Are Bank Runs Contagious? Ted Temzelides*

Banks are a vital part of the economy because they provide an important channel through which many businesses get their financing. However, as we know from the history of the United States and other countries, banks can be subject to runs and panics. A panic that encompasses a large part of the banking system can seriously disrupt economic activity.

During a run, a bank experiences much heavier demand for deposit withdrawals than it can easily meet. If the run is severe enough, the bank will not be able to meet the demands of all depositors trying to withdraw money and, consequently, will have to suspend payments. During a panic, runs occur on a large number of banks.

Panics may occur because of regional or economywide problems, such as a real estate bust, during which the portfolios of many banks lose value. If depositors have not completely lost confidence in the banking system, they will transfer their deposits from failing banks to solvent banks. But panics may also occur because runs on a few banks cause depositors at other banks to lose confidence and, therefore, to withdraw *indiscriminately* from both solvent and insolvent banks. These types of panics, which involve runs on a few banks spreading to otherwise solvent banks, are said to involve contagion.

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This general definition of contagion does not specify the precise reasons that bank runs might spread. Later, we will discuss several recent studies that test for different factors that can lead to contagion.

In the late 1800s and early 1900s, there were several episodes of widespread runs on banks. Even the 1980s saw a number of well-publicized runs, including those involving S&Ls in Maryland and Ohio, Penn Square Bank, and the Seattle First National Bank. Despite these more recent occurrences, the number of runs has fallen dramatically since deposit insurance was established in 1933.

Of course, deposit insurance is not without its own problems. For example, it has recently been criticized for distorting banks' incentives for taking excessive risk-the so-called moral hazard problem. This can lead to problems for institutions that are poorly capitalized. In fact, excessive risk-taking, fueled by distortions caused by deposit insurance, has been implicated in the S&L debacle of the 1980s. While a bank enjoys higher profits if risky projects pay off, it does not always have to pay for taking the additional risks. Rather, the FDIC bears the cost of paying off depositors when the bank cannot. Also, insured depositors, knowing the FDIC will repay them if their banks cannot, lose the incentive to try to assess the riskiness of their banks and, therefore, do not require higher interest rates from banks with riskier portfolios.

Although the FDIC Improvement Act of 1991 introduced risk-based deposit insurance premiums to try to mitigate excessive risk-taking, today's premiums do not vary much with the riskiness of a bank's portfolio. According to FDIC data, 94.4 percent of banks, which hold 96.8 percent of total deposits, pay the same premium (which is currently zero) for FDIC insurance. These banks are not identical in terms of the riskiness of their portfolios. Thus, the current risk-based premiums are unlikely to have a large effect on banks' risk-taking behavior.¹

Because of the potential distortions caused

by deposit insurance, some economists advocate scaling it back or even eliminating it. But before such steps are taken, analysis is needed to weigh the costs from the problems created by deposit insurance against its benefits in preventing panics. One necessary step in this analysis is to assess how serious the problem of runs would be if there were no deposit insurance. An insolvent bank should be allowed to close; however, its failure mustn't spread to healthy banks. If runs are contagious, deposit insurance, regulation, and the ability to borrow at the Federal Reserve's discount window may all play an important role in preventing runs from spreading. In this article, we will review the basic theory and present some recent evidence on contagious bank runs.

ILLIQUID ASSETS AND LACK OF INFORMATION

One of the major roles of banks is to provide liquidity in the economy by allowing depositors to withdraw money from their bank accounts whenever they want to. But while banks have liquid liabilities, they invest a large part of their portfolios in long-term illiquid assets, for example, real estate or business loans.² In normal circumstances, the bank's loan portfolio has some returns from loans that borrowers

¹Part of the reason most banks currently pay the lowest premiums is that the Deposit Insurance Funds Act of 1996 restricts the FDIC from collecting excessive reserves. Section 7 of the Federal Deposit Insurance Act sets the target ratio of reserves to estimated insured deposits at 1.25. Since the banking industry has been performing well, failures and, therefore, insurance payouts, have been low, allowing the insurance premiums banks pay to fall. Nevertheless, uniform premiums, regardless of whether they are high or low, can distort banks' incentives for taking on more risk than is best for society.

