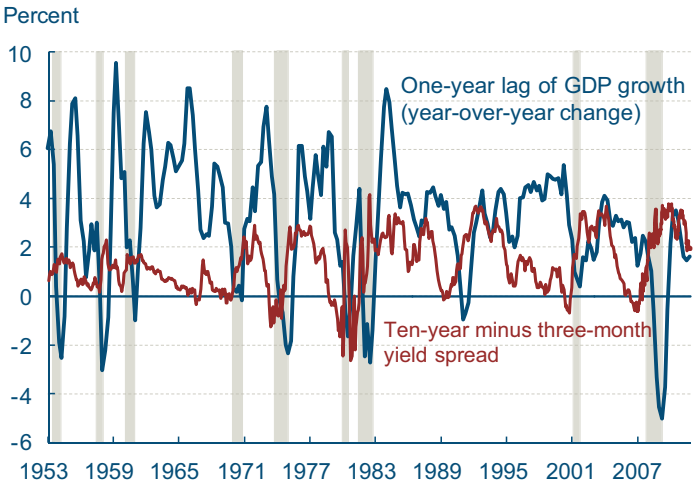
Yield Curve and Predicted GDP Growth, April 2012

Covering March 24, 2012–April 25, 2012
by Joseph G. Haubrich and Patricia Waiwood

Highlights

	March	February	January
3-month Treasury bill rate (percent)	0.08	0.09	0.11
10-year Treasury bond rate (percent)	2.00	2.21	1.97
Yield curve slope (basis points)	192	212	186
Prediction for GDP growth (percent)	0.7	0.7	0.7
Probability of recession in 1 year (percent)	6.4	6.5	6.9

Yield Curve Spread and Real GDP Growth



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

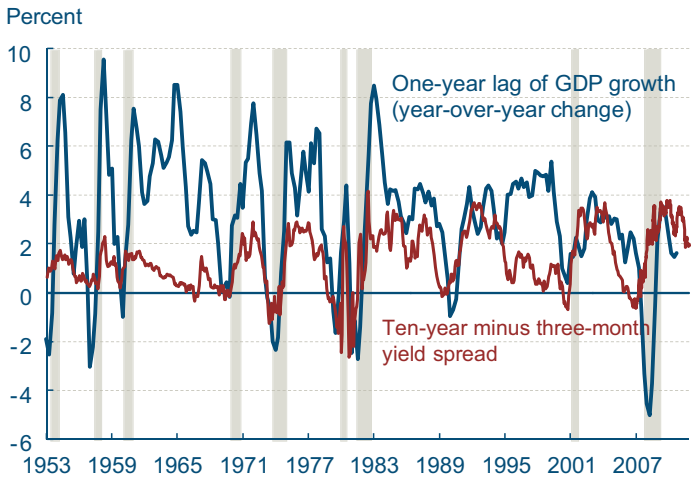
Overview of the Latest Yield Curve Figures

Over the past month, the yield curve has flattened, as short rates stayed even and long rates fell. The three-month Treasury bill dropped to 0.08 percent (for the week ending April 20), just down from the March number of 0.09 percent, itself a slight drop from February's 0.11 percent. The ten-year rate barely avoided dropping back below 2 percent, coming in at an even 2.00 percent, a fair drop from March's 2.21 percent, and still a little above February's 1.97 percent. The twist dropped the slope to 192 basis points, a full 20 basis points below March's 212 basis points, but still above February's 186 basis points.

The steeper slope was not enough to cause 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 0.7 percent rate over the next year, equal to the past two months. The strong influence of the recent recession is leading toward 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.

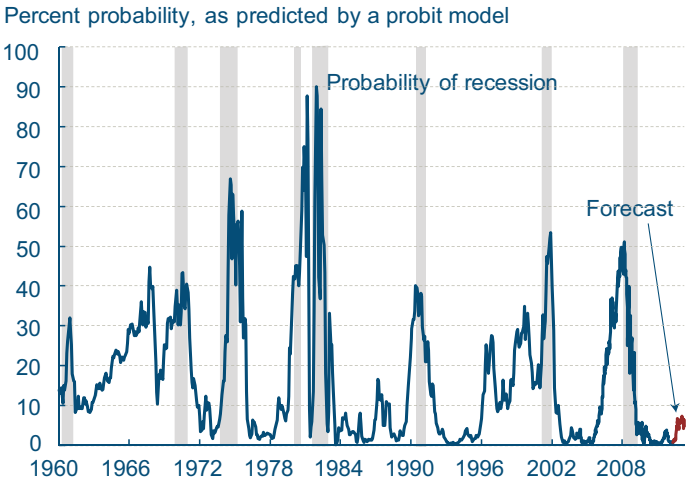
The flatter slope wasn't such good news on the recession front, however. Using the yield curve to predict whether or not the economy will be in recession in the future, we estimate that the expected chance of the economy being in a recession next April is 6.4 percent, up from March's 5.0 percent, but down from February's 6.9 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 Spread and Lagged Real GDP Growth



