

# Economic Trends

April 2012 (March 8, 2012-April 10, 2012)

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## New York Fed Breaks Up with Maiden II

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04.03.2012

by Mahmoud Elamin and William Bednar

Back when the financial crisis was in full swing, a number of simultaneously exploding problems struck at AIG (American International Group). The Fed's response was swift and varied. One particular response was Maiden Lane II, created to deal with problems in AIG's securities-lending program.

AIG is a big conglomerate comprised mainly of insurance companies. The trouble started in some of these insurance subsidiaries. Insurers collect premiums from customers to insure them against some adverse event. The premiums are generally invested in securities that the insurer buys and holds in its portfolio. Instead of holding the securities, AIG's insurance subsidiaries had lent some of them out using repurchase agreements (repos). Under the repos, the securities were lent out for cash, and AIG was obligated to repurchase them at some specified point in the future. The cash collected from repos was then invested in "safe" AAA residential subprime mortgage-backed securities (RMBS). Effectively, investors lent cash to AIG with the securities acting as collateral.

After market participants started to suspect that AAA was not AAA after all, and after AIG's own rating was downgraded, lenders demanded more collateral to cover their cash lending. AIG had two choices: come up with more collateral or sell the RMBS and return the cash to the lenders. Neither choice turned out to be possible. The AAA RMBS were losing value and proved illiquid, and AIG had problems trying to borrow money in the capital markets. At this stage a severe liquidity crunch ensued.

The New York Fed's first action was to lend AIG subsidiaries \$20 billion in cash, with RMBS serving as collateral. Under this arrangement, AIG still owned the securities and was subject to the effects of their possible losses on its balance sheet. The New York Fed was merely an AIG creditor. This arrangement did not prove potent enough to contain the problems.

In November 2008, two new special purpose vehicles (SPVs), Maiden Lane II LLC and Maiden Lane III LLC, were created to address the capital and liquidity pressures on AIG. The SPVs gave AIG more time and greater flexibility to sell assets and repay the government loans. Maiden Lane II was designed to deal with the securities-lending portfolio of AIG’s insurance subsidiaries. Instead of loaning AIG money with the RMBS acting as collateral, the New York Fed now bought the RMBS outright. It purchased approximately \$39.3 billion in face value of RMBS with a \$19.5 billion loan to the SPV. AIG deferred the receipt of \$1 billion of the sale price till after the Fed was paid back in full. The American public was on the hook if losses surmounted the \$1 billion mark.

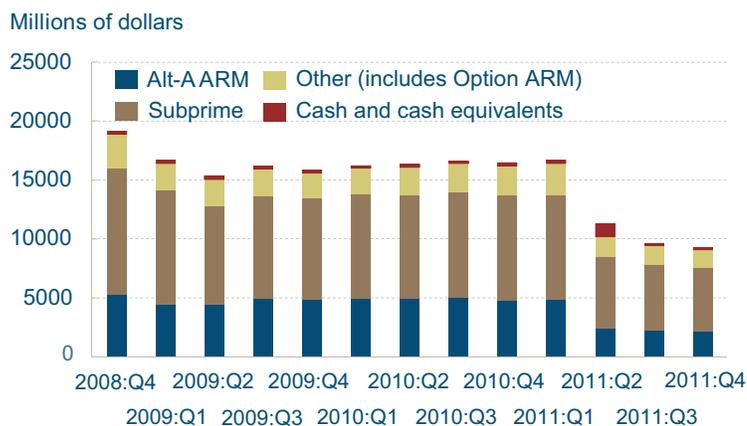
As it happened, the last securities in Maiden Lane II were sold off at the end of February 2012, and the American public ended up benefiting to the tune of \$2.8 billion. The fact that the American public did not end up with a loss does not address the question of whether the return was a good risk-adjusted return on the New York Fed’s investment.

Maiden Lane II’s portfolio consisted mainly of high-risk RMBS. Initially, 57 percent of the total asset value was collateralized by subprime mortgages, 28 percent of the portfolio by Alt-A ARMs, and 15 percent by other types of loans, including option ARMs. Without going into many details, we just mention here that “toxic” is the prevalent adjective for these kinds of loans. The composition of the portfolio stayed relatively stable up to the time that Maiden Lane II was unwound.

California and Florida mortgages initially made up more than 45 percent of the loan balances underlying the RMBS in the portfolio. California mortgages made up the largest fraction at over 30 percent. Over the time that the assets were held, the geographic distribution of the loans remained relatively stable. Roughly, loans from California made up around 30 percent, Florida around 13 percent, and New York about 6 percent.

The ratings of the securities held in Maiden Lane II experienced fast and deep deterioration. At the time they were purchased from AIG in the last quarter of 2008, 40 percent of the securities (based on market

## Maiden Lane II Holdings by Type (Fair Value)



Source: Federal Reserve Bank of New York.

## Percentage of Remaining Loan Balances by Geographic Location

	As of 12/31/2008	As of 12/31/2009	As of 12/31/2010	As of 12/31/2011
California	32.5	30.7	30.0	28.6
Florida	12.6	13.0	12.8	13.1
New York	N/A	5.9	5.5	6.3
Other	54.9	50.8	51.3	50.2

Note: New York was included in the "Other" category in 2008 because it made up less than 5 percent of the total.

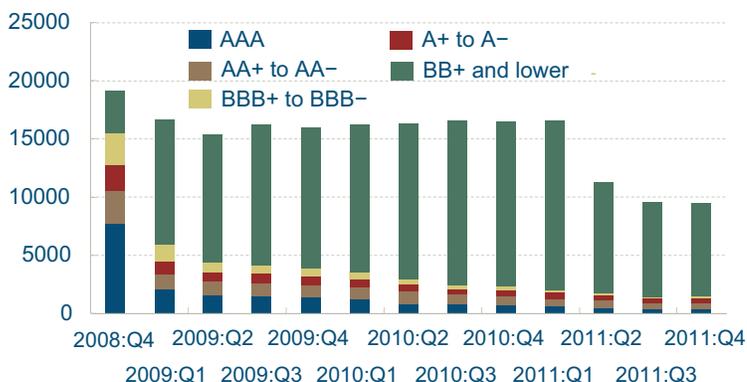
Source: Federal Reserve Bank of New York.

value) were still rated AAA, 15 percent were rated between AA+ and AA-, and only about 19 percent were rated BB+ or lower. After only three months, just 13 percent were rated AAA. The percentage rated BB+ or lower jumped to 64 percent. By the end of 2010, prior to any sales being made from the portfolio, 86 percent of the portfolio was rated BB+ or lower, and only about 5 percent was still rated AAA.

Maiden Lane II's securities were typically bought and sold at only a fraction of their face value. The face value is the principal balance remaining on the underlying loan pools. Originally, the portfolio's face value was about \$39.3 billion. The face value decreased over time for three reasons: monthly mortgage payments (only the principal part of the payment affects face value, not the interest part), mortgage defaults, and security sales by the Fed. The face value declined steadily from the time of purchase up to the first round of sales in 2011. The first large drop-off was in April 2011 and reflected both mortgage payments and security sales. The second large drop-off was at the start of 2012 and reflected the second round of sales

## Maiden Lane II Holdings by Rating (Fair Value)

Millions of dollars

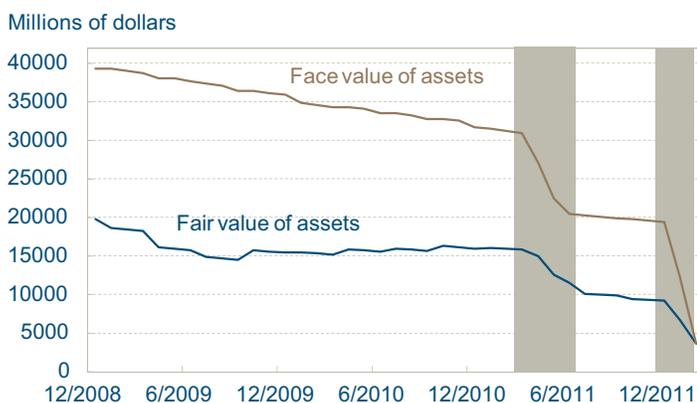


Source: Federal Reserve Bank of New York.

The fair value of Maiden Lane II's assets is tricky to calculate. Its RMBS were not traded liquidly, so there are no ready market prices for them. Fair value calculations would definitely include subjective assumptions about market participants' behavior were they to actually buy them. Nonetheless, Maiden Lane II periodically reported its estimated fair value. The fair value appeared to drop initially but remained relatively steady, increasing slightly up to the first security sale in April 2011. The face value was decreasing during that time period, implying an increasing fair value estimate.

