Contagion and Bank Failures During the Great Depression: The June 1932 Chicago Banking Panic

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We examine the social costs of asymmetric-information-induced bank panics in an environment without government deposit insurance. Our case study is the Chicago bank panic of June 1932. We compare the ex ante characteristics of panic failures and panic survivors. Despite temporary confusion about bank asset quality on the part of depositors during the panic, which was associated with widespread depositor runs and bank stock price declines, the panic did not produce significant social costs in terms of failures among solvent banks. (*JEL* G28, G21, N22, E58, E32)

Recent work in banking theory and history has helped to define the potential causes and costs of bank panics, which various authors have argued can be traced to speculative attacks on the numeraire (Barry A. Wigmore, 1987; R. Glenn Donaldson, 1992), illiquidity shocks (Douglas W. Diamond and Philip H. Dybvig, 1983; Donaldson, 1993), or shocks to bank asset values when there is information asymmetry between bankers and depositors about the incidence of those shocks (Calomiris and Gary B. Gorton, 1991; Calomiris and Charles M. Kahn, 1991; Calomiris and Larry Schweikart, 1991; Sudipto Bhattacharya and Anjan V. Thakor, 1993; George G. Kaufman, 1994). In the latter case, when depositors cannot observe whether individual banks are solvent, but can observe a shock that affects banks' portfolios, they may initiate runs on all banks, both solvent and insolvent.

Bank panics are short-lived phenomena, historically measured in days or weeks. However, a panic still can have important long-lived costs if it results in the disappearance of solvent banking institutions. That concern is often invoked to justify the significant expansion of the government safety net for U.S. banks during the 1930's (Anthony J. Saunders and Berry Wilson, 1994). In this paper, we take a close look at one of the clearest examples of an asymmetric-induced bank panic during the Great Depression, and ask whether solvent banks failed during that panic.

The answer to this question has important public policy implications. Studies of bank panics argue that panics induced by asset shocks and asymmetric information can be hard to resolve with monetary policy alone. In contrast, speculative attacks on the numeraire induced by uncertainty about its future value can be stopped by policies that resolve uncertainty about monetary policy (for example, by a devaluation, as in the United States in March 1933). Similarly, bank panics that result from shocks to liquidity preference and a limited supply of aggregate liquid bank assets can be resolved by traditional monetary policy in the form of open-market purchases of securities by the central bank (Bruce Champ et al., 1991). But bank panics caused by asymmetric information about the condition of banks

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cannot be resolved by monetary policy. Values of individual bank loan portfolios (about which uninformed depositors are concerned) are not controllable by monetary policy (Frederic S. Mishkin, 1991; Calomiris, 1994).

To resolve the problem of asymmetric-information-induced runs one must limit the risk depositors face as the result of asymmetric information, and thus remove the incentive for depositors to demand immediate withdrawal. This can either be done privately or publicly. Privately, banks can either act individually to reassure depositors or agree temporarily to stand behind each other's liabilities. So long as depositors are confident that the coalition of mutually insuring banks is solvent collectively, that collective action can bring the panic to an end without resort to suspension of convertibility. Alternatively, the government can provide insurance of deposits, either in the form of a commitment to pay depositors, or by lending cash to banks against their illiquid assets at a subsidized rate.

This paper addresses the empirical question of whether private bank actions to stem asymmetric-information runs are adequate, or whether government deposit insurance is needed. Specifically, we ask whether private institutions can prevent the failure of solvent banks during a bank panic. We examine that question in the context of the banking crises of the Great Depression. The example we focus on is the Chicago panic of June 1932. We choose this example for three reasons. First, we argue it is a quintessential example of an asymmetric-information-induced panic. Second, this was one of the most publicized examples of a run on banks during the banking crises of the early 1930's, which coincided with the federal government's decisions to establish the public safety net for banks. Third, by focusing on a particular location and episode, we are able to clearly identify the origins of the panic and to control for the effects of location, time, and macroeconomic environment—factors that might otherwise complicate our analysis.

Our strategy in the paper is as follows. We use a variety of measures to judge whether banks that failed during the Chicago panic were likely to have been solvent. We investigate whether they were predictably weaker *ex ante* (and thus more vulnerable to asset price decline) relative to banks that survived the panic. We employ data from individual bank failure experience, balance sheets, income and expense statements, and stock prices for failing and surviving Chicago banks before and during the panic. We analyze characteristics of failing and surviving banks to determine whether the banks that failed during the panic were similar *ex ante* to those that survived the panic. We find that panic failures were weaker than panic survivors, and argue that panic failures can be attributed to asset value decline of failed banks rather than to depositor confusion about the value of bank assets.

While depositors did confuse panic survivors with panic failures, the failure of solvent banks did not result from that confusion. One reason such failures were avoided may be that solvent banks knew each other's condition better than depositors, and had the incentive and the ability to help each other avoid failure during the crisis. Private cooperation by the Chicago clearing house banks appears to have been instrumental in preventing the failure of at least one solvent bank during the panic.

Section I provides historical background for the Chicago panic to support our use of the June crisis as an example of an asymmetric-information-induced bank panic, and our identification of the panic event window. Section II presents our empirical analysis of the characteristics of panic failures, panic survivors, and banks that failed outside the panic window. Section III concludes with a summary of our findings and a discussion of their importance and limitations.