²A typical bank holds a higher fraction of loans than securities in its portfolio; however, these fractions do vary over the business cycle. On average, over the last nine years, loans as a fraction of banks' total assets were 60.5 percent, while securities, which tend to be more liquid, were 19.6 percent of total assets.

are paying back. Also, the bank holds enough liquid assets, such as Treasury securities, to meet the usual demand for withdrawals.

However, if too many depositors want to withdraw their money, the bank will have to begin liquidating some of its long-term assets, for example, by selling them in a secondary market, before they mature. Typically, this early liquidation means the assets will not pay off as much as they would have, had the bank been able to hold them to maturity: the bank may have to sell the assets at "fire sale" prices. In other words, deposits are liquid-depositors can withdraw their money from the bank at any time. But loans are illiquid—it can be very costly to recall them and difficult for the bank to find a suitable buyer for them. While innovations in financial markets have permitted bank portfolios to become increasingly liquid—for example, through the securitization of mortgages and consumer loans-other bank assets, such as corporate loans, remain illiquid.

Since all banks keep only a fraction of their deposits as cash, any level of illiquidity makes them vulnerable if demand for withdrawals is high enough. This problem can become so severe that it can lead to insolvency. In a world without deposit insurance, if a depositor believes, for whatever reason, that her bank is about to become insolvent, she has an incentive to be the first to get her money out before the bank runs out of cash. If enough depositors panic and demand to withdraw their deposits, a run is created. Even healthy banks, whose assets would pay off in full if held to maturity, could fail if faced with a sufficiently large and unexpected amount of withdrawals. And the run might spread if depositors at other banks become worried as well.

When depositors at one bank start a run, why do depositors at other banks often follow suit? Banks' ability to handle unusually large withdrawals depends on what proportion of their assets is liquid and the quality of their illiquid assets. If a depositor believes that other depositors at her bank plan to withdraw their funds, she may start worrying about her own money. She knows that if withdrawals are large enough, the bank could fail. In this case, an amount less than the initial deposit will be left for her if she waits too long, so she may decide to withdraw her deposits immediately. If all depositors share her beliefs, a run could start and that bank could fail regardless of the condition of its assets. A run on one bank may lead depositors at other banks to form similar beliefs about the behavior of other depositors and to start a run on their banks. In this case, failures could spread among both solvent and insolvent banks because runs on a large number of banks could lead depositors to lose confidence in the banking system as a whole.

Alternatively, depositors might have some information about the quality of their bank's assets. If the assets turn sour—for example, during a period of unfavorable economic conditions—these depositors might start a run on the bank. Subsequently, depositors at other banks may start runs if they think their banks have assets similar to those of the first bank. Thus, panics can be triggered when depositors, in the light of new information, revise their beliefs about the quality of their banks' assets.³

In this case we might expect informed depositors to start runs mainly on troubled banks. Then, as they got more information about which banks were solvent, we would expect them to move their money from failing banks to healthy ones. Therefore, this type of run appears to be less costly for society. On the whole, it could even be beneficial, since monitoring bank performance helps to distinguish between good and bad banks. However, accurate monitoring relies on depositors' having perfect information about their banks' condition—but information about the economic condition of banks is almost never perfect. In times of financial distress, de-

³See, for example, Calomiris and Gorton (1991).

positors are particularly sensitive to any kind of news and may start runs on some liquidity-constrained but otherwise healthy banks, thereby causing them to fail.

Usually, economists view these as opposing theories of why runs occur, but real world episodes probably contain features of both. This article will discuss the evidence on whether certain historical episodes of bank failures have involved contagion and why or why not.