We next plot the ratio of fair value to face value. The ratio gives us the fair value of \$1 of assets of Maiden Lane II. An increase in this ratio means the securities become more valuable and the New York Fed's loan to Maiden Lane II becomes safer. The ratio initially dropped off just after the purchase until about the end of 2009. This drop shows that the drop in fair value exceeded the drop in face value over that time period. Then, the ratio increased steadily from about October 2009 until about June

## Face and Fair Value of Maiden Lane II's Assets



Note: Shaded bars represent periods during which securities were being sold.  
Sources: Federal Reserve Board, Federal Reserve Bank of New York.

## Ratio of Fair Value to Face Value



Note: Shaded bars represent periods during which securities were being sold.  
Sources: Federal Reserve Board, Federal Reserve Bank of New York.

2011, around when the first period of sales was ending. The increase was caused by a steady fair value, coupled with a decreasing face value. The first sale period started with a spike in the ratio. The sale seems to have caused downward pressure on the ratio by negatively impacting “market prices.” The second sale occurred after another spike in this ratio, but this time the New York Fed was able to dispose of these securities without significant market disruption.

Since the fair value computation is fairly idiosyncratic and depends on assumptions not fully observable in the market, we constructed a market-based measure that tracks the value of Maiden Lane II’s portfolio. This construction serves two purposes. First, it allows us to check if the assumptions used to calculate the fair value are truly reflected in actual market transactions. Second, it allows us to see if there were any market disruptions around the time the securities were sold by the New York Fed.

We used the ABX.HE indexes published by Markit. These indexes measure the prices of credit default swaps (CDS) on subprime mortgage-backed securities. Although the indexes do not directly measure the prices of the securities, they are still commonly used to evaluate the value of RBMS. A CDS is basically “insurance” against the default of a security. So an issuer of a CDS is practically betting that the security will not default, similar to actually buying the security itself. The buyer of a CDS, on the other hand, is protected by the seller against the security’s default. A rise in the index is a drop in the cost of this “insurance,” and it implies a market perception of less risky securities. Therefore, a rise in the index is correlated with a rise in the price of the security.

Each of these indexes tracks the CDS prices for a bunch of similarly rated RMBS issued in a specific six-month period. For example, the ABX.HE AAA-07-02 index tracks CDS prices for RMBS issued in the first six months of 2007 that had a rating of AAA at issuance. Since the Maiden Lane II securities were issued in several different six-month periods, not one of these indexes is a good representation of the whole portfolio. Based on the face value of the portfolio as of 10/31/2010,

approximately 30 percent of the portfolio's assets were issued during the first half of 2007, 28 percent in the second half of 2006, 21 percent in the first half of 2006, and the remaining fraction from other six-month intervals. The chart below is an index of the weighted average price from the various ABX indexes based on those calculated percentages.

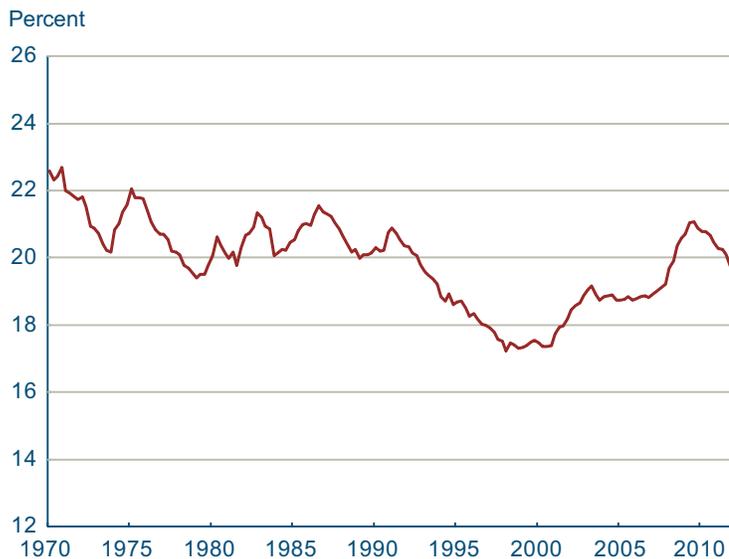
This index followed a similar pattern to the ratio of the fair value to face value, confirming that the fair value assumptions appear to be shared by market participants. There was an initial drop in the value of these securities in the months immediately following the purchase. Then the value steadily increased until the first round of sales, then it dropped off immediately after, and finally it increased again during the last round of sales. This shows that the fair value of Maiden Lane II securities appreciated above the initial purchase value. It also shows that there was a drop in the value of the securities around the first round of sales and no significant downward disruption during the second round of sales this year.

# The Shrinking Government Sector

03.20.2012

by Daniel Carroll

## Government Expenditures as a Fraction of GDP

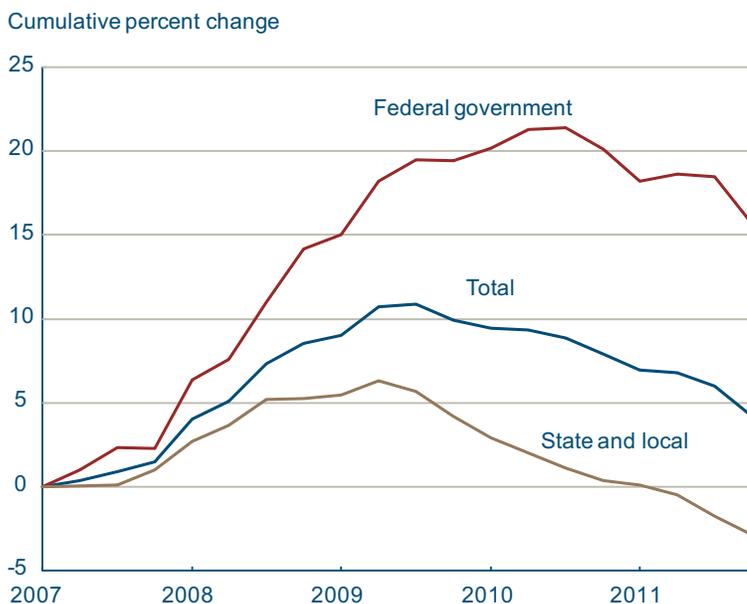


Sources: Bureau of Economic Analysis; Haver Analytics.

The run-up in government expenditures during the recent financial crisis has led some to believe that growth in the government sector is far outpacing the economy. Over the past five years, the government-to-GDP ratio has averaged 20.2 percent, just a bit above its average of 19.9 percent since 1970. While it is true that the ratio of government expenditures—including federal, state, and local government—to GDP increased precipitously during the crisis (reaching 21.1 percent in 2009), it has been trending down sharply since. At 19.7 percent as of the fourth quarter of 2011, it has given back 70 percent of its post-crisis increase.

This downward trend is the result of decreasing shares at all levels of government; however, the most significant factor has been cuts at the state and local level. Unlike the federal government share, which currently sits at 15.7 percent, state and local government spending is now nearly 3 percent below its first-quarter 2007 level. Because state and local government accounts for about 60 percent of total government spending, the trend in this component has more weight than the federal component on the overall government share.

## Change in Government Expenditures as a Fraction of GDP since 2007



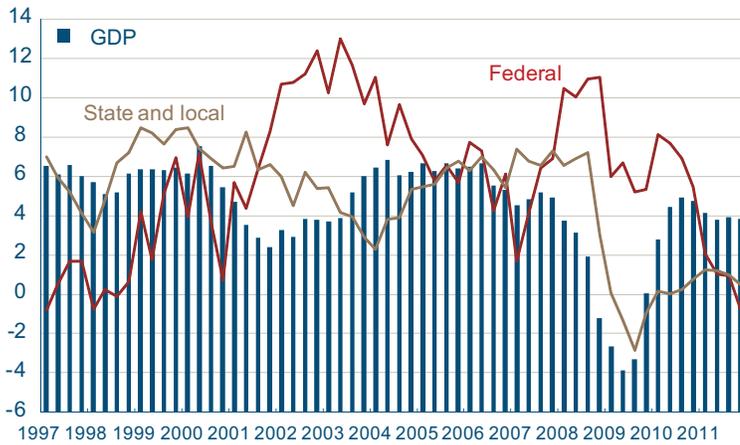
Sources: Bureau of Economic Analysis; Haver Analytics.

Some of the decline in the ratio is also due to the recovery of GDP, as the year-over-year change in levels for GDP show steady growth since the beginning of 2010. Growth in state and local government has remained modest relative to its recent history. Most striking is that federal government expenditures (year-over-year) are negative for the first time since the late 1990s, a period of government surpluses.