I. The June 1932 Banking Crisis in Chicago

Our discussion of the Chicago banking crisis establishes five "facts" that support its use for testing the value and limitations of private cooperation during asymmetric-information-induced panics. Together, these five facts establish that the Chicago panic resulted from location-specific asset shocks that were relevant for bank portfolios; that it was a true asymmetric-information-induced panic in that all banks (*ex post* solvent and *ex post* insolvent) experienced heavy withdrawals and stock price declines during the panic; that (at

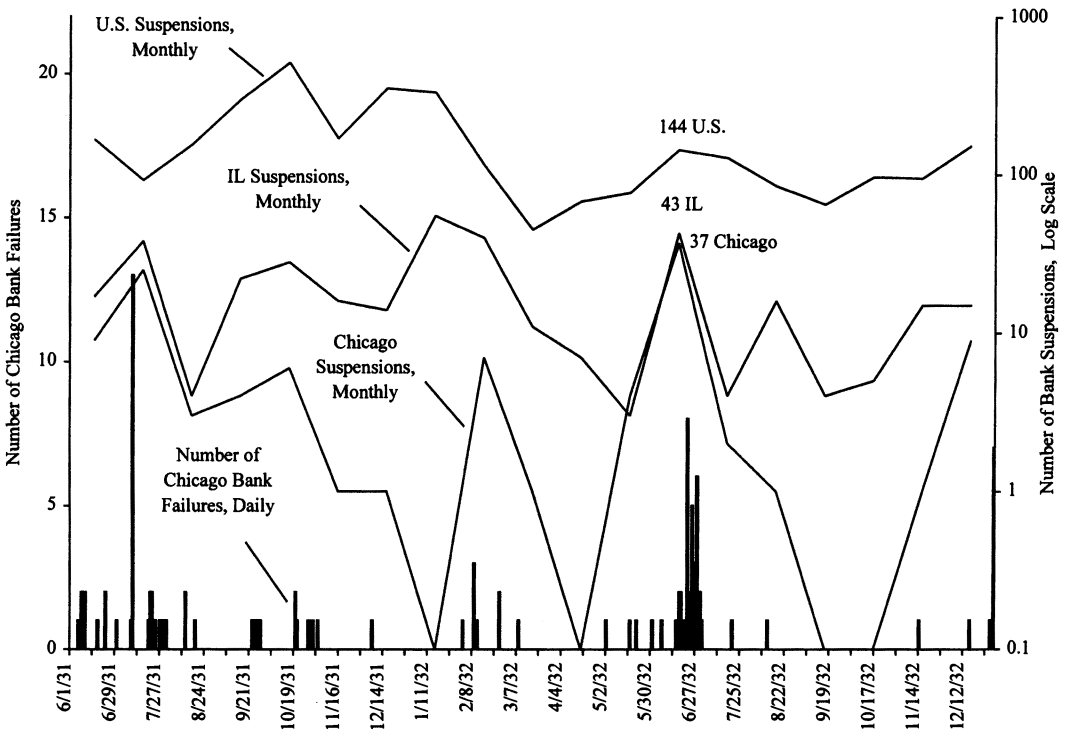

FIGURE 1. NUMBER OF FAILED OR SUSPENDED BANKS (DAILY AND MONTHLY), JUNE 1931–DECEMBER 1932

Notes: Bank suspensions are from the *Federal Reserve Bulletin,* various issues. Bank failures consist of receiverships and voluntary liquidations, and come from the *Annual Report of the Comptroller of the Currency,* and the *Statement Showing Total Resources and Liabilities of Illinois State Banks at the Close of Business,* Superintendent of Banking of the State of Illinois, various issues. In order to accommodate the logarithmic scale on the right-hand side, 0.1 is substituted for observed values of zero in the monthly data.

least in one case) banks were willing to support each other against the uninformed runs of depositors; and that Chicago bank failures that occurred outside the panic window did not coincide with similar (panic) events.

A. *Was the June Crisis in Chicago a Unique Event Nationally?*

As Figure 1 shows, mid-to-late June of 1932 witnessed concentration of bank failures in Chicago, whether measured by the number or total assets of failed banks.[1] The number of bank failures in June 1932 was not particularly high at the state, Federal Reserve District, or national level in comparison to previous months. In contrast, Chicago experienced a severe concentration of failures during the week of the panic. Of the 49 bank failures in the state of Illinois during that month, 40 took place in Chicago, and 26 of these failed in the week of June 20–27 (*Commercial and Financial Chronicle,* July 2, 1932 p. 71).[2]

Deposit outflows indicate a similar pattern. As shown in Figure 2, Chicago banks saw an unusually large decline in their deposits during

[1] Asset plots are available from the authors upon request.

[2] The reported "failure dates" in the *Commercial and Financial Chronicle* of June 20–June 27 correspond to failure dates of June 21–June 28 reported by state and national bank regulators.