ONE VIEW: NO CONTAGION EFFECTS

During the National Banking Era (1863-1914), there were five major banking panics: 1873, 1884, 1890, 1893, and 1907, roughly one a decade. All these panics occurred before either the Federal Reserve System or deposit insurance was created.⁴ In most of these episodes, large numbers of banks temporarily suspended the convertibility of de-

⁴See the box *Selected Bank Runs During the National Banking Era* for brief descriptions of the proximate causes and the main sequence of events during selected panics from this period.

Selected Bank Runs During the National Banking Era*

1873

Economic Environment: Railroad boom; four years of rapid economic growth.

Proximate Cause: Excessive loan expansion to railroad companies and decline of the railroad business.

Major Events:

Sept. 8: Suspension of the N.Y. Warehouse and Security Company, which was financially involved with the Missouri, Kansas, and Texas Railroad.

Sept. 13: Failure of Messrs. Kenyon, Cox & Co., which endorsed Canada Southern Railway paper.

Sept. 18: Major bank runs started.

Sept. 20: Closing of N.Y. Stock Exchange.

Sept. 24: Suspension of currency payments by N.Y. banks.

1893

Economic Environment: Monetary disturbance caused by Sherman Silver Purchase Act and international gold flows.

Proximate Cause: Stock market collapse in May.

Major Events:

Feb. 26: Failure of Philadelphia and Reading Railroad.

May 4: Failure of the National Cordage Company (trust company), which caused the stock market collapse.

July: Numerous bank failures throughout the nation. Reserve outflows from N.Y. banks.

Aug 5: Suspension of payments by N.Y. banks.

1907

Economic Environment: Steady rise in the price level and economic boom in the 1900s.

Proximate Cause: Failure of an attempt to corner copper stocks. *Major Events:*

Oct. 17: Runs on the Mercantile National Bank, which attempted to corner the stock of the United Copper Company.

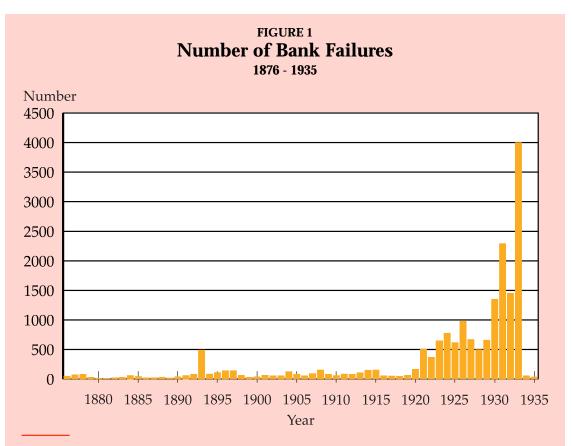
Oct. 21: Runs on Knickerbocker Trust Company, which was financially involved with the Mercantile National Bank. Major bank runs started. Oct. 22: Suspension of Knickerbocker Trust Company.

Oct. 23: Major runs on trust companies.

^{*}Taken from Sangkyun Park, "A Triggering Mechanism of Economywide Bank Runs," in Allin F. Cottrell, Michael S. Lawlor, and John H. Wood, eds., *The Causes and Costs of Depository Institution Failures,* Kluwer, Boston, 1995. Used with permission.

posits into cash. In other words, depositors could not withdraw their money from the bank. A suspension would typically start at banks in the East, commonly New York, and subsequently spread westward. Panics tended to occur during the fall when the demand for liquidity was higher, mostly because of the seasonal increase in demand for currency to cover needs related to agriculture and the seasonal movement of crops. Panics were also associated with recessions, during which nonbank businesses also experienced difficulties. But the nature of the economy is not the only determinant of banking system stability. While the economies of the United States and Canada were quite similar in the late 1800s and early 1900s, the experiences of their banking systems were very different. During 1930-33, more than 9000 banks failed in the United States, but none failed in Canada. (Figures 1 and 2 show the number and percentage of bank failures in the United States from 1876-1935.) And unlike in the United States, panics were not widespread in Canada.