This time is different, however. Despite the downturn in government consumption and investment relative to GDP, deficits continue to accrue. This is because government as a component of GDP does not include transfers; however, transfers greatly

## GDP and Government Expenditures

Year-over-year percentage change

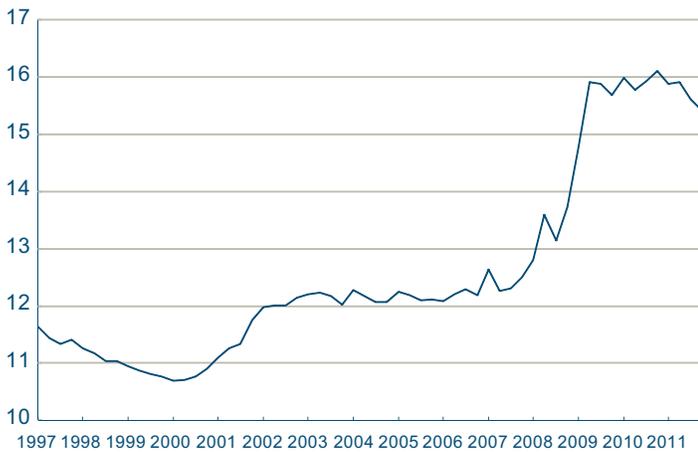


Sources: Bureau of Economic Analysis; Haver Analytics.

exceed tax revenue and nearly exhaust total revenues. This leaves little funding to pay for government consumption and investment, and so the difference must be borrowed.

## Transfer Payments as a Fraction of GDP

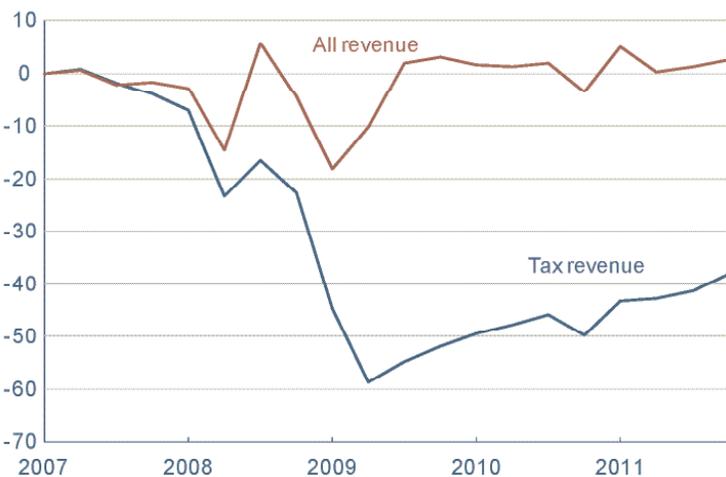
Percent



Sources: Bureau of Economic Analysis; Haver Analytics.

## Change in Revenues Less Transfers as a Fraction of GDP

Cumulative percentage change



Sources: Bureau of Economic Analysis; Haver Analytics.

## The Availability and Profitability of Credit Cards

03.16.2012

by O. Emre Ergungor and Patricia Waiwood

Credit cards serve a dual purpose in our economy. First, they are used to pay for things in lieu of cash or checks. Used in this way, they make it easier for people to conduct day-to-day transactions and manage their cash. At the same time, credit cards are often used for short- or medium-term unsecured borrowing. Individuals may use the revolving balance of a credit card to finance large purchases.

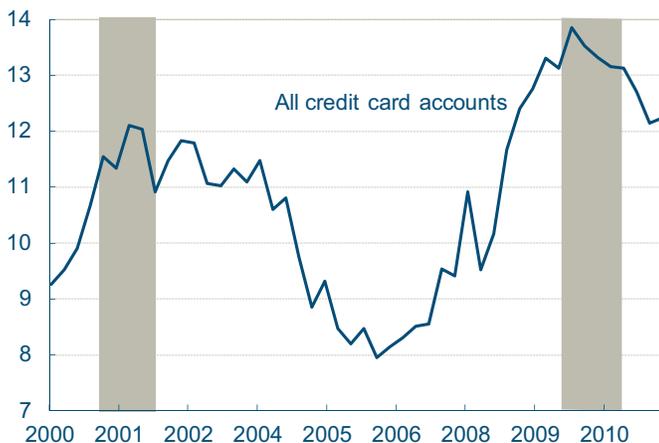
Credit cards often carry substantially higher interest rates than, say, mortgages and auto loans, because credit cards are not secured by marketable assets and they have uncertain repayment periods. Interest rates for credit cards can also serve as a barometer for the broader risk profile of consumers as well as the availability of credit to them. Following a peak at 14 percent in the first quarter of 2010, credit card interest rates have fallen over the past two years. When interpreted jointly with the increasing balances, this development suggests that credit is becoming more available to consumers.

Credit has been growing, while at the same time, lenders' credit card portfolios have been getting healthier. Charge-offs were particularly problematic during the last recession, when they crept steadily upward to hover around 10 percent for almost a year. However, they started a determined decline in the second quarter of 2010, a trend which in turn led to a choppy but unmistakable rebound in credit card issuers' profit (as measured by the excess spread rate).

Another factor that affects the availability and cost of unsecured credit is liquidity in the market for credit card debt. Historically, the asset-backed securities (ABS) markets have funded a substantial share of consumer credit loans. In the fall of 2008, both the market for short-term bank funds and the market for securitized credit card receivables seized up, meaning banks could only fund new credit card debt on their balance sheets. A visible result was that for the five months between September

### Credit Card Interest Rates

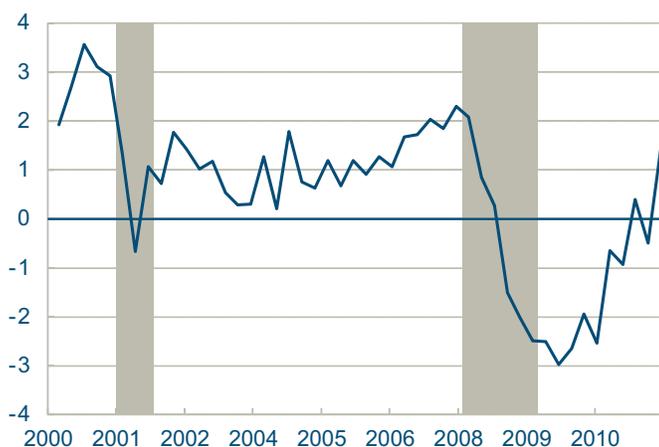
Spread over one-year treasury notes



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

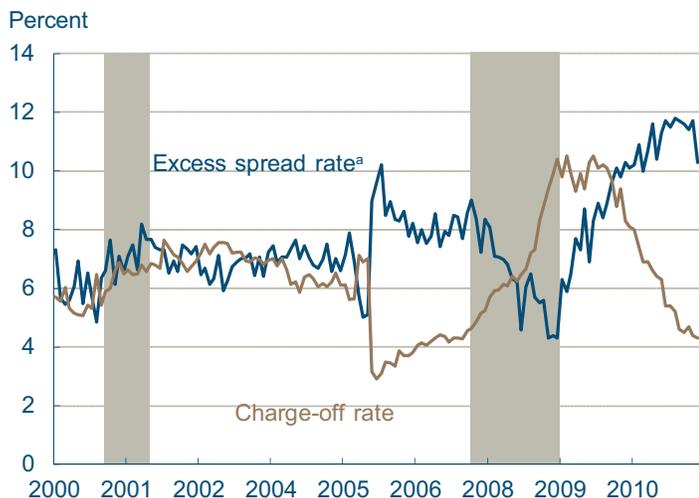
### Revolving Consumer Credit Outstanding

Quarter-over-quarter changes (percent)



Note: Shaded bars indicate recessions.  
Source: Federal Reserve Board: G.19 Release.

## Credit Card Profitability

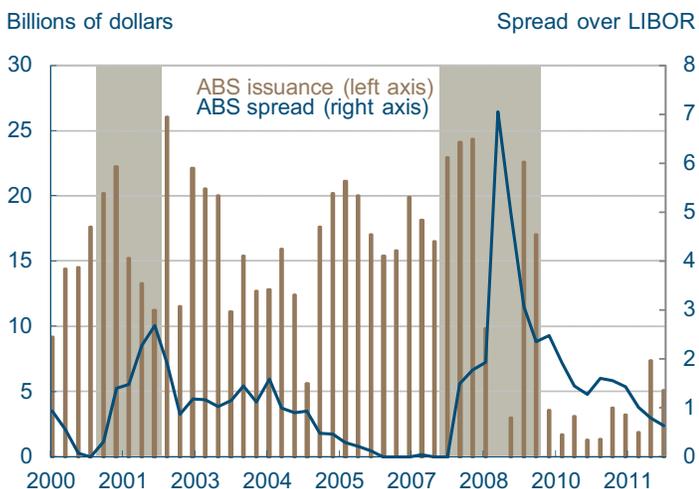


a. Revenue less charge-offs and financing costs.  
 Note: Shaded bars indicate recessions.  
 Source: Standard & Poor's

2008 and March 2009, no ABS secured by credit card receivables were issued, as spreads on existing securities spiked from around 1 percent to nearly 7 percent. In many cases, financial institutions chose to severely restrict the amount of new credit extended. Balance sheet funding by commercial banks continues to be the most widely observed form of credit card lending even today. The total amount of outstanding credit card debt held at commercial banks is holding relatively steady at around \$600 billion.