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

Recession Probability from Yield Curve



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

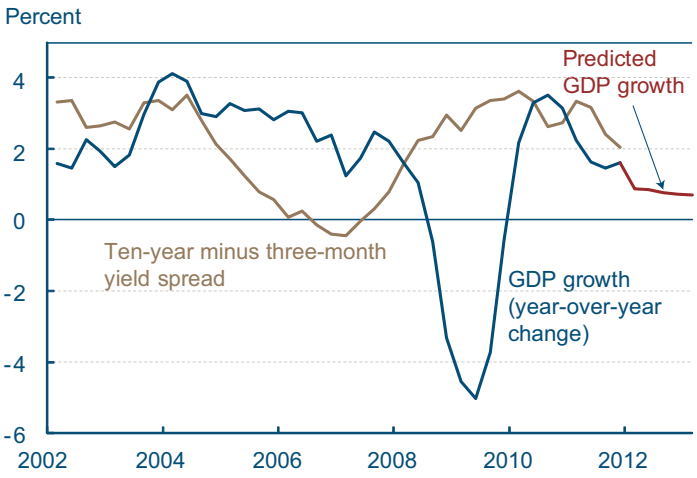
We use past values of the yield spread and GDP growth to project what real GDP will be in the future. We typically calculate and post the prediction for real GDP growth one year forward.

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 Predicted GDP Growth



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

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.

Regional Differences in Household Income

05.01.2012
by Nelson Oliver and Stephan Whitaker

Statistics on the distribution of personal income by region can be helpful context for thinking about many important questions. Can lower labor costs help the Southern states to lure corporate operations? Do the higher salaries of the Northeast and West attract Midwestern college graduates? Does everyone in the Northeast benefit from its concentrations of finance and government employment? Has immigration pulled down wages in the West?

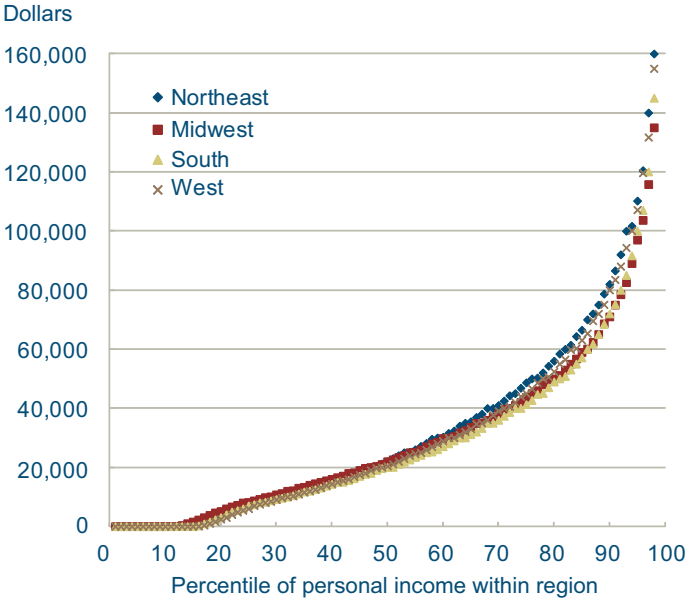
Our analysis of recent Current Population Survey (CPS) data finds that differences in personal income are actually quite small between regions. If we account for important determinants of income, such as education and age, the differences shrink further. We also find little evidence that gaps have increased over the past decade.

As a first look at the regional distribution of personal income, we ranked the CPS respondents within each region by their total personal income, from low to high. We then divided each regional sample into one hundred equal groups. (The dollar figures in the charts below represent the incomes of individuals at the bounds between the groups, and they are referred to as percentiles.) When plotting these values, the regions appear remarkably similar. We do not see masses of people in any region with significantly higher or lower wages compared to similarly ranked people in other regions.

The highest income plotted in the chart may seem surprisingly low, given all the attention paid to rising inequality. However, the very top-ranking incomes are not shown here. The highest incomes in the CPS are not released, for confidentiality reasons. Also, we exclude the 99th percentiles ($173,000 to $218,000) because they distort the scale and obscure the differences in the rest of distribution.