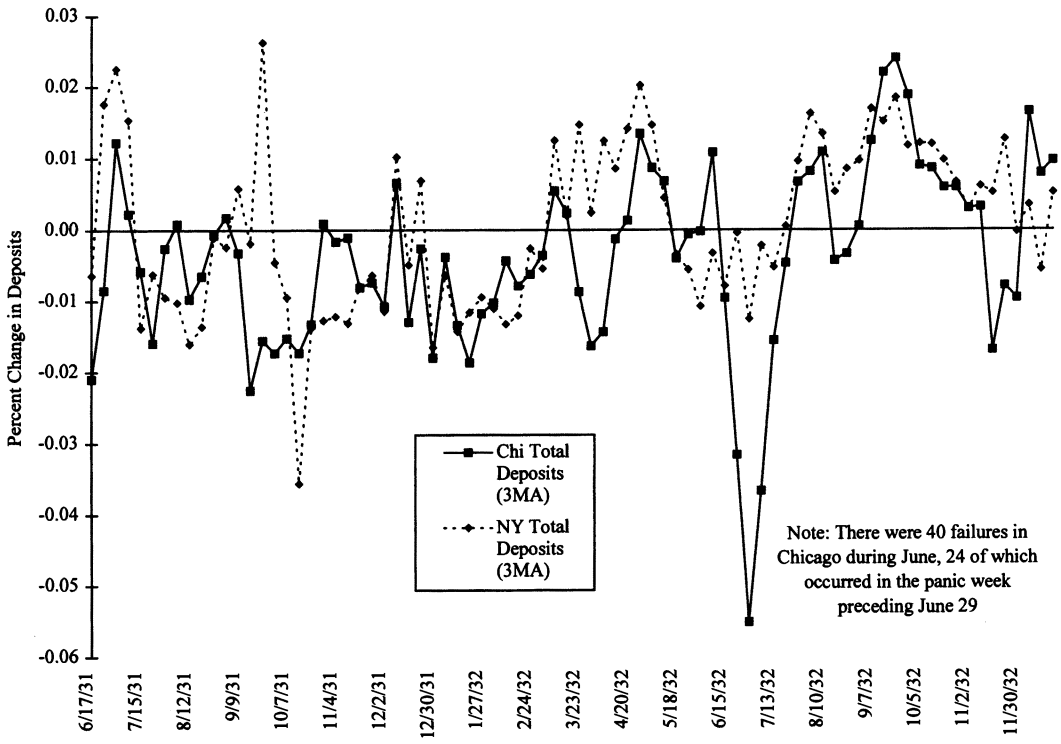

FIGURE 2. PERCENT CHANGE IN THE THREE-PERIOD MOVING AVERAGE OF TOTAL DEPOSITS, WEEKLY-REPORTING BANKS IN CHICAGO AND NEW YORK CITY, JUNE 1931–DECEMBER 1932

late June, and banks in other areas of the country (notably New York City, the financial center) did not share in that precipitous decline.

B. *Solvent and Insolvent Banks Both Suffered During the Panic*

Contemporary chroniclers and economic historians have pointed to the June banking crisis in Chicago as an important example of how a systemwide attack by depositors on banks can produce pressure on solvent and insolvent banks alike. In 1932, the crisis received national, as well as local, attention in the press. Contemporary reports clearly indicate that depositors ran *ex post* solvent as well as *ex post* insolvent banks en masse.

The *Commercial and Financial Chronicle* (July 2, 1932 pp. 70–71) provided a detailed account of the runs on Chicago banks, and specifically noted that even healthy banks (including, for example, First Chicago) were affected. These reports emphasized that long lines of individual depositors formed at banks. Some banks that were reported to have experienced large withdrawals (including First Chicago and Continental) were able to withstand their runs and remain open, while other banks (including one Loop bank—the Chicago Bank of Commerce), were forced to close.

Initially (before June 22), bank distress was limited to a few banks, but this soon spread and was associated with a dramatic decline in aggregate deposits in Chicago banks. The dramatic withdrawals from downtown banks began on June 22 and reached their peak on Friday, June 24. F. Cyril James (1938 p. 1034) distinguishes the panic in late June from previous periods of banking distress in Chicago:

> [previous] runs ... were directed against particular banks that were known to be enfeebled; this one was directed against the whole Chicago money market and

> the First National group, in the center of the battle, still had more than a hundred and twenty-five million dollars of cash resources available, even though it had paid out fifty millions since Tuesday night. In the case of earlier runs, the crowds had been drawn from a particular locality or a special group: this time people from all parts of the city seemed to converge on the Loop in hysterical fear and anxiety.

Bank stock prices fell during the panic, although not all Loop banks experienced large declines. Central Republic, First Chicago, and Continental were among the Loop bank survivors whose stock prices declined the most. First Chicago stock fell from 150 (bid) at the close on June 18 to a low of 131 (bid) at the close on June 24. Continental's stock fell from 70 (bid) on June 18 to a low of 60 (bid) on June 27. Central Republic saw its stock price fall from 52 (bid, June 18 close) to 47 (bid) on June 25, and then its stock plummeted to a price of 4 (bid) on Monday, June 27. Afterwards, its stock price, and those of the other surviving Loop banks, rebounded rapidly. The stock of the only Loop bank to fail during the panic, the Bank of Commerce, was trading at 9 (bid) on June 18–June 24 for a $20 par value. On June 25 its price ceased to be reported.

C. *Local Adverse Economic News Precipitated the Panic*

Contemporary discussion of the crisis emphasized the adverse local economic news that had precipitated it. The panic did not reflect exogenous liquidity-demand shocks. Rather than withdrawing deposits to spend them, depositors often redeposited those withdrawals in their postal savings accounts. James (1938) argues that the panic was triggered by several factors, all of which combined in rapid succession to undermine depositors' faith in the value of Chicago banks' assets. The bad news included falling prices for local utility stocks and other corporate assets, a well-publicized local case of bank fraud and mismanagement, and a municipal revenue crisis for the city of Chicago (*Chicago Tribune,* June 26, 1932 p. A17).

The city government's revenue problem weakened the banks in three ways. First, it meant that the banks were forced to bear increased risk on their bond portfolios as the flow of coupons was interrupted. Second, Chicago banks were called upon to purchase illiquid tax warrants to help keep the municipal government afloat. Third, city workers were forced to draw down their bank deposits to pay normal living expenses, thus reducing bank reserves and increasing the proportion of (risky) loans and securities in bank portfolios. Not surprisingly, Chicago bankers saw the viability of the banking system and the financial problems of the city as closely related. A delegation of Chicago city officials and citizens visiting Congress to request federal government assistance for the city in June 1932 included many prominent bankers. The delegation's request for $80 million in aid was rebuffed by Congress on June 22 (*Chicago Tribune,* June 23, 1932 p. 1).

The municipal revenue crisis was symptomatic of the deep contraction in local asset prices and economic activity. Among the many victims was the Insull utility empire in Chicago, whose stock and debt were widely held by institutions and individual investors. Chicago utility companies grew dramatically during the 1920's in anticipation of growing demand and were caught short by the sudden decline in the local economy. The prices of Commonwealth Edison (ComEd) and Insull stocks and bonds show precipitous declines in the first six months of 1932. From January through March, Insull stock declined by 76 percent, Insull bonds fell by 62 percent, and ComEd stock lost 25 percent of its value. From March through early June the declines accelerated. Insull debt lost 98 percent of its value, Insull common stock lost 89 percent, and Insull preferred lost 47 percent.