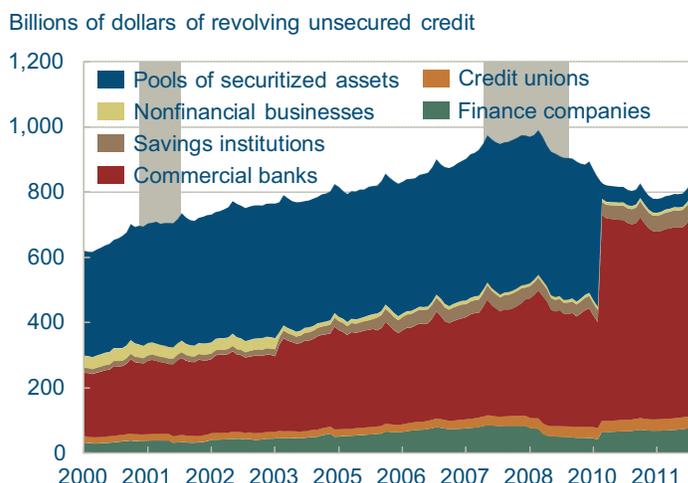
While the virtual disappearance of an important funding source could be a cause for concern, if balance sheet lending leads to more responsible lending and sound banking, credit market excesses of the bubble years may be less likely to recur.

## Credit Card ABS Issuance and Spreads



Note: Shaded bars indicate recessions.  
 Sources: Bank of America Merrill Lynch, Financial Times.

## Credit Card Financing Sources



Note: Shaded bars indicate recessions.  
 Source: Federal Reserve Board: G.19 Release.

# Market-based Inflation Expectations

04.03.2012

by Mehmet Pasaguolari and Patricia Waiwood

Some prices and price indexes have shot up recently, but measures of core inflation have remained low. The consumer price index (CPI) rose 5 percent in annualized terms from January to February and 2.9 percent over the previous year. Energy prices rose by 45.7 percent in annualized terms during the month, and gas prices were responsible for almost 80 percent of the monthly increase in the CPI. On the other hand, underlying inflation series do not show an increasing inflationary trend. Indeed, three-month changes in these series show a decline after the summer and fall of 2011.

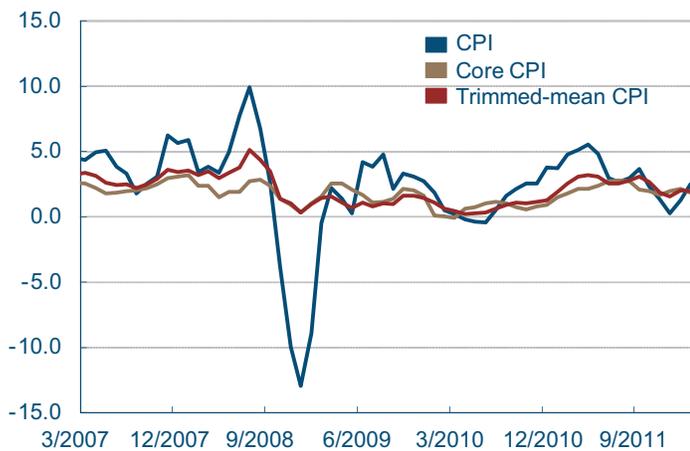
For more insight into where the rate of inflation is likely to head in the future, we look at a couple of measures that tell us how markets are currently pricing future inflation. These measures are inflation swap rates and breakeven inflation rates. Breakeven inflation is the difference between the interest rate on Treasury bonds that are protected against inflation (TIPS) and nominal Treasury bonds, which are not. Inflation swaps are derivatives used to hedge against inflation (more here).

First, let's look at short- and medium-term expectations calculated from inflation swaps. The rates on one- to four-year inflation swaps have increased considerably since last October. The increase in the one-year swap rate is higher than the longer-term swap rates. The one-year swap rate increased by 1.13 percent between October and March, ending at 2.30 percent on March 27. In the same period, the two-year swap rate increased by 92 basis points and the four-year swap rate increased by 69 basis points.

Although the rapid increase between October and mid-March seems to reflect concern for higher inflation in the short-to-medium term, we have to note that these rates currently signal an inflation level slightly above the Federal Reserve's long-run target of 2 percent. In addition, neither these levels nor the rapid movements are uncommon for the swap rate data.

## Inflation Measures

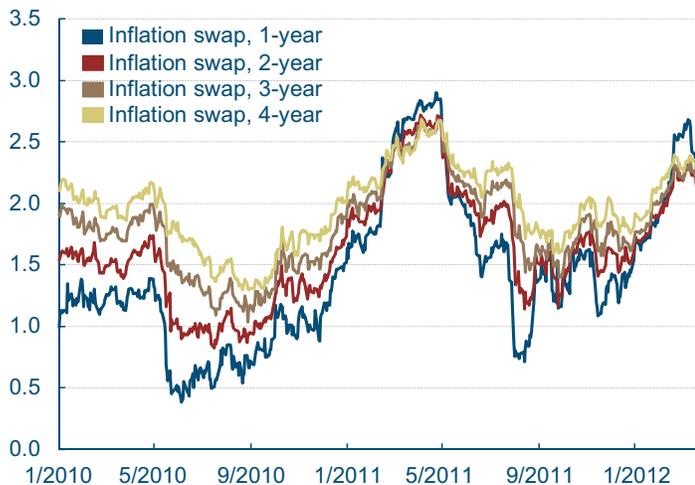
3-month annualized inflation rates



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

## Short- and Medium-Term Inflation Expectations

Percent



Source: Bloomberg.

## Longer Term Measures of Inflation Expectations



Sources: Federal Reserve Board; Bloomberg.

## Forward Measures of Long-Term Inflation Expectations



Sources: Bloomberg; Federal Reserve Board.

Next, we check longer-term market-based expectation measures. In particular, we look at the five- and ten-year inflation swap rates and the breakeven inflation rates. All these rates experienced a path similar to those of the short- and medium-term measures. After a small decline in the second half of March, the five-year breakeven rate is at 2.01 percent, and the ten-year breakeven rate is at 2.33 percent on March 27. The five- and ten-year inflation swap rates are 2.37 percent and 2.66 percent, respectively. Again, although the breakeven and swap rates are significantly higher for five- and ten-year maturities compared to the last fall, they do not signal a significant inflationary threat.

Finally, we check the forward measures of long-term inflation expectations, that is, expectations of the inflation rate that will prevail for a specified period beginning x-number of years in the future. Specifically, we check the five-year, five-year forward and the ten-year, ten-year forward measures of inflation calculated from swap rates, as well as the breakeven inflation rates. These longer-term rates have increased, too, since October, though to a lesser extent than the shorter-term measures we considered. In addition, the forward measures for the longer term are lower than the shorter term. For example, the five-year, five-year forward inflation swap rate is currently at 2.95 percent, while the ten-year, ten-year forward breakeven inflation rate is 2.85 percent. The breakeven inflation rates for the same maturities are 2.65 percent and 2.47 percent, respectively.

Overall, we have seen a sizable increase in market-based measures of inflation expectations since last October, especially for shorter maturities, followed by a reversal in the second half of March. However, these inflation measures still do not reflect a rapid inflationary period in either the medium or long term. In fact, all market-based inflation-expectation measures up to five-year maturities are currently below 2.5 percent, and the measures for longer-term are below 3 percent.

