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# Financial Market Imperfections and Macroeconomics: Conference Summary

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The Federal Reserve Bank of San Francisco's annual macroeconomics conference focused this year on the theme "Financial Market Imperfections and Macroeconomics." Conference papers explored the empirical and theoretical performance of the U.S. and international economies before, during, and after a financial crisis. Financial crises are typically associated with severe economic downturns, but monetary policy can help to offset some of these effects. The unconventional monetary policies pursued by many central banks after the most recent crisis may have helped prevent it from becoming much worse.

*This Economic Letter summarizes papers presented at the "Financial Market Imperfections and Macroeconomics" conference held March 5, 2010, at the Federal Reserve Bank of San Francisco. Conference papers are listed at the end and are available [online](#).*

The U.S. economy is extremely large and complex, so studies of it necessarily make many simplifying assumptions. A common one is that financial markets allocate credit smoothly and efficiently to borrowers that have the best uses for those funds. The recent financial crisis and credit crunch have made that frictionless financial markets assumption untenable at present and raised serious questions about its validity and desirability even in more normal times. This year the Federal Reserve Bank of San Francisco's macroeconomics conference brought together leading researchers from academia and central banking to discuss ways of incorporating financial market imperfections into empirical and theoretical macroeconomic analysis.

### Historical evidence

The United States has experienced several financial crises throughout its history, as have many other advanced economies. Schularick and Taylor collect data on the behavior of money, credit, GDP, and other macroeconomic indicators for 14 developed countries from 1870 through 2008. Given the extraordinary length and breadth of their sample, they have data on more than 70 financial crisis episodes, allowing them to identify empirical regularities across these episodes and to study longer-term

relationships between money, credit, and real economic activity.

Schularick and Taylor find that, for decades prior to the Great Depression of the 1930s, fluctuations in money and credit relative to GDP were fairly moderate across essentially all the developed countries in their sample. Money and credit then fell precipitously during the Great Depression, took until about 1970 to recover to pre-Depression levels, and finally continued to grow to ever-greater heights. Thus, they refer to the post-World War II period as an “era of credit” due to the striking upward trend in borrowing relative to GDP throughout these years. Schularick and Taylor also find that past credit growth is a powerful predictor of financial crises, consistent with the idea that these episodes are “credit booms gone wrong.”

Finally, the authors examine monetary policy responses to financial crises in different countries both before and after the Great Depression. In the pre-Depression era, substantial deflation and a decline in the broad money supply, as measured in the United States by such aggregates as M2 and M3, were the norm during and after financial crises. Since the Great Depression, however, prices and the broad money supply typically have remained about unchanged during and after financial crises. The authors interpret this as evidence that central banks have learned lessons from the Great Depression and now respond more forcefully to financial crises. However, despite this stronger monetary policy response, the decline in macroeconomic indicators such as real GDP during financial crises is not substantially different in the pre- and post-Depression periods.

### Credit booms gone wrong?

Consistent with the empirical evidence in Schularick and Taylor, Beaudry and Lahiri construct a model of financial crises in which an episode of financial distress is intimately related to a credit boom preceding it. In their model, risk-tolerant financiers provide equity funding to companies that are risk-averse. When the economy is doing well, financiers’ wealth increases and they are able to take larger equity positions in companies, enabling those businesses to grow and hire more workers—a credit boom. During the credit boom, risk premiums decline and financiers become increasingly wealthy and increasingly leveraged.

Sooner or later, however, the economy is hit by a negative shock and the boom comes to an end. In Beaudry and Lahiri’s model, financiers are hit particularly hard after a long credit boom because they have become more highly leveraged, obtained larger equity stakes in companies, and thus bear a greater share of those companies’ losses in a downturn. The sharp drop in financiers’ net worth leads to a credit crunch environment in which businesses cannot obtain the financing they would like and consequently must scale back operations and lay off workers. A fast crash follows the long, slow boom. The authors also demonstrate cases in which even a small increase in asymmetric information and uncertainty can cause financial markets in their model to freeze up, resulting in a severe downturn.

In Beaudry and Lahiri’s model, financial markets facilitate a higher level of economic activity on average, but also lead to greater economic volatility. Thus, there is a tradeoff in the model between reducing the volatility caused by financial market imperfections and reaping the benefits that credit markets and bank leverage provide to the average level of economic activity.

