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FRBSF ECONOMIC LETTER

2009-32 | October 19, 2009



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Gauging Aggregate Credit Market Conditions

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The Federal Reserve and other central banks have responded to the current financial crisis by taking a range of aggressive policy actions aimed at reviving credit markets. In particular, the Fed has pushed the federal funds rate, its key policy instrument, to historically low levels. Research suggests that overall credit conditions since late 2007 have remained tighter than would have been expected based on historical experience and that this tightness may be partly offsetting the Fed's policy actions.

The financial crisis that began in August 2007 and the subsequent responses by the Federal Reserve and other central banks have had a multifaceted effect on aggregate credit market conditions. However, the effects have typically been analyzed by examining individual sectors of the markets rather than credit conditions as a whole. For example, in response to dislocations in the London interbank offered rate (Libor) market in the fall of 2007, the Fed created the Term Auction Facility (TAF) to provide domestic commercial banks access to 28-day collateralized funding and reached currency swap agreements with several central banks to provide foreign banks with dollar funding. Several recent studies, such as Christensen, Lopez, Rudebusch (2009), have found that these policy responses contributed to the decline in Libor rates in early 2008.

Few studies have sought to gauge the overall effect on credit market conditions of both the crisis itself and these policy responses. This *Economic Letter* attempts to quantify those effects by constructing two indicators of aggregate credit market conditions using simple statistical tools and data from an array of credit market sectors. These indicators suggest that overall credit market conditions have indeed eased in response to policy actions, but not by as much as historical experience with standard measures of monetary policy would indicate. This suggests that the widespread damage to the financial system experienced during the crisis may have limited the effectiveness of monetary policy.

Overview of the financial crisis and policy response

The stresses in the credit markets generated by the unwinding of the U.S. housing boom are generally held to have reached the crisis stage in August 2007 after several international financial institutions reported problems valuing or liquidating U.S. mortgage-related assets. One manifestation of the severity

of the turmoil then was the sharp rise in Libor rates—one of the most widely watched money market benchmarks—as banks and other financial institutions sharply cut short-term lending to one another. In response, the Fed and other central banks used existing programs and created a variety of new programs, such as TAF, to provide funding in the short-term interbank loan markets. In addition, the Fed lowered the overnight federal funds rate from 5.25% to 3% by January 2008. Tight funding conditions continued into 2008, contributing to the collapse of the investment bank Bear Stearns in March. The Fed assisted in JPMorgan Chase’s acquisition of Bear Stearns and initiated a lending facility to give primary securities dealers access to collateralized funding. The Fed further lowered the federal funds rate to 2% by April.

The next major steps in the financial crisis occurred in September 2008 amid a series of financial emergencies: federal officials placed government-sponsored mortgage entities Fannie Mae and Freddie Mac into conservatorship; investment bank Lehman Brothers filed for bankruptcy; and the Fed extended urgently needed loans to the insurance company American International Group, or AIG. In addition, the Fed expanded existing liquidity programs and created new ones, such as the Commercial Paper Funding Facility that provided liquidity to the commercial paper market. In December, the Fed further lowered its policy rate to a range from zero to 0.25 percentage points, the lowest possible monetary target. In January 2009, the Fed initiated purchases of Fannie Mae and Freddie Mac mortgage-backed securities, and in March it began buying long-term Treasury securities.

To analyze the aggregate effect of this combination of conventional and unconventional policy actions, I examine 13 interest rate series on a monthly basis across several markets, giving a broad overview of credit conditions. The 13 series include one- and three-month Libor rates, and term federal funds rates of the same maturities, in the interbank market; one-month AA-rated financial paper, and one- and three-month A2/P2-rated nonfinancial paper, in the commercial paper market; Baa-rated corporate bond rates and the index rates on Fannie Mae and Freddie Mac securities in the longer term corporate credit market; and conforming and jumbo 30-year mortgage rates in the mortgage market. The analysis extends from January 1998 through June 2009.

A method for measuring the effectiveness of monetary policy during the crisis

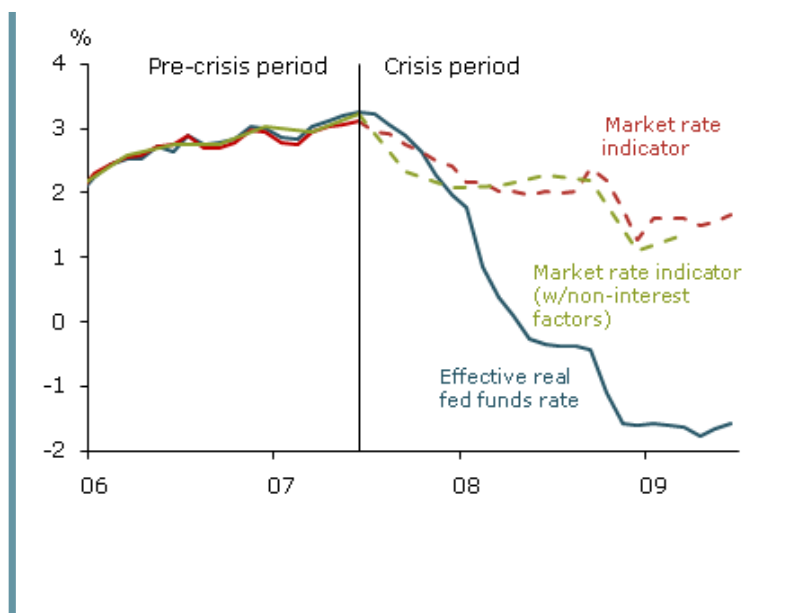
To what extent did Fed policy actions succeed in easing credit conditions after the onset of the financial crisis by bringing market interest rates down? One approach to answering this is to estimate what level of the federal funds rate would be associated with current credit conditions if pre-crisis relationships had held between market rates and the Fed’s policy rate. If the results of this analysis show a higher federal funds rate than the one actually targeted by the Fed during the crisis, then monetary policy can be said to be partly less effective at lowering market interest rates.

