
FRBSF WEEKLY LETTER

Number 95-21, May 26, 1995

Financial Fragility and the Lender of Last Resort

Financial crises, such as banking panics and stock market crashes, were a common occurrence in the U.S. economy before World War II. Since then, financial crises have been less common. However, events of the past decade have led to renewed concerns about financial instability and about the proper role of monetary policy in reacting to financial turbulence.

This *Weekly Letter* provides some background on the nature of financial crises, and it discusses whether and how policymakers should intervene. Our discussion borrows heavily from papers by Frederic Mishkin (1991, 1994). Because there are costs to inappropriate intervention, Mishkin suggests that the central bank should intervene only when certain informational problems make it difficult for financial markets to efficiently channel funds to productive investment opportunities. A conceptual framework is needed in order to determine when these informational problems arise. This *Letter* discusses a framework that is based upon theories of asymmetrical information, and it describes the trade-offs that policymakers face.

Theories of financial crises

The traditional theory of financial crises focuses on the effects of bank runs on the money supply. Other things equal, bank runs tend to reduce the money supply by increasing the public's desire to hold currency and banks' desire to hold reserves. Unless the central bank reacts by increasing the supply of currency and reserves, the money supply would fall and interest rates would rise, thus reducing the public's spending on goods and services. For example, Milton Friedman and Anna Schwartz (1963) argue that the Federal Reserve's inaction during the banking panics of the early 1930s helped turn an ordinary recession into the Great Depression. They argue that the Federal Reserve should intervene in a banking panic in order to prevent a contraction in the money supply.

In addition to this effect, modern theories of financial crises focus on the consequences of asym-

metrical information between borrowers and lenders. Borrowers generally know more about their investment projects than lenders, and this can lead to problems related to adverse selection and moral hazard.

Adverse selection occurs when events cause low-risk borrowers to drop out of credit markets. Borrowers invest in projects that involve various payoffs and degrees of risk. High-risk projects also tend to have high expected returns. If lenders do not have enough information to assess the risk-return tradeoffs of particular projects, they must extend credit at an interest rate that reflects the average risk of the market. The average interest rate is too high for projects with low risk and expected return, and it is too low for high-risk, high-return projects. Thus asymmetrical information tends to push low-risk borrowers out of credit markets, leaving only the high-risk borrowers.

Asymmetrical information can also give rise to moral hazard. Once a borrower has received credit, he may have an incentive to undertake activities which raise his own expected return but which also increase the probability of default. This is especially problematic when credit takes the form of a debt contract that allows for bankruptcy and when lenders have difficulty monitoring the borrower's activities.

To mitigate adverse selection and moral hazard problems, Stiglitz and Weiss (1981) show that lenders might prefer to ration credit rather than to raise interest rates when credit demand or uncertainty increases. If lenders were to raise interest rates when credit demands or uncertainty increased, low-risk, low-return borrowers would drop out of the credit market, and high-risk, high-return borrowers would remain. Thus, if creditors were to increase interest rates, the riskiness of the pool of borrowers would increase. Therefore, lenders may choose not to raise interest rates and may instead choose to supply less credit than borrowers demand at the going

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interest rate. Thus, borrowers who have profitable investment opportunities may be unable to find credit.

Mishkin defines a financial crisis as a situation in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to channel credit to borrowers with profitable investment opportunities. Clearly, this definition does not apply to markets in which creditors can easily evaluate the riskiness of projects and monitor the behavior of investors. But in markets where information is asymmetrical, financial crises are costly, because they reduce economic efficiency and because they may lead to a sharp reduction in investment and aggregate demand. Finally, note that a market crash does not by itself constitute a crisis. A crash could reflect a sharp, adverse turn in fundamentals, as in May 1940 when the U.S. stock market crashed after the fall of France.

Symptoms of financial crisis

To identify a crisis, policymakers must determine whether adverse selection or moral hazard problems have become critical. Mishkin lists a number of symptoms. One is a sharp increase in interest rates. This tends to push low-risk borrowers out of credit markets and may lead to credit rationing.

Another symptom is a sharp, unexpected decline in stock prices or inflation. This exacerbates asymmetrical information problems because it reduces the net worth of firms that seek credit. Bernanke and Gertler (1989) show how a large decline in borrower net worth can increase adverse selection and moral hazard problems. A firm's net worth performs a role that is similar to collateral, since a lender can take title to a firm's assets in case of default. Collateral mitigates adverse selection and moral hazard problems because it reduces the lender's losses if the borrower defaults. A decline in net worth implicitly reduces the value of a firm's collateral and may tighten credit rationing.