Stephen Williamson has argued that this difference in failures and panics was partly due to the structure of the banking systems in the two countries. Because of branching restrictions, the



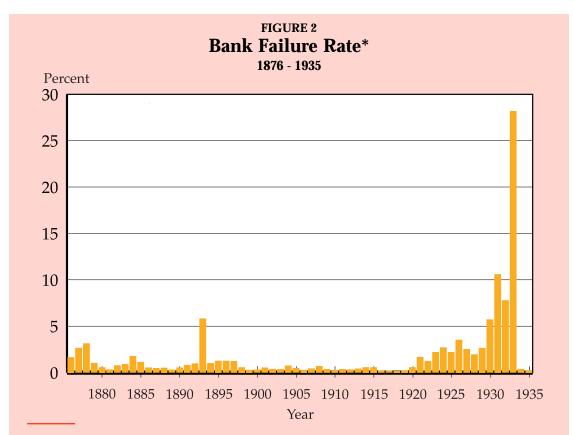
Data Source: Table 2, Chapter 2, in George J. Benston, Robert A. Eisenbeis, Paul M. Horvitz, Edward J. Kane, and George G. Kaufman, *Perspectives on Safe and Sound Banking: Past, Present, and Future.* Cambridge, MA: MIT Press, 1986.

BUSINESS REVIEW

U.S. system consisted of a large number of relatively small banks. In fact, in 1890, there were more than 7000 banks in the United States.⁵ At the same time, Canada had a branch banking system without geographic restrictions—about 40 chartered banks with about 400 branches. Williamson argues that the ability of bigger banks to diversify in Canada was one of the factors that prevented widespread crises there in the early 1930s.⁶ Researchers are not in complete agreement about whether certain historical episodes in the United States were severe enough to constitute banking panics or were merely less significant episodes in which a small number of banks failed. Moreover, even when researchers agree that a certain episode was a panic, they do not always agree about whether contagion effects played an important role in the panic's development.

 $^5\mathrm{By}$ 1920, the number of banks in the United States had grown to more than 30,000.

⁶Nationwide branching was permitted in the United States as of June 1997.



*Failures during the year as a percent of the total number of banks at year-end.

Data Source: Table 2, Chapter 2, in George J. Benston, Robert A. Eisenbeis, Paul M. Horvitz, Edward J. Kane, and George G. Kaufman, *Perspectives on Safe and Sound Banking: Past, Present, and Future.* Cambridge, MA: MIT Press, 1986.

Several researchers have questioned the widespread existence of contagion effects.⁷ Instead, they argue that panics are the result of bad economic times that cause weak banks to become insolvent. They think it unlikely that depositors' loss of confidence in banks or the banking system can, by itself, cause a financial crisis. They argue that depositors who withdraw funds generally transfer them to another bank that is considered safe, in which case the total deposits of the banking system are not affected.

In addition, banks' own actions helped stop contagion. During some panics in the National Banking Era, bankers lent money among themselves to help one another meet the high demand for withdrawals. In several episodes, a coalition of banks, such as the New York Clearing House, acted collectively by issuing clearing house loan certificates to help banks that needed temporary liquidity. Because these certificates were joint liabilities of the entire group, this action helped the coalition's member banks that were in good standing but that were nevertheless facing liquidity demands they could not meet. While such cooperative arrangements did not succeed in eliminating panics altogether, there is evidence that they were successful in reducing the frequency and severity of panics. The "no contagion" view, then, maintains that, on the whole, contagious bank panics were rare events.8

A recent study by Charles Calomiris and Joseph Mason investigates whether, in the absence of deposit insurance, differences in information across depositors induced runs on solvent banks and involved contagion effects in the June 1932 banking panic in Chicago. Although the number of bank failures at the national or state level was not particularly high that month, there was a very strong concentration of bank failures in Chicago during the week of June 20. Calomiris and Mason report that 40 bank failures took place in Chicago in June, 26 of them during that week. In addition, the pattern of deposits shows that Chicago banks experienced a large decline in deposits during late June, and this pattern was not observed in other areas of the country.