I use a three-step quantitative approach to construct indicators that should provide insights on the degree to which the crisis distorted the historical relationships between credit markets and monetary policy. The first step is based on principal components analysis (PCA), a statistical technique that identifies patterns in large datasets by highlighting the key drivers of correlations in the data. Using this technique, I generate three mathematical indicators that serve as a proxy for the 13 interest rate series in the data set. To highlight the difference between the pre-crisis and crisis periods, I analyze the 127 months prior to August 2007 separately from the period after.

The second step is to examine the relationship between monetary policy variables and these three interest rate indicators during the pre-crisis period. For this analysis, I examine the real, or inflation-adjusted, federal funds target rate, a common measure of the stance of

Figure 1
Effective real federal funds rate

monetary policy. The real federal funds rate is measured as the monthly actual federal funds rate minus the year-over-year change in core personal consumption expenditures (PCE) price inflation. It is shown by the blue line in Figure 1. I then construct a line summarizing the historical relationship between the real federal funds rate and the three mathematical indicators of market interest rates, shown in red. Because this analysis uses the pre-crisis period as a benchmark for measuring the historical relationship between the real federal funds rate and market interest rates, the blue and red lines are nearly identical until the onset of the crisis in the summer of 2007.



The third step extends this analysis into the crisis period, beginning in the summer of 2007. The dotted red line traces the path that the real federal funds rate would have taken had the historical relationships with the mathematical interest rate indicators continued during the crisis period. What the figure shows is an important shift in the relationship between the real federal funds rate and market interest rates, indicated by the sharp diversion of the red line from the blue line. This shift suggests the extraordinary tightening of credit conditions that occurred as the crisis gained momentum. The interest rates observed in the credit markets during this period would have been associated with higher real federal funds rates had pre-crisis relationships continued, as suggested by the dotted red line. In other words, market interest rates did not fall as much in response to target rate cuts during the crisis as they had typically done before the crisis.

If historical relationships had held, the real federal funds rate would have been around 2% from the summer of 2007 through August 2008 and then risen in September with the worsening credit market conditions that followed the collapse of Lehman Brothers. Since then, the dotted red line has fallen, with a slight uptick in January 2009, but has remained near 1.5% through June 2009, producing a widening gap with the blue line. In June, the difference between the two series was almost 3.50 percentage points. This indicates that credit market tightness continues to offset a large proportion of the monetary policy easing put in place since September 2007. Alternatively, one could argue that the unconventional policy actions were required to achieve as much credit easing as suggested by the market-rate indicator. This analysis cannot distinguish between these alternative explanations clearly, but it does show that current credit market conditions are quite different from their historical relationships.

Measuring credit market conditions incorporating nonprice terms

The interest rate series examined previously do not capture changes in nonprice credit conditions, such as stricter terms and reduced availability. To address this, I incorporate data from the Fed's quarterly Senior Loan Officer Opinion Survey (SLOS) on Bank Lending Practices. I use the net percentage of surveyed banks that report tighter lending standards for commercial loans, which Lown and Morgan (2006) found to be useful in macroeconomic models. Figure 2 presents this series from 1998 through the first quarter of 2009.

I also incorporate survey information on the net percentage of banks tightening lending standards for commercial real

Figure 2

estate loans, residential mortgage loans, and consumer and credit card loans. To examine the potential impact of these nonprice lending terms, I perform an analysis similar to the one for market interest rates, determining the pre-crisis relationships between SLOS survey results and the observed real federal funds rate and then projecting those relationships forward into the crisis period. I then modify the calculation of what level of the real federal funds rate would be associated with observed credit conditions to include these nonprice factors, as shown by the green line in Figure 1.

Commercial and industrial loan tightening (as %) from Senior Loan Officer Opinion Survey



Clearly, after the onset of the crisis, the real federal funds rate indicator incorporating the SLOS survey data, shown as the dashed portion of the green line in Figure 1, closely follows the indicator without these data, with the exception of the third quarter of 2007. In short, including nonprice credit terms in the analysis supports the conclusion that the Fed's monetary policy actions and related credit easing programs appear to have been offset in part by stubbornly high market interest rates and restrictive loan terms.

Conclusion

Several economic commentators have concluded that damage to the financial system has hampered the ability of monetary policy to lower credit costs and improve macroeconomic conditions—that is, that monetary policy is famously “pushing on a string” (see Mishkin 2009). Mishkin argues that monetary policy has actually been even more potent during the crisis period. He concludes that, if the Fed had not aggressively cut the target federal funds rate, “[i]nterest rates relevant to household and business spending decisions would then have been *much higher than what we see currently.*”

The indicators of aggregate credit conditions outlined in this article suggest that the Fed's accommodative monetary policy stance during the financial crisis has worked to improve credit markets. The historical federal funds rate indicator declined from 3.1% in June 2007 to 1.7% by June 2009. At the same time though, these results also suggest that overall credit conditions since late 2007 have been tighter than might otherwise have been expected based on historical experience and that this tightness is partly offsetting the Fed's policy actions.

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