A third symptom is a banking panic or the failure of other financial institutions. Banks specialize in processing information about borrowers and in monitoring their activities. For example, they usually engage in long-term relationships with their customers, and can monitor their customers' behavior by overseeing their checking account or credit line activity. Bank services are valuable because they reduce the degree of information asymmetry between borrowers and individual

savers, who are the ultimate lenders. During a panic, bank failures increase the degree of information asymmetry. Furthermore, banks that remain in business seek to protect themselves by increasing reserves relative to deposits, and this also results in a reduction of lending.

A fourth symptom is an increase in the spread between interest rates on high- and low-quality bonds. This spread reflects the difference in default risk on well-known, high-quality borrowers (such as the U.S. Treasury) and lesser-known, lower-quality borrowers. Hence, this interest rate spread tends to widen when asymmetrical information problems become severe. Historically, this has proven to be a relatively reliable indicator.

Implications for monetary policy

The classical policy prescription in the event of a financial panic is for the central bank to act as a lender of last resort. In a narrow sense, this can be justified on monetarist principles. Bank failures are contractionary because they reduce the stock of money. Thus, during a banking panic, the central bank should lend through the discount window or engage in open-market purchases in order to prevent a contraction in the supply of money.

The asymmetrical information theory suggests a broader perspective. There may also be occasions when the central bank may need to provide lender-of-last-resort services to nonbanking firms as well. This can be done through the discount window, but other policy actions also may have a role. For example, in June 1970, when Penn Central defaulted on more than \$200 million in commercial paper, the Federal Reserve became concerned that at a time when financial markets were already unsettled, the liquidity of the commercial paper market might be impaired and the pressures arising in that market might spill over to other short-term credit markets. The Federal Reserve moved to suspend the maximum interest rate ceilings on large-denomination time deposits with maturities of 30 to 89 days imposed by Regulation Q. This made it easier for private banks to serve as intermediaries. Investors reluctant to lend to the commercial paper market now provided additional funds to the private banking sector, and borrowers unable to roll over their commercial paper were provided with this new source of credit. The Fed also increased liquidity in the commercial paper market by allowing banks to borrow at its discount window (see Board of Governors, 1971).

The stock market crash of 1987 provides another example of a successful intervention and illustrates the value of lender-of-last-resort activity. On Monday, October 19th, the Dow Jones Industrial Average fell by 22 percent. The day after the crash, many securities firms and exchange specialists needed credit to finance inventories of stocks whose value had fallen sharply. Also, many investors were asked to provide more collateral for securities bought on credit. These demands, known as margin calls, occur when the value of equities in an investor's account fall below a set minimum. Since the value of collateral had fallen sharply, banks were increasingly reluctant to lend. The interest rate spread between junk bonds and Treasury bills jumped by 130 basis points during the week of the crash and rose by another 60 basis points over the following two weeks. The presence of both the stock market crash and the increase in the spread of interest rates between high- and low-quality bonds indicates that asymmetrical information may have increased in the securities sector.

The Federal Reserve became concerned about a possible systemic breakdown in the market's clearing and settlement systems, and it announced a readiness to "serve as a source of liquidity to support the economic and financial system." The Federal Reserve then proceeded to accommodate the increase in demand for liquidity in the economy by buying government securities on the open market. This provided banks with the extra reserves they needed to extend credit to the securities dealers. The Fed also tried to maintain a high level of visibility in the financial markets to help calm fears of a potential crisis. The Fed placed examiners in major banking institutions to monitor banking developments, and also closely monitored securities firms' demands for credit (Greenspan 1988).

While lender-of-last-resort activity may help protect against financial crises, there is a cost. If depositors know that the central bank will bail private banks out if their loans go bad, they may have less incentive to monitor the riskiness of the banks' portfolios. Likewise, if nonbanking institutions know that the central bank will step in during a financial crisis, they might take on more risks that are associated with an economy-wide

financial crisis. Because of these costs, lender-of-last-resort activity should probably be used sparingly.

Conclusion

Theories based on asymmetrical information suggest that financial markets can be fragile, since lenders may opt out of the market when credit demands increase or when uncertainty is especially great. By serving as a lender of last resort, central banks can play an important role in reducing financial panics, as they can ensure that credit markets remain liquid in the event of a crisis. However, this literature suggests that central banks should intervene sparingly, as too much involvement may cause market participants to assume more risk.

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