# An Elusive Relation between Unemployment and GDP Growth: Okun's Law

04.05.2012

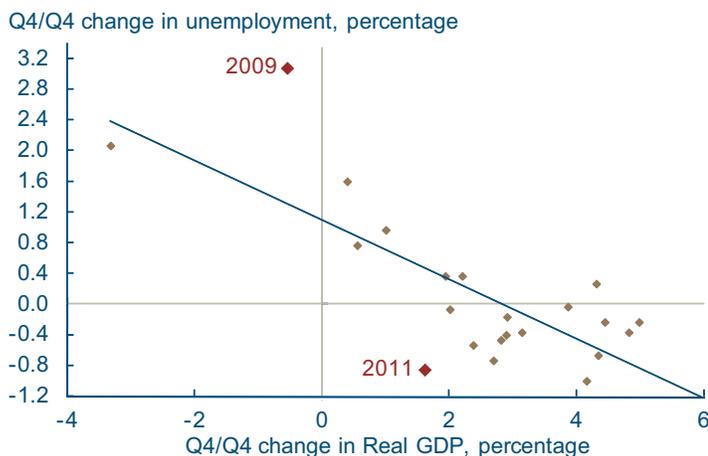
by Emily Burgen, Brent Meyer, and Murat Tasci

The unemployment rate fell from 9.1 percent to 8.3 in 2011, but real GDP grew only 1.6 percent. That is much lower than its average growth of 2.6 percent since 1985. The slow GDP growth has led some observers to question how sustainable the recent improvement in the labor market is. Implicit in this suspicion is the idea that the unemployment rate can improve only so much given the modest growth of economic activity. This idea is based on an empirical relationship sometimes referred to as Okun's law, which is essentially a simple rule of thumb that associates the growth rate in real GDP to changes in the unemployment rate observed around the same time.

We argue that the pace of improvement in the labor market (as measured by the unemployment rate) is, to a large extent, consistent with the pace of the recovery in GDP. Looking at the relationship between these two macro variables in slightly different ways shows that, if anything, the recession had a larger impact on unemployment than one might have anticipated, and what we're seeing during the recovery is not necessarily puzzling.

A simple version of Okun's law regresses the change in the unemployment rate over a period in time (usually a quarter, or in the picture below, a year) on a constant and the change in real GDP growth over the same period. If we just look at the data from 1990 forward, 2009 and 2011 look somewhat remarkable. In 2009, the unemployment rate jumped up 3.0 percentage points despite just a 0.5 percent decline in real GDP, well above the roughly 1.2 percentage point increase implied by Okun's law. Skipping over 2010 (which wasn't too far off the regression line), 2011 was unusual in the opposite direction; output growth increased 1.6 percent while the unemployment rate fell a mere 0.9 percentage point, even though according to Okun's law, it should have posted a modest increase.

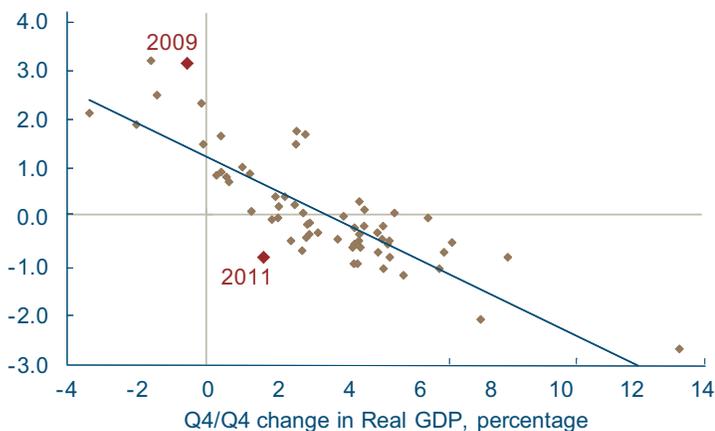
## Okun's Law, 1990-2011



Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; authors' calculations.

## Okun's Law, 1948-2011

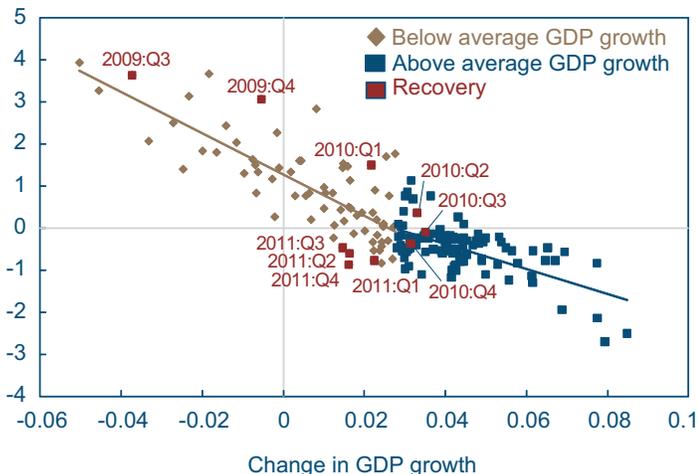
Q4/Q4 change in unemployment, percentage points



Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; authors' calculations.

## Okun's Law, 1970:Q1–2011:Q4

Change in unemployment rate



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

Correction: April 6, 2012

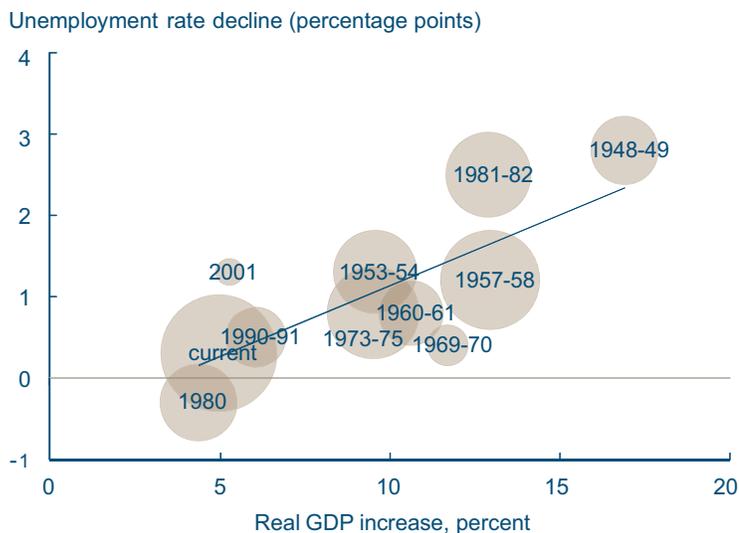
This chart was updated to correct the positions of the recovery data points.

Some analysts suggest that 2011 was a “catch-up” year; they argue that in 2009 firms shed far more workers than necessary (perhaps fearing a further deterioration in the outlook), but once the outlook appeared to be a little brighter, firms started bringing their employment levels back in line with expected growth. While this may be the case, looking at the Okun’s law relationship over a longer period of time makes 2009 and 2011 appear to be less unusual. This leaves open the possibility that these deviations are just noise.

However, if we look at another version of Okun’s law, which relates the annual growth rate of GDP over the past year and the associated change in unemployment rate at quarterly frequency since 1970, these years stand out in a different way. There have been many instances over the last five years when the predicted unemployment-rate change was significantly above or below the simple line that represents Okun’s law. What is more striking is that in six out of ten quarters since the recovery started (through the fourth quarter of 2011), growth rates were below the sample average of 2.6 percent. If anything, the pace of the recovery as measured by output has been very anemic.

This is not the first time that the behavior of the unemployment rate during the Great Recession and subsequent recovery has puzzled analysts. Over the course of the recession, especially toward the end of 2008 and the first two quarters of 2009, unemployment increased sharply to levels not seen since the 1980s. At the time, we thought the aggregate economy had contracted 3.6 percent over the course of the recession from its pre-recession peak, so the huge jump in the unemployment rate—from 5 percent to 9.5 percent—seemed way out of line. Later, when government agencies revised their estimates of GDP, the true severity of the output loss during the recession was realized. It turns out the the economy contracted 5.1 percent during the downturn, the largest decline in postwar history. In an unfortunate way, this made the recession more consistent with historical patterns. Similarly, part of the puzzle of 2011 (based on the first figure above) might be resolved as we get revised data on GDP in the future, though we think this is not as likely.

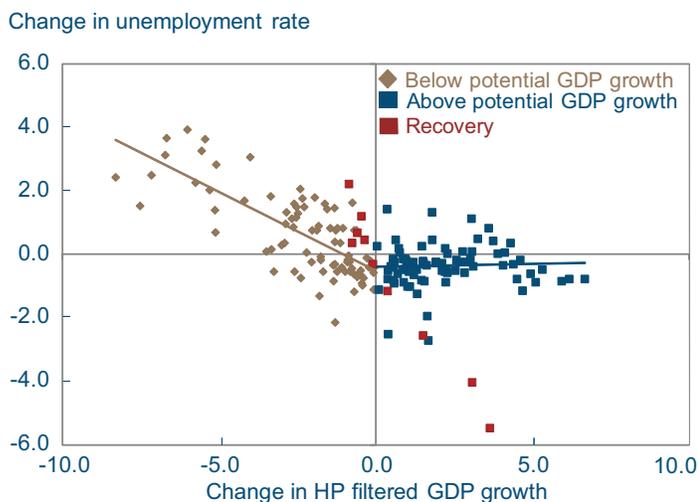
## Recovery in Real GDP and Unemployment



Note: Size of bubble represents GDP decline during recession.  
Sources: Bureau Economic Analysis; Bureau of Labor Statistics.