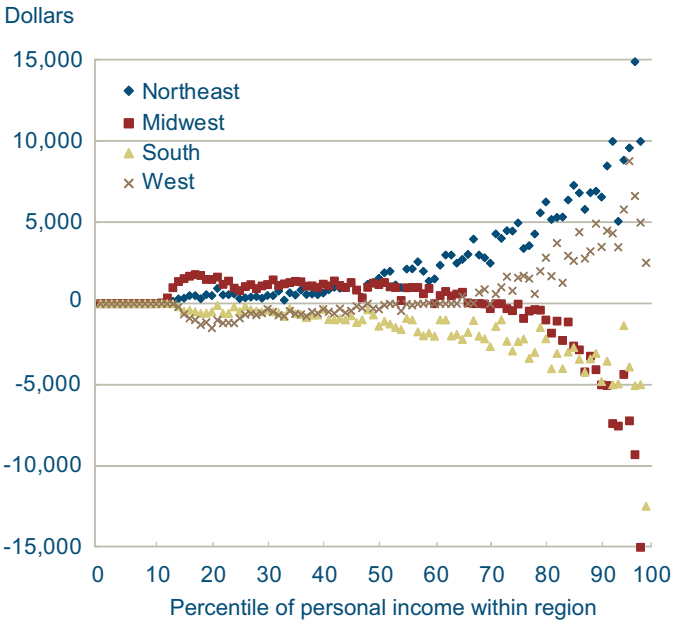
Next we subtracted off the equivalent nationwide dollar figure for each percentile. After this change, the distance on the graph between a high marker

Personal Income



Source: Current Population Survey, March 2011.

Personal Income Differences between Regions and the Nation



Source: Current Population Survey, March 2011.

Descriptive Statistics of U.S. Regions

	Percent of region's population			
	Northeast	Midwest	South	West
Age (average 15+)	45.25	44.99	44.64	43.94
Female	51.78	51/33	51/59	50.31
No degree	16.17	15.59	18.93	19.17
High school	30.24	31.66	29.35	24.5
Some college	23.54	28.26	26.81	29.05
Bachelor's degree	18.83	16.35	16.3	18.14
Graduate degree	11.22	8.14	8.62	9.13
Agriculture and mining	5.09	6.3	6.55	6.9
Manufacturing	4.3	7.23	4.37	4.8
Transportation and retail	9.13	9.55	9.08	8.78
Finance, insurance, and real estate	12.8	12.51	12.24	12
Services	6.96	6.22	7.07	7.91
Government	24.58	22.95	22.43	22.55
Not in the labor force	37.14	35.24	38.27	37.06

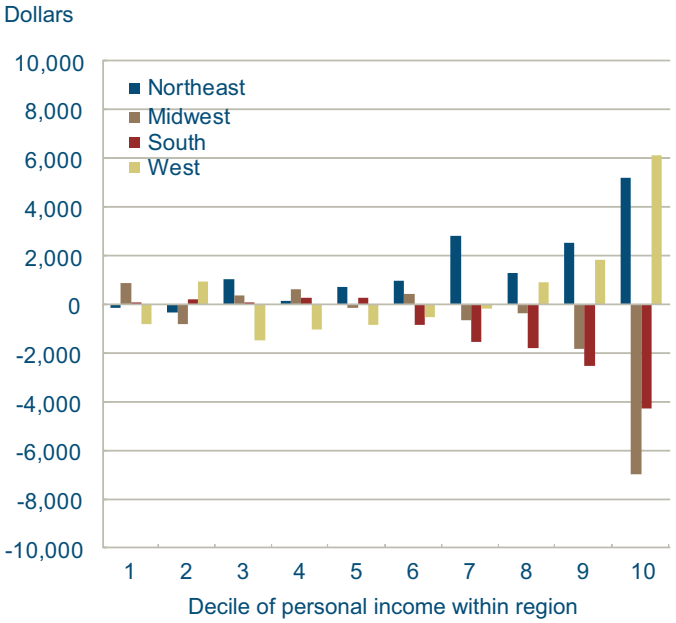
Source: Authors' calculations using March 2011 CPS.

for one region and a low marker for another region indicates how much higher an equally ranked person's income is in the higher region. The scale is in dollars, and the gaps for low-income people are small in these terms—just a few hundred dollars. In the upper half of the distribution, the gaps increase to $10,000. Only at the 95th percentile and above, where personal incomes are over $100,000, do we observe regional differences larger than $10,000. In percentage terms, the relatively high regional values are almost never beyond 112 percent of the national figure, and the lower values are rarely below 90 percent of the national figure. For the bottom half of the distribution, incomes in the Midwest are slightly higher. In the top half of the distribution, incomes are higher in the Northeast and lower in the South.