### Financial intermediation

Earlier macroeconomic work modeling financial market imperfections tended to focus on frictions in the investor-borrower relationship, such as the chance that a borrower might default. Gertler and Kiyotaki extend this framework to include a more explicit treatment of financial *intermediation*—the presence of a bank, investment bank, or other financial intermediary between the investors and the borrower. Financial intermediation adds an additional layer—and an additional source of fragility—to the relationship between borrowers and lenders.

In Gertler and Kiyotaki's model, a financial crisis is caused by a decline in the value of financial intermediaries' asset portfolios. An example would be the decline in nonprime mortgage-backed securities in the most recent crisis. Because financial intermediaries are leveraged in the model, this decline has a large effect on their net worth. As a result, those intermediaries become seriously constrained in their ability to borrow from investors, and thus to channel funds to would-be borrowers. A credit crunch results, causing large declines in business investment and purchases of consumer durables.

A notable implication of Gertler and Kiyotaki's model is that economic recoveries after financial crises are substantially slower than normal because it takes time for financial intermediaries to rebuild their balance sheets. As long as intermediaries' balance sheets are impaired, their ability to gather funds from investors is constrained and they are unable to channel those funds to would-be borrowers. Only when the financial intermediation sector has recovered is the credit crunch fully alleviated, bringing the economy back to normal.

### **Financial crises and monetary policy**

Two conference papers analyzed the appropriate response of monetary policy to a financial crisis and the potential role for "unconventional monetary policy," as pursued by the Federal Reserve and other central banks during the most recent crisis.

Curdia and Woodford extend a small, standard "New Keynesian" macroeconomic model to incorporate credit spreads in financial markets and a role for the size and composition of the central bank's balance sheet. These modifications allow a simple, standard macroeconomic model to address new questions that have become relevant in light of the recent financial crisis.

Curdia and Woodford find that, during normal times, monetary policy should be implemented using a short-term nominal interest rate, such as the federal funds rate. However, when private credit markets are significantly impaired and credit spreads rise to very abnormal levels, the authors find that the central bank should begin to bring private-sector debt onto its balance sheet in order to free up private investors' capital, allow those funds to flow to private borrowers, and thereby reduce the abnormal credit spreads. Moreover, when the zero lower bound on nominal interest rates is binding, the authors find that the central bank should commit to keeping short-term interest rates low in order to reduce interest rate expectations and thereby lower longer-term interest rates. These policy recommendations bear a remarkable resemblance to many of the policies that central banks around the world actually pursued in the most recent crisis, although it should be noted that the authors recommend returning to a normal interest-rate-only policy once credit spreads return to more normal levels and the zero lower bound is no longer a substantial constraint.

Del Negro, Eggertsson, Ferrero, and Kiyotaki consider many of the same issues, but within the framework of a more complicated New Keynesian model used for quantitative analysis rather than building intuition. Because of the additional structure and complexity of their model, Del Negro and coauthors can model financial market imperfections more explicitly than Curdia and Woodford, which may lead to additional insights regarding the interaction between those imperfections and the economy. According to the authors, businesses can only obtain financing in proportion to the amount of collateral, such as hard assets or land, that they have available. When there is a negative economic shock, businesses' assets are less productive and the value of those assets declines, reducing businesses' ability to borrow. When those businesses can't borrow, they must further reduce output, which in turn further reduces economic activity and leads to additional declines in the value of capital—a downward spiral.

Like Curdia and Woodford, Del Negro and coauthors find that unconventional monetary policies such as central bank balance sheet expansion can have large effects on the economy. The authors find that

these policies are particularly effective when short-term nominal interest rates are constrained by the zero lower bound, as in the most recent crisis. The authors thus conclude that these unconventional monetary policies played a substantial role in supporting the U.S. economy during the most recent downturn and that, without them, the United States would have fallen into a recession comparable to the Great Depression.

## Summary

Financial crises are often associated with severe economic downturns, a fact that is absent from traditional macroeconomic models. Papers presented at the conference considered different ways of integrating financial market imperfections into traditional macroeconomic analysis. Although this line of research is ongoing, a common finding across several of the papers was that monetary policy can and should respond to financial crises to prevent deflation and depression. The kinds of unconventional monetary policies pursued by central banks during the most recent financial crisis may be an appropriate part of this response when credit spreads are highly abnormal and short-term nominal interest rates are constrained by the zero lower bound.

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