After the recession officially ended, the unemployment rate remained high, above 9 percent, for 22 consecutive months. Again, this very small improvement was puzzling to some. However, as we argued elsewhere, unemployment usually lags the economic cycle. Thus we need to look at a longer time span to gauge the cumulative effect of output growth on unemployment. To do this, we compute the overall growth rate of GDP from its recession trough through 10 quarters of the recovery for all postwar recovery episodes and compare it to the unemployment-rate improvement over the same time interval. This exercise produces the following chart, which shows that the fall in the unemployment rate in the current cycle is explained very well by the growth in output. The current recovery lies right along the estimated regression line. So the relatively modest improvement in the unemployment rate can be closely linked to the recovery in output. Relatively weak output growth in fact seems to be a feature of all the recent “jobless” recoveries.

## Okun’s Law—Deviations from Potential



Sources: Bureau of Economic Analysis; Bureau of Labor Statistics; authors’ calculations.

It is also important to recognize that Okun’s law is just an empirical relationship. It may not necessarily reflect a structural link between output growth and the unemployment rate. Moreover, the relationship might change over time as the dynamics of the labor market change.

For instance, one version of Okun’s law suggests that the relationship between unemployment and GDP gets very tight when the growth rate of output is above its potential. However, looking at the data over the last 40 years suggests that there may be some asymmetry in the relationship over the business cycle. Even though empirically there seems to be a strong correlation between output growth when it is below potential and increases in the unemployment rate, this relationship disappears when output is growing above potential.

Part of the explanation for this effect has to do with the fact that we will always have some level of unemployment even in good times, due to natural churning in the labor market. As the economy goes through a long expansion, unemployment will stabilize at this lower level, and additional growth may not necessarily generate additional reductions in

the unemployment rate. The upshot is that the rate may not go below that level. As a result, further output growth will not necessarily manifest itself as a further decline in the unemployment rate.

To sum up, it seems intuitive to think there is a natural, robust relationship between changes in unemployment and changes in output. However, what exact form it takes is a complicated problem that requires going beyond the simple rule of thumb given by Okun's law.

# European Liquidity Strains

03.16.2012

by John Lindner

After peaking at \$1.71 trillion last summer, the level of reserves held at the Federal Reserve has declined. In the second half of 2011, reserve balances shrank gradually, falling to just \$1.55 trillion in November and December. Given the public's concerns about elevated reserve levels and all the new tools the Fed has developed for managing reserves, it is important for policymakers to understand where those reserves have gone. Data suggest that a large part of the decline in reserves was spurred by foreign-related banks. A quick examination of the Fed's balance sheet, and the Fed's data on the balance sheets of commercial banks, confirms that the likely culprit was liquidity strains in Europe.

As an accounting identity, the Fed's assets and liabilities have to remain even with each other. When the level of reserves fell, which count as liabilities for the Fed, the asset side of the balance sheet fell as well. Part of the asset decline was a reduction in the amount of outstanding loans in the Fed's specialized lending facilities, which had been created during the crisis. This part of the decline included lower balances in the Maiden Lane portfolios and the Term Asset-Backed Securities Loan Facility (TALF). Another sliver represented brief delays in the clearing of certain Fed security purchases, which are part of its reinvestment programs.

But these asset-side declines were not enough to keep pace with the fall in reserves. This excess slack was picked up by increases in other Federal Reserve liabilities. The two major categories that filled that hole were foreign official reverse repurchase agreements and other deposits with Fed banks. Both of these accounts deal with international institutions, like the International Monetary Fund (IMF), and foreign central banks, like the European Central Bank (ECB).

After examining Federal Reserve data on the balance sheets of depository institutions, it becomes clear that the movements in reserves were related

## Reserves

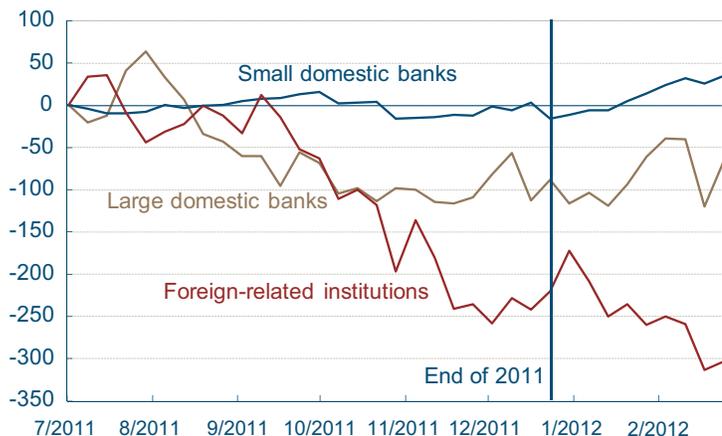
Trillions of dollars



Source: Federal Reserve Board.

## Cash Assets of Commercial Banks

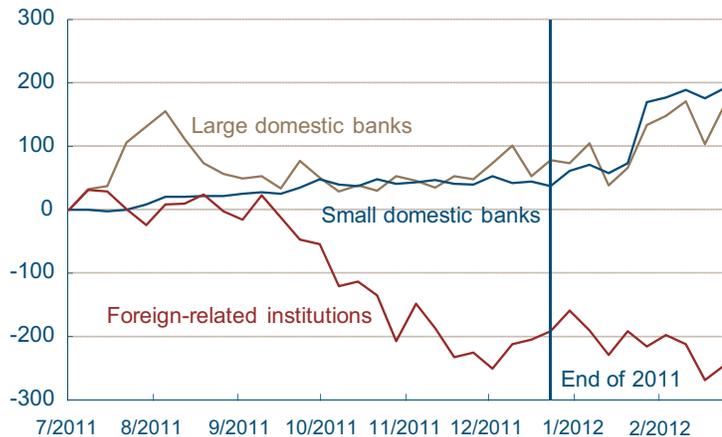
Change, in billions of dollars (seasonally adjusted)



Source: Federal Reserve Board.

## Total Assets of Commercial Banks

Change, in billions of dollars (seasonally adjusted)



Source: Federal Reserve Board.

to the liquidity strains in Europe. The data are compiled in the Fed's H.8 data release, which looks at the assets and liabilities of commercial banks. Reserves held at the Fed accumulate in the "cash assets" account, and they make up the vast majority of those balances. Large domestic commercial banks saw a decline of \$88 billion in cash assets from July to December, but foreign-related institutions declined by an even larger \$220 billion over the same period.

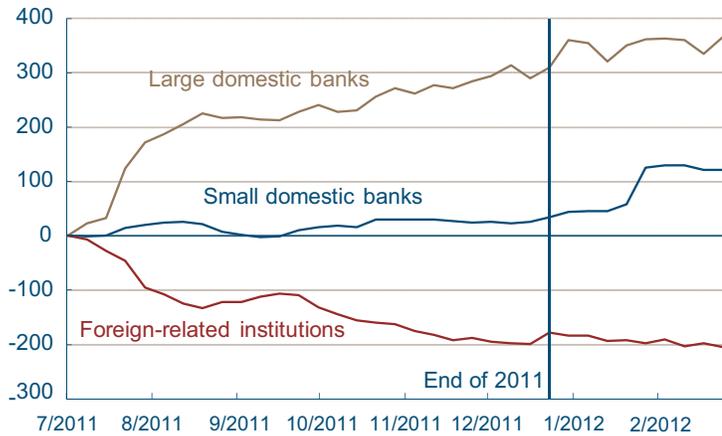
Where these reserves have gone has depended upon the type of institution withdrawing from its account. In the case of large domestic banks, the reserves were used to expand lending operations and acquire securities holdings. For this reason, the total assets at large domestic banks remained fairly constant over the second half of 2011 and have even grown recently. However, the total assets at foreign-related institutions tumbled along with their reserve balances starting in July, and they have yet to recover.

One possible explanation for the decline in the assets of foreign-related institutions is that deposits at those banks have been shrinking. Unlike domestic banks, whose deposits are primarily composed of demand deposits, foreign-related deposits are mostly made up of time deposits. These time deposits come from a number of sources, but one major provider is money market funds.

Money market funds are typically awash in cash, since they generally are considered very safe money managers and they are restricted to holding securities that mature over short time horizons. Their investments are usually limited to risk-free securities, including government bonds and loans to highly rated companies. In 2008, one of the largest money market funds (the Reserve Primary Fund) acted as a catalyst to the financial panic when it "broke the buck," and its net asset value fell below \$1. That fund had invested in the commercial paper of Lehman Brothers. To avoid a comparable outcome with European banks, it seems as if money funds have withdrawn their funding of commercial paper for many domestic branches of foreign banks.