By focusing on a particular location, Calomiris and Mason ensured that the banks they studied faced similar economic environments, e.g., the mix of industries of potential borrowers, and the incomes of potential depositors. Using a variety of measures, they investigated whether banks that failed during this episode were weaker and thus-panic asidemore vulnerable to declines in the prices of assets than banks that survived. The authors looked at market-to-book value of equity, interest rates paid on borrowings from other banks, and other accounting measures that gave them information about the probability of a bank's failure. They compared these factors at banks that failed during the panic with those at banks that survived. They found that the banks that went on to fail began with lower market-to-book values of equity, higher estimated probabilities of failure, and higher borrowing rates. In other words, they were weaker banks, and they shared characteristics with banks that failed outside the panic period.

Calomiris and Mason concluded that bank failures in Chicago in June 1932 were due to declines in asset values at the failed banks and not to panic-induced withdrawals because of depositors' confusion about the status of the banks or contagion.⁹ Furthermore, they argued that contagion to solvent banks was avoided because the banks knew each other's status bet-

⁷See the articles by George Benston and coauthors; George Kaufman; and Charles Calomiris and Gary Gorton.

⁸Even this camp considers the events of late 1932 through early 1933, which brought the entire banking system to a halt, to be consistent with contagion effects. The disagreement between researchers seems to be about how frequently we would expect to observe such events in an environment without government deposit insurance.

ter than depositors did. Therefore, they helped each other by making loans backed by very high-quality assets. Hence, solvent banks that could post collateral avoided failure during the crisis. Some banks with sufficient collateral also borrowed from the Fed's discount window. But, in general, banks preferred borrowing from one another, since this action was less public: they feared that borrowing from the Fed might be misinterpreted by depositors as a sign of weakness.

Although it is hard to generalize on the basis of one event, the authors' findings are consistent with many studies that suggest that private interbank cooperation may be sufficient to reduce, although not necessarily prevent, contagious panics.

ANOTHER VIEW: CONTAGION EFFECTS

While it is difficult to distinguish between runs that occur at the same time in many banks and contagious ones, some researchers have been able to identify contagious runs.¹⁰ Milton Friedman and Anna Schwartz have interpreted the panic of 1930 as a purely autonomous disturbance largely unrelated to the Depression and, thus, a candidate for a contagious panic.¹¹ Elmus Wicker studied the same event and argued that the crisis was precipitated by the collapse of the Caldwell financial empire. Caldwell and Company, located in Nashville, Tennessee, controlled the largest chain of banks in the South. Wicker attributes this failure to Caldwell's "weak and precarious financial state on the eve of the Depression." Caldwell's collapse caused depositors to revise their expectations about future deposit losses and affected more banks in later months. Wicker thus disputes the view that the panic of 1930 was a wholly autonomous event. His view does not rule out contagion, but makes it less likely that contagion was present.

Soon after Caldwell's closing, the Bank of United States also failed. Friedman and Schwartz maintained that the bank's name led to confusion about its official status, constituting a serious blow to depositor confidence.¹² They concluded that the banking panic of November-December 1930 was the result of a contagion of fear that spread among depositors, accelerating the bank failure rate, reducing the money stock, and worsening the economic downturn. (See *The Banking Panic of 1930*.)

Anthony Saunders and Berry Wilson found evidence for significant contagion effects during the period 1930-32 but no evidence of contagion during the panics of 1929 or 1933. Using regression techniques, Saunders and Wilson investigated the determinants of deposit withdrawal rates during these periods. Their analysis compares the deposit withdrawal rates at failing banks in the three years prior to the year of a bank's failure with the withdrawal rates at a matched sample of surviving banks. Each bank in the sample of banks that survived was

⁹But they did acknowledge that some confusion among depositors was present during this episode.