Chicago's economic problems were reflected in several local financial disasters and cases of bank fraud (an activity traditionally more pronounced in bad times than in good) that made front-page news in Chicago day after day just prior to the crisis.[3] John Bain, a defendant in the most important bank fraud

[3] Milton Esbitt (1986) emphasizes the importance of management practices for explaining bank failures in Chicago in 1931.

case, was a local real estate developer who owned a chain of banks. On June 9, the 12 banks in the chain failed to open for business (James, 1938 p. 1033; Elmus R. Wicker, 1993 p. 15). Not until June 23, however, did it become clear just how large the losses from fraud had been in the Bain chain. On that date the court released its estimate that the value of the banks' assets was roughly $3.5 million, compared to total deposits of $13 million (*Chicago Tribune,* June 24, 1932 p. 9).

An important additional piece of evidence that the panic was induced by fears of bank insolvency, rather than by exogenous liquidity demand by depositors, is that much of the funds withdrawn from banks were redeposited immediately in the form of riskless postal savings. The *Commercial and Financial Chronicle* (July 2, 1932 p. 71) reports that, during the week of June 20–June 27, "The Postal Savings Department, which normally has 25 or 30 windows in the Chicago post office ... increased the number to around 100 ... to accommodate deposits." That report noted that "... about $1,000,000 had been received [in postal savings on June 27], compared to $2,000,000 and $3,000,000 a day at [the] peak [of the crisis], and [compared to] a normal daily average of $200,000."

In summary, by June 23, Chicago bank depositors had witnessed, in a matter of only two weeks, the collapse of some of the largest businesses in their city, several enormously costly cases of bank fraud, and a deepening of the municipal financial crisis as the result of the denial of relief to their city government by federal authorities. All of these stories were front-page news day after day in the two weeks leading up to the banking crisis, and the news grew progressively worse. In this light, it is not surprising that depositors became increasingly concerned about the ability of banks to pay out their deposits, and transferred bank deposits to riskless postal savings accounts.

D. *Interbank Cooperation Helped to Preserve Solvent Banks Under Pressure*

As already noted, the Loop banks experienced severe stock price decline and deposit withdrawals during the crisis. Although two banks, Central Republic and the Bank of Commerce, experienced unusually severe declines in their stock prices, the Bank of Commerce failed while Central Republic survived. Its survival, however, depended on cooperation by large Loop banks to resolve its distress.

During the crisis, Central Republic was nearly taken down by its depositors. As doubts about Central Republic's solvency grew and deposit withdrawal pressure mounted, the bank's management prepared to close the bank voluntarily to avoid the risk of its being closed by bank depositors. Solvent banks that had lost depositors' confidence had an incentive to close preemptively to preserve stock value by avoiding the costs of liquidating bank assets during a run, and the transaction costs associated with having the bank taken over by a regulator. This incentive was particularly strong in 1932, when bank stockholders faced the threat of double liability on deposits, which meant that liquidation costs borne by stockholders could conceivably exceed the complete loss of the bank's capital.

Other Chicago banks saw the prospect of Central Republic's voluntary liquidation as a potential disaster for depositor confidence in their banks. Bankers clearly believed that depositors were reacting to fears of bank insolvency and were unable to distinguish between solvent and insolvent banks. Prominent bankers from Chicago and New York met as a group to devise a plan to defend the Central Republic Bank and Trust Co. from the continuing withdrawals. Fearing the spillover effects of a decision to liquidate Central Republic, these bankers managed to persuade General Dawes (its Chair) to continue operating by offering an arrangement to infuse Central Republic with new liquidity.

The initial plan for the loan to Central Republic provided for $10 million in back-up liquidity from New York and Chicago banks and $80 million from the Reconstruction Finance Corporation (RFC), but the final deal involved assistance only from Chicago banks and the RFC. The deal that emerged combined liquidity assistance from the RFC with, in essence, a back-up credit enhancement by the Chicago banks.[4] RFC liquidity support for the

[4] It is important to keep in mind that the RFC was the only entity charged with helping avoid the insolvency of

Chicago banks—like all RFC lending during this period—was fully collateralized by very high-quality, liquid assets; credit risk on the RFC loan to Central Republic was borne in largest part by the Chicago banks that formed the lending syndicate.[5] Importantly, the RFC agreed to allow municipal tax warrants—$30 million of which had been sold to Loop banks (*Chicago Tribune,* June 25, 1932 p. 6)—to qualify as collateral for its loan.[6] Once the crisis passed, Central Republic saw its deposit outflows cease and its stock price increase. Central Republic was a solvent bank saved from failure by the collective intervention of other Loop banks.

E. *The June 20–27 Crisis Was a Unique Event*

Having argued that the June banking crisis is an example of a panic induced by asset value decline and asymmetric information, we turn to the question of whether there were other such episodes in Chicago during the first six months of 1932. That question is relevant for our discussion in Section II, where we will use the absence of panics during that period (outside the window of the June crisis) as an identifying restriction to investigate whether failures during the panic were similar to failures outside of the panic.

Bank failures during 1932, and more generally during the Great Depression, for the most part have not been identified by historians as resulting from panics or asymmetric information. With the exception of the June panic, no contemporary chronicler or scholar of which we are aware has identified any other time interval during 1932 as a panic or banking crisis in Chicago. Neither has anyone identified any nationwide banking panics as having occurred during 1932 (Milton Friedman and Schwartz, 1963; Wicker, 1980, 1993; Ben S. Bernanke, 1983; Calomiris, 1993; Clifford Thies and Daniel Gerlowski, 1993; Eugene N. White, 1984).