What could explain the differences that do exist between regions? Among other things, they could reflect differences in education levels, industry mix, and the age of residents. Below we summarize the differences between the regions on several measures in the CPS that relate to personal income. The Northeast and West both have higher percentages of adults holding undergraduate and graduate degrees. The Midwest has more adults working in manufacturing, while the Northeast has a smaller share employed in agriculture and a larger share in government. The South's share of adults not in the workforce is 3 points higher than the Midwest's figure. This measure includes retirees, discouraged workers, students, etc.

When we use these statistics, along with measures of race and occupation, we can explain about 42 percent of the variation in personal income. We plot the unexplained differences between people at each level of the personal income ranking in the chart below (these data points are highly variable, so we gathered them into 10 deciles to reveal their pattern). Comparing this to the second chart above, we can see that the range is narrower because individuals' characteristics have explained much of the differences in their incomes. Remarkably, in the lower half of the distributions, there appears to be little or no difference between observationally similar people in different regions. In the higher percentiles, which will include many professionals in law,

Income Differences After Controlling for Personal Characteristics



Note: Figures represent regional differences in personal income that remain after controlling for age, gender, race, education, industry and occupation at the individual level.
Source: Current Population Survey, March 2011.

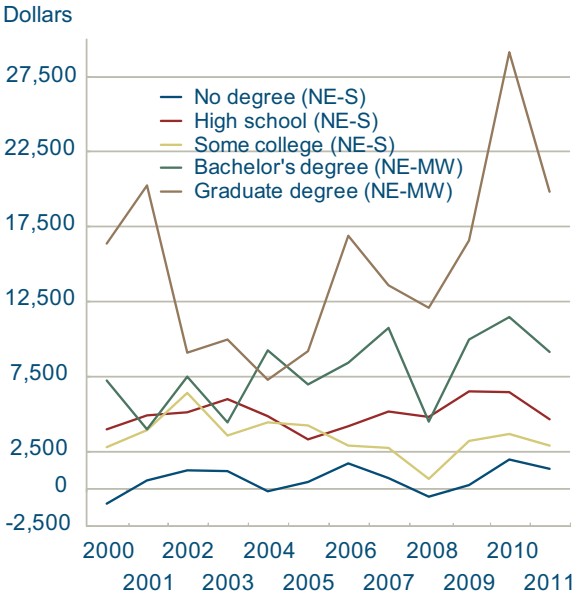
medicine, and finance, there are still only modest income advantages (less than $14,000) from living in the Northeast or West. For individuals at the top of the income rankings, personal characteristics do not explain as much of their incomes. The large regional differences in the top tenth decile cannot be explained away by differences in education or occupation.

Economic theory suggests that regional differences in income should be small because workers would migrate from one region to another if the differences were large. The lower supply in the sending region would increase wages, and the higher supply in the receiving region would lower wages until the wages equalized. Employers might also migrate with the same equalizing effect.

Wage differences may persist if income has to offset inequality in housing costs, taxes, and other cost-of-living differences. Consider the difference between purchasing a median-priced home in the South ($144,200 in 2011) versus the Northeast ($237,500) with a standard mortgage (30-year fixed, 20 percent down, 5 percent interest). The payment on the median home in the South is $619, while it is $1020 in the Northeast. This sums to $4,800 annually. Per capita taxes also differ. In Tennessee and South Carolina, state and local taxes are around $2,800 per person, while Connecticut and New Jersey governments collect over $5,800 per person. Cost-of-living differences could absorb the regional differences in income for many people.

What has been presented so far are 2011 data that reflect the recent slow recovery. Perhaps the gaps widen when the economy is growing quickly, or when some regions are growing faster than others. To look at time trends, we opted to focus on the largest gaps. Within each education category, the regional income differences are largest in the upper portion of the distribution. We calculated the gaps for individuals between the 75th and 95th percentiles. For people without a college degree, the largest gaps are between the Northeast and South. For people with college degrees, the largest gaps are between the Northeast and Midwest. We plot these differences over the last 12 years. The earnings gap between high income (75th-95th percentile) gradu-

Trends in the Largest Regional Differences in Personal Income



Notes: Figures represent regional differences calculated using personal income averaged over the 75th to 95th percentiles, within the education category. Dollars adjusted for inflation using the CPI.
Source: Current Population Survey, March 2000–2011.

ate degree holders in the Northeast and Midwest appears to have been smaller during the mid-decade expansion. The other four series do not display a recognizable difference between years of growth and years of recession. There might be up or down drifts, but these trends are small relative to the year-to-year variation, which prevents us from identifying them definitively.

Having looked at the data, we may be less concerned about the questions mentioned at the beginning. Interregional income differences appear to be modest, which is consistent with competitive national labor markets. After controlling for observable characteristics, such as education and occupation, only differences of $10,000 or less remain for 95 percent of working-age adults. Gaps large enough to overcome cost-of-living differences are found mostly in the top 10 percent of the distributions.

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