¹⁰George Kaufman, who maintains that the importance of contagion effects has been exaggerated, nonetheless cites examples of runs on neighboring banks that occurred after the announcement of negative news about the solvency of one institution. Kaufman also points out four periods in which the level of deposits in the banking system declined (1878, 1893, 1908, and 1930-33), a condition consistent with contagion.

¹¹In addition to being a candidate for a panic in which contagion effects were present, the panic of 1930 provides an example of a crisis that developed after the Federal Reserve System was created but before deposit insurance was established.

¹²Confusion may have arisen because of the similarity in names between the Bank of United States and the first Bank of the United States and the second Bank of the United States, both of which were early attempts at establishing a central bank. However, the Bank of United States was a commercial bank with no special ties to the government.

The Banking Panic of 1930*

In several of the panics that occurred before the Federal Reserve System was established, banks temporarily suspended convertibility of deposits into currency. Such suspension of payments, often coordinated by banks in the New York Clearing House, successfully prevented panics from spreading when banks were suffering mainly from temporary liquidity problems. Restriction of payments by banks during the early signs of a panic protected the banking system by giving time for depositors' fears to wear off and for banks to regain liquidity. Once the danger of widespread runs had passed, banks resumed converting deposits into currency. During these suspensions, banks typically carried on with their usual operations: making loans, transferring deposits by check, and, in certain cases, converting limited amounts of deposits into cash, for example, so that firms could meet their payrolls. Such limited suspension was not without costs, but the costs were far smaller than those of the panics of the 1930s.

During the panic of 1930, early suspension of convertibility did not occur. Milton Friedman and Anna Schwartz maintain that, as a result, the panic of 1930 became the first of a series of crises that ended only after the banking holiday of March 1933.

Friedman and Schwartz emphasize the importance of the failure of the Bank of United States on December 11, 1930. This bank was the largest that had failed in the United States up to that time, and its failure provides an example of how the methods for stemming incipient panics had changed after the Fed came into existence. Despite various plans sponsored by the Federal Reserve Bank of New York and others to save the bank, the member banks of the New York Clearing House withdrew support and did not provide the new capital funds that would have helped in reorganizing the bank. Personal appeals by the state superintendent of banks and the lieutenant governor of New York were unsuccessful at changing the position of the clearing house. Instead, the president of the New York Clearing House suggested that the effects of closing the bank would be only local.

The bank, a member of the Federal Reserve System, borrowed from the Fed, but this borrowing was not sufficient to save it. It is not certain whether the bank could have raised collateral of high enough quality to back more substantial lending. In general, banks avoided borrowing from the Fed during periods in which fearful depositors were looking for signs of weakness, trying to predict which banks were likely to fail. Thus, the Bank of United States failed, and many others followed.

Friedman and Schwartz argue that under the pre-Federal Reserve banking system, banks would probably have restricted payments to depositors during the final months of 1930, which might have bought time for the panic to subside. They claim that the existence of the Federal Reserve prevented suspension by reducing the concerns of stronger private banks, which in the past had taken the lead in such a move. Furthermore, many people, assuming the Federal Reserve would deal with such crises, believed such a move was unnecessary. Had suspension of convertibility taken place during this episode, the Bank of United States might have been able to reopen, since this bank eventually paid off 83.5 percent of its liabilities at its closing, despite the fact that it had to liquidate a large fraction of its assets under unfavorable conditions.

^{*}Some parts are based on Milton Friedman and Anna Schwartz, A Monetary History of the United States.

matched to a failed bank in terms of deposit size and the city in which it was located.¹³ The authors reasoned that if a bank run was not due to a contagious panic, depositors should withdraw their money from bad banks and re-deposit it with good banks in the same locality. If, on the other hand, bank runs were developing into contagious panics, the authors would observe increased withdrawal rates at both good and bad banks as the time of failure approached.