We have reviewed a variety of facts that identify the Chicago bank panic of June 1932 as a quintessential example of an asymmetric-information-induced panic, resulting from local economic problems that affected bank asset values. Just as important for our purposes is the uniqueness of the panic window. The crisis, as reflected in sudden deposit withdrawals and stock price declines, and widespread coverage in the local and national press, was brief and was surrounded by times in which bank failures did not coincide with a panic.

II. Failures and Survivors During the Panic

We now return to our central question of whether the absence of government deposit insurance promotes the failure of solvent banks during asymmetric-information-induced panics. Specifically, we investigate whether solvent banks were able to survive withdrawal pressures (partly via private coordination) during the June 1932 Chicago bank panic. To answer that question we make use of the fact that the panic was a unique event during 1932. We assume that outside the panic window (in early 1932) banks that failed were actually insolvent. We then use the characteristics of those nonpanic failures to evaluate the likely solvency or insolvency of banks that failed during the panic.

If banks that failed during the panic were just as strong (according to some set of criteria) as those that survived during the panic, that would provide evidence in favor of the null hypothesis that confusion on the part of depositors about bank quality produced random bank failure. If, on the other hand, banks that failed during the panic were weaker than bank survivors, then panic failures cannot be

individual banks. At this time, Federal Reserve Banks did not view the prevention of bank insolvency as their mandate. This is in sharp contrast to more recent experience during the 1980's. For a review of the history of Fed lending policy, see Anna J. Schwartz (1992).

[5] Joseph R. Mason (1995) argues that prior to its use of preferred stock purchases to assist banks, the RFC was not effective in stemming bank failures. James (1938 p. 1044) cites the view, common at the time, that because of the strict collateral requirements on RFC lending, RFC assistance often increased the credit risk faced by bank depositors.

[6] Abbreviated bank balance sheets were routinely reported in newspapers following call dates. Thus the June 30 *Reports of Condition* published in the *Chicago Tribune* on July 2 provided further evidence of the soundness of Chicago banks (*Chicago Tribune,* pp. 18–24).

viewed as purely random. That implies a rejection of the null hypothesis.

It is not difficult to reject this "strong" version of the null hypothesis, but that does not prove that only insolvent banks failed during the panic. Depositor confusion might have produced the failure of some solvent banks, with potentially large social costs, even if on average banks that failed during the panic were weaker than those that survived it. Thus in our empirical work we also address a "weak" form of the null hypothesis—that panic-induced failures were not purely random, but were importantly random. This version of the null hypothesis is inherently difficult to reject formally on the basis of *ex ante* statistical tests of means, medians, and regression coefficients. Combining these with additional evidence, however, we argue that the social costs of the unwarranted closure of solvent institutions (if any) must have been very small.

Our empirical discussion divides into two parts. First, in subsection A we present evidence that leads to the rejection of the strong form of the null hypothesis. Then we confront and reject the weak form of the null hypothesis, using statistical evidence as well as information from bank examiner reports.

A. *Comparisons of Bank Attributes Leading Up to the Panic*

We divide the Chicago banks in our sample into three groups: panic failures (banks that failed during the panic, June 20–27), nonpanic failures (banks that failed at other dates), and survivors (banks that did not fail in the first seven months of 1932). We then compare the *ex ante* attributes of these three groups.[7]

In our analysis of survivors, panic failures, and nonpanic failures, we focus on four *ex ante* measures of bank condition: (1) the ratio of the market value of equity to the book value of equity; (2) the estimated probability of failure of banks; (3) the rate of decline in bank deposits; and (4) the interest paid on bank debts. These various measures of bank risk are available for different subsets of Chicago banks, depending on the availability of data on stock prices and interest paid on deposits. Stock prices are not available for all Chicago banks, and interest paid is only available for Fed member banks. The data set for the study consists of several components: balance sheet data, income and expense data, and stock price data. Balance sheet data from December 31, 1931 call reports were collected for all state and national banks in Chicago, a total of 123 banks. Total assets and total deposits were also collected for December 31, 1930, to permit calculation of the changes in those variables during 1931. Balance sheet data for the 22 national banks and 11 state banks that were members of the Federal Reserve System come from microfilm of the original *Reports of Condition* filed with the Office of the Comptroller of the Currency (OCC) and the Board of Governors of the Federal Reserve System. State nonmember bank balance sheet data are from the compilation of *Statements of State Banks of Illinois* issued by the Superintendent of Banking of the State of Illinois. The disaggregated *Reports of Condition* of member banks facilitated aggregation of balance sheet categories to reporting standards comparable with the *Statements of State Banks of Illinois.* The stock prices for Chicago banks are end-of-month observations published in the *Bank and Quotation Record* (*of the Commercial and Financial Chronicle*). Interest payments are available only for Fed member banks (from the *Reports of Condition*).

1. *Market-to-Book Value Ratios.* Figure 3 plots the means and 50-percent inclusion ranges for market-to-book value ratios for the three separate groups of Chicago banks (survivors, panic failures, and nonpanic failures). To adjust for survivorship bias in plotting these trends, we retain failed banks in our sample after their date of failure, and assume that their stock value after failure is zero.

The striking fact illustrated by Figure 3 is that as early as January 1931 the banks that

[7] The dates we choose for the panic window are consistent with James's (1938) discussion, newspaper accounts of the beginning and end of the panic, and the daily movements of the stock prices of the ten Loop banks reported in the *Chicago Tribune,* which reached their nadir on June 27. The results are robust to reasonable alternative definitions of the panic window.