## Deposits at Commercial Banks

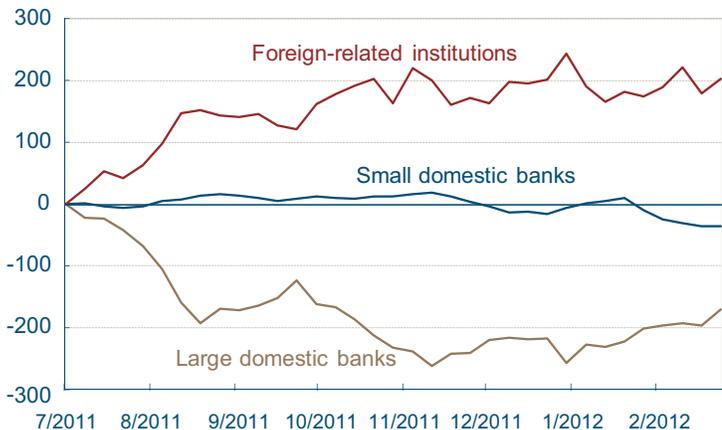
Change, in billions of dollars (seasonally adjusted)



Source: Federal Reserve Board.

## Net Due to Related Foreign Offices at Commercial Banks

Change, in billions of dollars (seasonally adjusted)



Source: Federal Reserve Board.

Reports during the second half of 2011 repeatedly highlighted the removal of funds from European banking institutions by money market funds.

Federal Reserve data show that there has been a decline in large time-deposits at foreign-related institutions, which is how the sale of commercial paper is categorized on bank balance sheets. This means that domestic foreign-related banks have seen a dramatic decline in the amount of dollar liquidity they have available. To fill the gap, these foreign-owned banks have drawn down their reserve balances. Hence, the data show a decline in both cash assets and total assets for foreign-related institutions.

Another data series that supports this story is “net due to related foreign offices,” which is a measure of the flows of dollars between domestic and foreign offices of related institutions. Positive numbers represent an inflow of dollars to US banks, which will be due back to foreign offices, and negative numbers represent flows out of the US to foreign offices. To help domestic offices with the decline in money market funding, foreign parent banks have sent dollars to their US counterparts.

The timing of events in Europe matches fairly well with the data, as concerns about Italy’s finances were heightened in August and September. It is also notable that these effects have moderated recently after efforts by the Fed and the ECB to provide support to struggling banks. Specifically, the expansion of the central bank liquidity swap lines by the Fed in late December, as well as after the ECB’s long-term refinancing operations (LTRO), helped provide European banks with more liquidity.

## Yield Curve and Predicted GDP Growth, March 2012

Covering February 25, 2012–March 23, 2012  
by Joseph G. Haubrich and Margaret Jacobson

### Highlights

	February	January	December
3-month Treasury bill rate (percent)	0.09	0.11	0.04
10-year Treasury bond rate (percent)	2.21	1.97	1.96
Yield curve slope (basis points)	212	186	192
Prediction for GDP growth (percent)	0.7	0.7	0.7
Probability of recession in 1 year (percent)	5.0	6.9	6.4

### Overview of the Latest Yield Curve Figures

Over the past month, the yield curve has gotten noticeably steeper, as short rates edged down and long rates jumped up. The three-month Treasury bill dropped to 0.09 percent (for the week ending March 16), down from 0.11 percent in February but above January's 0.04 percent. The ten-year rate moved back above 2 percent, coming in at 2.21 percent, rising almost a full quarter of a percent from February's 1.97 percent and January's 1.96 percent. The twist increased the slope about the same. It stood at 212 basis points, up from January's 192 basis points and February's 186 basis points.

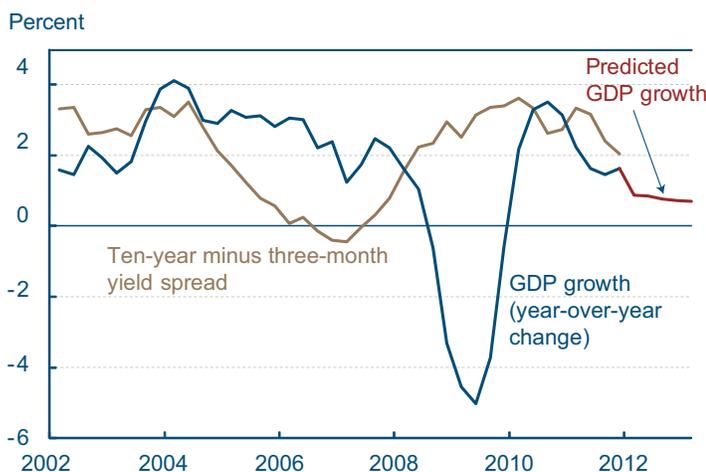
The steeper slope was not enough to change projected future growth appreciably, however. Projecting forward using past values of the spread and GDP growth suggests that real GDP will grow at about a 0.7 percent rate over the next year, equal to the past two months. The strong influence of the recent 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 steeper slope was 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 March is 5.0 percent, down from February's 6.9 percent and January's 6.4 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.

### 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

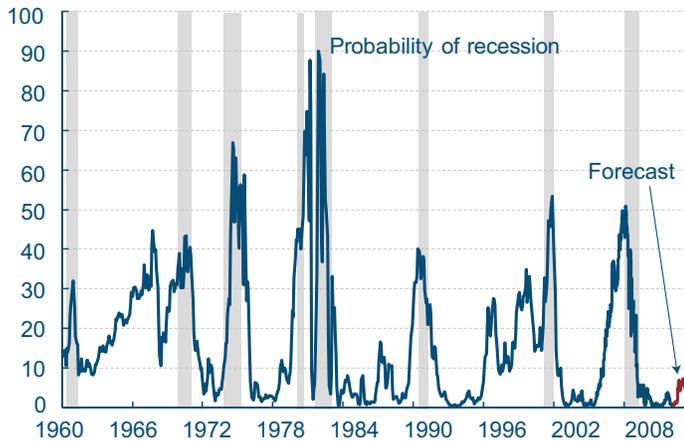
### Yield Curve Predicted GDP Growth



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

## Recession Probability from Yield Curve

Percent probability, as predicted by a probit model



Note: Shaded bars indicate recessions.

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

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.

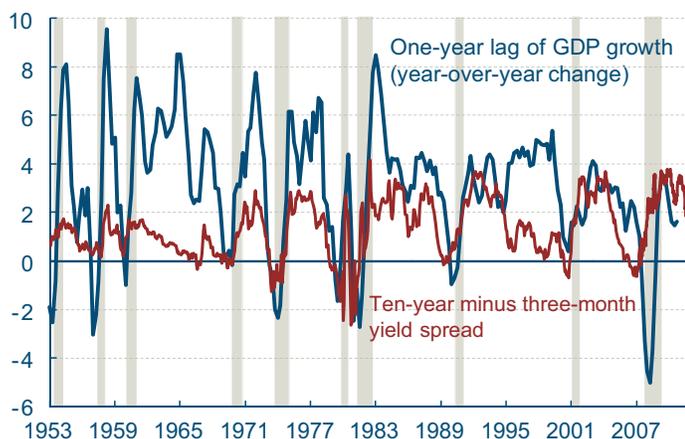
### Predicting the Probability of Recession

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 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

## Yield Spread and Lagged Real GDP Growth

Percent

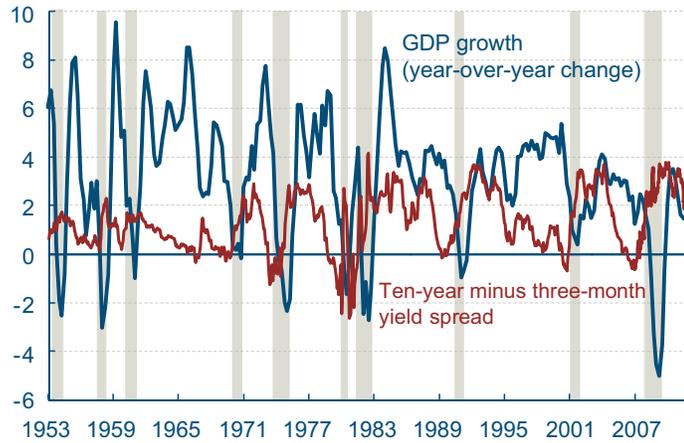


Note: Shaded bars indicate recessions.

Sources: Bureau of Economic Analysis, Federal Reserve Board.

## Yield Curve Spread and Real GDP Growth

Percent



Note: Shaded bars indicate recessions.