Saunders and Wilson found that, for banks that failed in the period 1930-32, deposit withdrawals at good banks increased over the three years leading up to the failure of their matched bad banks.¹⁴ Withdrawals at banks that failed and those that survived differed little in the years prior to failure. In the year of failure, failing banks lost, on average, a higher fraction of their deposits than banks that survived. For example, banks that failed in 1932 experienced, on average, withdrawals of 51.8 percent, while the matched control banks suffered withdrawals of 19.3 percent in that year.

The authors interpreted these observations as evidence consistent with contagion. In addition, regression analysis showed that in the period 1930-32, the rate of withdrawals at the matched surviving banks was significantly higher if the rate of bank failures in the surviving bank's state was higher or if the deposit outflows at their matched failing banks were higher. We would expect neither of these factors to be positively related to deposit withdrawals at the surviving banks if contagion were not present because, in the absence of contagion, we would expect to see funds moving

¹³If no such matched bank existed within the city, they chose the matching bank from a city of similar size.

¹⁴This was true even when differences in local economic conditions that could affect deposit withdrawals, for example, differences in personal income, were taken into account. from failing banks to healthy ones instead of withdrawals from both types.¹⁵

Joseph Aharony and Itzhak Swary studied the behavior of bank stockholders in more recent bank failures. Since these stockholders are not insured, how they acted might illuminate how depositors might behave in the absence of deposit insurance. The authors empirically tested whether stockholders draw inferences about the health of a bank by observing similar banks. Such observations may be one mechanism through which contagion arises.

The authors focused on the failure of five large banks in the southwestern United States during the mid-1980s.¹⁶ They concentrated on a set of bank characteristics as a measure for the information on which depositors base their assessments of banks' riskiness. For example, the distance of a nonfailing bank's headquarters from a failed bank's headquarters may be particularly important: it's a good indication that both banks have similar loan portfolios, and hence face similar risks, because banks in the same location are subject to similar economic conditions and have similar types of borrowers. Size may also be important, since banks of different sizes may engage in different types of activities. For example, large banks tend to be more involved in wholesale activities, such as offering credit to large firms. So the failure of a large bank, if there is contagion, will likely have more of an impact on other large banks.

The authors' results indicated that the closer a large solvent bank is to a large failing bank, the stronger is the negative impact of the fail-

¹⁵Saunders and Wilson also show that contagion effects grew worse over the period 1930-32.

¹⁶The failure of the First National Bank of Midland, Texas, for example, in October 1983 resulted from a run by large depositors. This was the second biggest commercial bank failure in the United States.

ure on the solvent bank's stock return.¹⁷ Joseph Aharony and Itzhak Swary also found that the larger the solvent bank is, the larger the decline of its stock return after the failure of another large bank. The results are consistent with information-based runs, in which the market assumes that similar banks are likely to have similar problems. The authors interpret their results as suggesting that the failure of a bank in one region should make regulatory authorities concerned about the possibility of contagion and, therefore, of consecutive runs on similar, but otherwise healthy, banks in the same region.

CONCLUSION

The study by Saunders and Wilson suggests that contagion effects were present in some

cases and not in others. But additional research is needed before the *magnitude* of contagion effects during different episodes is documented with certainty. Research similar to the Calomiris and Mason study, which used bank-level data on local panics that occurred before federal deposit insurance existed, could prove useful in this endeavor as could more formal statistical tests.

Historically, the possibility of panics, and therefore of contagious panics, appears to depend on the structure of the banking system and the specific private arrangements designed to prevent such events. But private arrangements have limitations; historically, they did not eliminate banking crises altogether. Current evidence suggests that contagion effects have to be taken seriously in the debate about deposit insurance. Before drastic changes are made to the safety net, we should remember what banks experienced when they had to work without a net.

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¹⁷Since data on stock returns are easily accessible, both depositors and stockholders may use them to evaluate the condition of their bank.

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