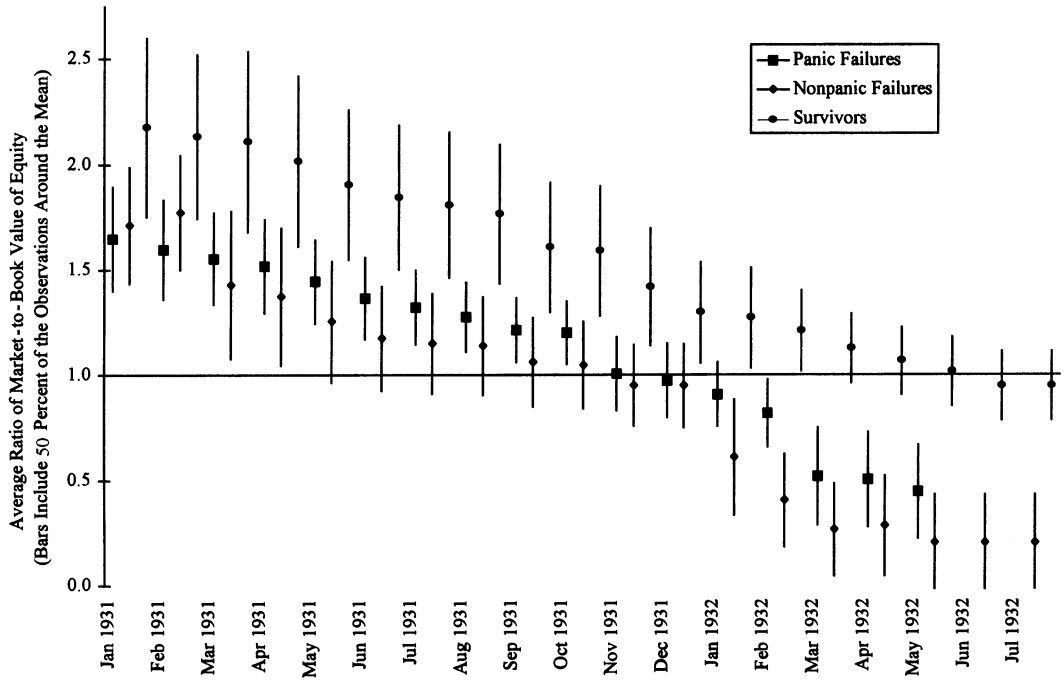

FIGURE 3. RATIOS OF MARKET-TO-BOOK VALUES OF EQUITY, END-OF-MONTH QUOTES, JANUARY 1931–JULY 1932

Notes: Survivorship bias can arise if banks that fail are excluded from subsequent means and standard deviations. We correct for this bias by including failed banks and assuming they had zero market value of equity after the date of failure.

survived the June panic appeared to be a distinct group with higher average market-to-book ratios. The banks that failed during the panic generally had slightly higher average ratios than those that failed at other times, but throughout the prepanic period (January 1, 1931–June 20, 1932) the market-to-book value ratios of panic failures were very close on average to those of prepanic failures and very different from those of panic survivors. By January 1932, most of the panic failures had market-to-book ratios less than unity. Figure 3 shows that all Chicago banks suffered from capital decline during 1931 and 1932, and that the banks that failed during the June panic reached and maintained unusually low market-to-book value ratios long before the panic.

2. *Failure Predictions.* Next, we use *ex ante* observable characteristics of Chicago banks (based on bank data reported in December 1931) to compute scores predicting failure during the first seven months of 1932. We compare the probabilities of failure for the three groups of banks (panic failures, nonpanic failures, and survivors). Our *ex ante* scores indicate that panic failures and nonpanic failures on average were weaker banks than survivors at least as early as the end of 1931.

We estimate the probability of failure using a logit model of the links between bank characteristics (e.g., balance sheet ratios) and bank failure. The danger of using *ex post* failures to estimate failure risk, of course, is that special events with low probabilities may have influenced actual failure experience during the panic in ways that were unpredictable *ex ante* and possibly unrelated to underlying insolvency. For example, if a panic were a common shock to all banks, then the level of reserves might do an excellent job of forecasting panic failures even if the banks that failed during the panic

did not have higher *ex ante* probabilities of failing. Thus using *ex post* panic failures to construct a model of *ex ante* bank weakness may bias toward identifying panic failures as inherently weak when in fact they were not. To avoid (or at least minimize) this problem, we report logit failure forecasts constructed from both in-sample and out-of-sample estimation.[8] In the out-of-sample forecasts, we exclude banks that failed during the panic from the sample when we estimate the coefficients relating bank characteristics to the probability of failure. This constrains the panic failures to be predicted using model parameters that were constructed to explain nonpanic failures, and thus prevents special unpredictable events during the panic from influencing predictions of failure.

Our logit results are reported in Table 1. We include the following variables (all measured at year-end 1931) in our specification: size (log of total assets), the reserve-to-demand deposit ratio (where reserve assets are defined as cash and government securities), the real estate loan share (defined as the ratio of loans on real estate to total loans), the ratio of real estate owned to illiquid assets (which mainly includes repossessed real estate collateral, and excludes bank premises), the ratio of last year's retained earnings to net worth, and the long-term debt ratio (bills payable plus rediscounts plus time deposits, divided by total assets).

This combination of variables also forms the basis of the logit models of White (1984), David C. Wheelock (1992), Calomiris and Wheelock (1995), and Mason (1995), all of which are used to forecast bank failures for the 1920's and 1930's. This specification typically is interpreted as capturing measures of each of the following fundamental bank characteristics: bank size, asset liquidity, exposure to real estate market risk, nonperforming loans (real estate owned), recent bank performance (retained earnings/net worth), and bank liability composition. Bank liability composition is a useful signal of weakness because—as White (1984), Wheelock (1992), Calomiris and Wheelock (1995), and Mason (1995) argue—reliance on high-interest, borrowed funds was an undesirable necessity only suffered by higher-risk banks (see also our discussion of debt composition below). While not all variables prove significant in our logits, we retain measures of the basic concepts that previous studies have found to be important even if they do not prove statistically significant in our sample. Excluding them would not affect our results. We also experimented with including two other variables (not reported in Table 1): the ratio of book net worth to assets and the percent changes in deposits or assets of banks from December 1930 to December 1931. In neither case did the regressors add predictive power to our models.