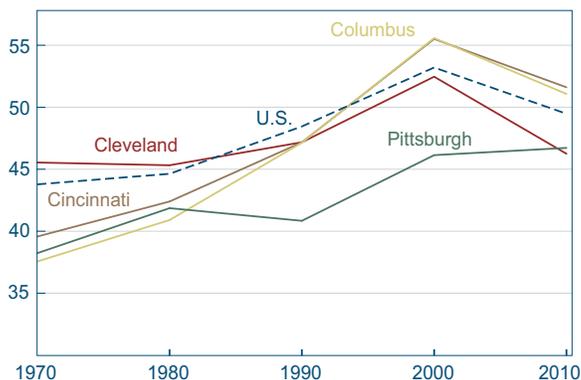
Source: Bureau of Economic Analysis, Federal Reserve Board.

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.

# Income Growth in the Fourth District since 1970

## Median Household Income

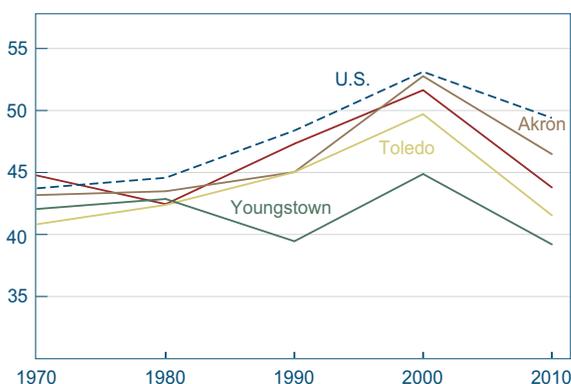
Thousands of 2010 dollars



Notes: Metro area data are deflated using the personal consumption expenditures chain-type price Index. U.S. data are deflated using the consumer price index for all urban consumers, research series. Sources: Bureau of Census; Bureau of Labor Statistics.

## Median Household Income

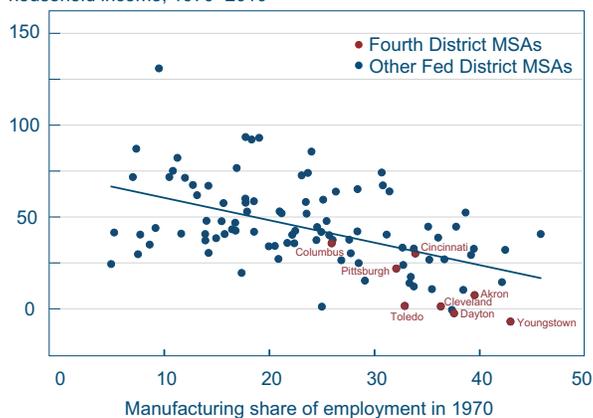
Thousands of 2010 dollars



Notes: Metro area data are deflated using the personal consumption expenditures chain-type price Index. U.S. data are deflated using the consumer price index for all urban consumers, research series. Sources: Bureau of Census; Bureau of Labor Statistics.

## Median Income and Manufacturing in 100 Largest U.S. MSAs

Percent change in median household income, 1970–2010



Source: Bureau of Census.

04.05.2012

by Guhan Venkatu

One of the key ways to assess the economic well-being of residents in an area is to consider the area's median household income. Median household income is the income level at which half of all the households in the area have less income and half have more. Unlike average income, median income is less sensitive to extremes in the distribution. As such, it is a better representation of the amount of income available to a typical household.

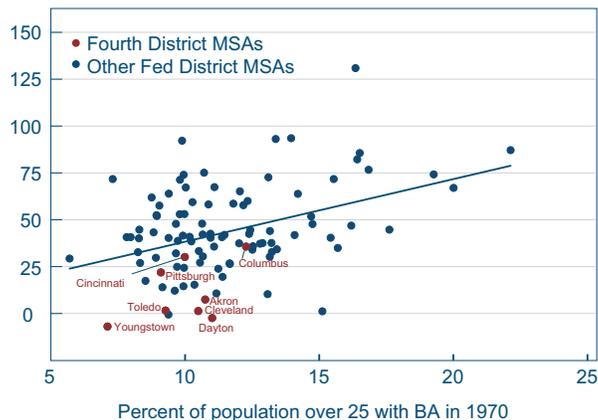
Inflation-adjusted median household income in the United States has risen from just under \$44,000 in 1970 to around \$50,000 in 2010, an increase of about 13 percent in real purchasing power. Over this same period, median household incomes in some of the major metropolitan statistical areas (MSAs) of the Fourth District have taken different paths. Columbus and Cincinnati have seen the strongest gains among the eight District MSAs shown in the charts below. Pittsburgh has also seen notably larger increases in median household income than the other areas. Interestingly, these three MSAs began the 40-year period with the lowest median household incomes among the eight areas shown. The remaining five District MSAs have seen very little real income growth over this time, and indeed a few have seen outright declines.

What accounts for these differing trajectories? For the 100 largest U.S. metro areas in 1970, two factors explain almost a third of the variation in median household income growth over the subsequent 40 years: the share of overall employment in the area that was in manufacturing industries in 1970 and the percentage of the population with bachelor's degrees (BAs) in 1970.

Metro areas that had a higher manufacturing-employment share in 1970 generally had less median household income growth from 1970 to 2010. The District MSAs among the nation's 100 largest generally conformed to this broader pattern. They are in the lower-right quadrant of the chart below,

## Median Income and Education in 100 Largest U.S. MSAs

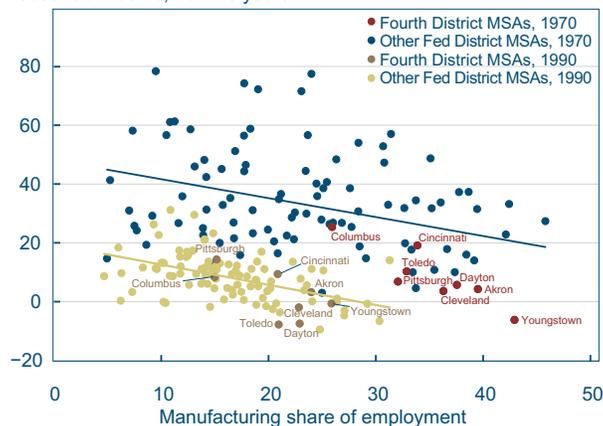
Percent change in median household income, 1970–2010



Source: Bureau of Census.

## Median Income and Manufacturing over Time

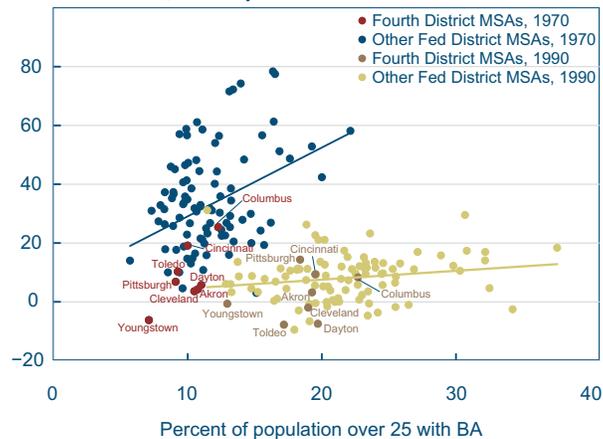
Percent change in median household income, next 20 years



Source: Bureau of Census.

## Median Income and Education over Time

Percent change in median household income, next 20 years



Source: Bureau of Census.

that is, in the upper half of the distribution of manufacturing-employment share and in the lower half of the income-growth distribution.

The share of residents with a BA in 1970 was also predictive of median income growth in a metro area from 1970 to 2010. This time, the Fourth District’s MSAs are clustered in the lower-left quadrant of the chart, that is, generally low in BA attainment in 1970 and low in income gains over the 40 years thereafter. (There is some correlation between the manufacturing-employment share and BA attainment. However, even after accounting for this, each variable has an independent influence on median household income growth.)

Have these relationships changed over time? One way to consider this question is to split the 40-year period into two equal parts (1970-1990 and 1990-2010) and do the same sort of analysis as done above. Since we’re measuring income changes over shorter periods in this case, we can’t make a direct comparison to the results using the entire period. However, we can get a sense of how important the manufacturing-employment share and BA attainment are in predicting income growth in the ensuing 20-year periods, and whether this influence is changing over time.

For the manufacturing-employment share, the relationship to median household income growth does not appear to change noticeably in the two 20-year periods. When we take the manufacturing-employment share in 1970 and 1990 and plot these against the changes in median household income in the subsequent 20 years, the slopes of the two best-fit lines don’t differ much.

The story for BA attainment, however, is quite different. There is a noticeable difference between the two periods. BA attainment appears to be much more important in the earlier period than it is in the later period. While there still seems to be a positive relationship between initial BA attainment and subsequent income growth, the slope of the best-fit line is actually statistically indistinguishable from zero.

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