The results in Table 1 are quite similar for the in-sample and out-of-sample specifications, which is consistent with the view that failures during panics were similar events to nonpanic failures. The variable coefficients that are significant are of the expected signs. Banks with higher reserve ratios, higher ratios of retained earnings to net worth, and lower proportions of long-term debt were less likely to fail.

Table 2 reports the mean and median predicted failure probabilities for the logit models by category of bank (panic failure, nonpanic failure, and survivor), and the significance levels for tests of differences across categories in means and medians. These results indicate that the banks that failed during the panic were less risky *ex ante* than banks that failed outside the panic and more risky than survivors. Comparisons using predicted values from in-sample and out-of-sample regressions are similar. By construction, the in-sample results show less of a difference between panic and nonpanic failures. Also by construction, out-of-sample forecasts tend to have lower probabilities of failure. Our results are consistent with the notions that panic failures were much weaker banks than panic survivors, and that failures during the panic were a continuation of the same process that underlay other failures.

3. *Deposit Withdrawals and Debt Composition.* If panic failures had been relatively weak

[8] We also estimated logit models for *prepanic* failures only (excluding the failures that occurred during or after the panic). The results were essentially identical to those we report below for *nonpanic* failures (which include failures that occurred after the panic), and so we do not report them here.

TABLE 1—LOGIT MODEL RESULTS

	Out-of-sample	In-sample
Dependent variable of all models: Bank failure $N[0, 1]$ used for significance levels		
Number of observations	86	114
Number of panic failures	0	28
Number of nonpanic failures	18	18
Log-likelihood	−18.95	−51.37
Restricted (slopes = 0) log-likelihood	−44.12	−76.88
Chi-squared statistic (k − 1 df)	50.34	51.03
Significance level	3.38E-09	2.28E-09
Variable name	Coefficient *Standard error*	Coefficient *Standard error*
Constant	3.31 *7.40*	1.49 *3.73*
Bank size (log of total assets)	−0.75* *0.54*	−0.20 *0.25*
Ratio of reserves to demand deposits	−4.47*** *1.81*	−2.97*** *0.83*
Real estate loan share	2.10 *2.78*	−1.39 *1.71*
Ratio of other real estate owned to illiquid assets	13.89 *12.16*	2.09 *8.25*
Ratio of net earnings to net worth	−25.33*** *10.27*	−15.20*** *5.30*
Long-term debt	23.31*** *6.48*	12.05*** *2.64*

* Statistical significance at $\alpha = 0.10$.
** Statistical significance at $\alpha = 0.05$.
*** Statistical significance at $\alpha = 0.01$.

institutions for months prior to the panic, then they should have experienced larger rates of depositor withdrawal before the panic. It is not possible to obtain comparable records of deposit accounts for failed banks after the December 1931 call, but one can ask whether panic failures experienced relatively large deposit withdrawals from December 1930 to December 1931. Table 3 reports data on the rate of decline of deposits over that year. Clearly, panic failures and nonpanic failures experienced much larger withdrawals than survivors in 1931. Panic survivors experienced an average decline in deposits of 41 percent, compared to 55 percent for nonpanic failures, and 33 percent for survivors.

The higher rate of decline in deposits for panic failures and nonpanic failures during 1931 is reflected in the debt compositions of those banks. Detailed data on the composition of bank liabilities are available for all banks in our sample, either from Federal Reserve or state call reports. Table 3 presents data on the liability composition of banks as of December 1931.

Interestingly, the shares of the various debt categories vary systematically across the three groups of banks. In particular, panic failures

TABLE 2—MEANS AND MEDIANS OF FAILURE PROBABILITIES, BY CLASS OF BANK

	In-sample logit		Out-of-sample logit	
	Mean	Median	Mean	Median
Nonpanic failures				
Score	0.753	0.796	0.669	0.780
Standard error	0.042	0.033	0.068	0.053
Number	18	18	18	18
Panic failures				
Score	0.556	0.625	0.269	0.166
Standard error	0.043	0.059	0.055	0.106
Number	28	28	28	28
Survivors				
Score	0.248	0.187	0.088	0.005
Standard error	0.030	0.055	0.021	0.015
Number	68	68	68	68
t-statistics for tests of differences				
Panic, survivors	5.66***	4.67***	3.75***	2.25***
Panic, nonpanic	3.11***	2.19**	4.57***	4.42***
Nonpanic, survivors	8.13***	5.61***	10.78***	19.32***

* Significant at $\alpha = 0.10$.
** Significant at $\alpha = 0.05$.
*** Significant at $\alpha = 0.01$.

(like nonpanic failures) tend to rely much more on borrowed money (defined as bills payable and rediscounts). As we have noted above, the standard interpretation of this finding—which is consistent with observed differences in deposit withdrawal rates across categories during 1931 reported in these tables—is that when demandable debt is withdrawn from risky banks, those banks are forced to rely on high-cost borrowed money, typically collateralized by liquid bank assets. As noted above, other studies have found that the share of borrowed money is a reliable predictor of bank failure during the 1920's and 1930's (White, 1984; Wheelock, 1992; Calomiris and Wheelock, 1995; Mason, 1995). Moreover, examiners from the Office of the Comptroller of the Currency used a reliance on borrowed money as a clear indication that a bank was having trouble. For example, in referring to the trouble at the Hyde Park-Kenwood National Bank, the examiner wrote that: "... practically all of the bank's bonds and securities are pledged [as collateral for borrowed money] and the bank is now a heavy borrower, the Chief Examiner advising that the total borrowings on January 28 amounted to $684,000 due to the heavy decline in deposits."

In summary, panic failures and nonpanic failures experienced significantly larger withdrawals of deposits long before the panic. Consistent with this deposit withdrawal pressure, panic and nonpanic failures alike experienced fundamental debt financing reallocations characteristic of troubled institutions.

4. *Interest Rates on Debt.* Interest rates on debt should indicate debtholders' perceptions of the risk of bank failure. If panic failures and

TABLE 3—DEPOSIT AND INTEREST RATE COMPOSITION, BY CLASS OF BANK

	Change in total deposits	Change in total assets	Demand deposits	Due to banks	Time deposits	Borrowed money	Interest on total debt
Survivors							
Mean	−0.3251	−0.2145	0.5098	0.0301	0.4600	0.0197	0.0062
Standard error	0.0363	0.0491	0.0226	0.0078	0.0245	0.0070	0.0005
Number of obs.	62	63	68	68	68	68	18
Panic failures							
Mean	−0.4115	−0.3397	0.4911	0.0216	0.4873	0.0831	0.0093
Standard error	0.0595	0.0299	0.0314	0.0058	0.0315	0.0159	0.0009
Number of obs.	28	28	28	28	28	28	11
Nonpanic failures							
Mean	−0.5514	−0.3979	0.3835	0.0053	0.6113	0.1872	0.0116
Standard error	0.0316	0.0242	0.0336	0.0029	0.0325	0.0301	0.0014
Number of obs.	18	18	18	18	18	18	3
Tests of differences between means (t-statistics)							
Nonpanic, panic	1.777**	1.381*	2.263***	2.131**	2.629***	3.338***	1.161
Panic, survivor	1.287*	1.637*	0.461	0.667	0.630	4.249***	3.386***
Nonpanic, survivor	3.245***	1.971**	2.672***	1.618*	2.99***	8.192***	4.201***

Notes: Deposits are presented as a proportion of total deposits, equal to demand deposits, interbank deposits, time deposits, and bills payable and rediscounts. Interest is reported as interest expense as a proportion of the relevant deposit category, i.e., demand deposit interest expense/demand deposits. Interest is calculated as the amount of interest paid over the last six months as a proportion of the total in each category of debt as of December 31, 1931. Changes in total assets and deposits are from December 31, 1930 to December 31, 1931.

* Significant at $\alpha = 0.10$.
** Significant at $\alpha = 0.05$.
*** Significant at $\alpha = 0.01$.

nonpanic failures were more likely to fail *ex ante* they should have been forced to pay higher interest on their debt prior to the June panic. For a small sample of Chicago banks (31) that were Fed members, we have data on the interest paid during the last six months of 1931 on each of the categories of debt discussed above (individual demand deposits, bank deposits, time deposits, and borrowed money). We report the aggregate amounts of these in Table 3 as a fraction of the respective outstanding debts shown on the December 31, 1931 balance sheets. The banks are grouped, as before, according to their failure experience. It is important to keep in mind that our reported interest rate differences capture the experience of only a small sample of banks, and are measured with error because we divide interest flows over a six-month period by end-of-year balances. Therefore, these data may not provide an entirely accurate picture of interest rates paid as of December 1931.

In the column entitled interest paid on total debt we compute the means for each of the three categories of banks of the ratio of total interest paid relative to total debt. We find that panic failures and nonpanic failures paid significantly higher interest rates on debt than

survivors. Panic failures paid an overall interest cost that was 50 percent higher than that of survivors, and nonpanic failures paid nearly double the interest rate paid by survivors.[9]

In summary, we find that panic failures and nonpanic failures paid higher interest rates on their debt than survivors. The higher interest paid by those two classes of banks reflected their relative reliance on high-cost funds (borrowed money and time deposits) rather than higher interest costs on demand debt.

B. *The Role of Declining Asset Values in Chicago Bank Failures*

The fact that panic failures appear to have been stronger institutions on average than nonpanic failures, as measured by their publicly available financial data as of the end of 1931, has several possible explanations. One possibility is the weak form of the null hypothesis (that a significant number of solvent banks failed during the panic). If one believed that bank characteristics (as measured in December 1931) accurately reflect unchanging cross-sectional differences in bank condition throughout the period January–July 1932, then panic failures consequently appear excessive. That is, under the assumption of unchanging bank condition, the fact that panic failures' characteristics lie between those of nonpanic failures and those of survivors implies that the failure process was less discriminating during the panic—that is, that the traits of panic failures reflect a mix of solvent and insolvent institutions.

But such an assumption is surely incorrect. In Section I we presented evidence that local asset values (and the value of bank portfolios) declined dramatically in the first half of 1932. This implies that the failure threshold for banks was shifting over that period. In an environment of persistently declining asset prices, the first banks to fail (nonpanic failures) will appear measurably weaker than banks that fail only after asset values have fallen much more (panic failures). To control for changes in the probability of failure within our period, we estimate a survival duration model of bank failure. This model supports the argument that declining fundamentals can explain the quality difference between (early) nonpanic failures and (late) panic failures.

Our survival duration model is similar to our logit model except that it forecasts the length of time the bank will survive (measured in days after December 31, 1931), and allows for changes in the underlying transition probabilities during our period, i.e., the conditional probabilities of failure on any given day, via a logistic hazard function. This hazard function effectively separates the effects of changes in the probability of failure across individuals from shifts in the baseline probability of failure associated with diminishing fundamental bank asset prices (Guido W. Imbens, 1994 p. 703). The implied baseline probability of failure estimated in our model increases at a decreasing rate from January to June, and declines during July. A technical Appendix, available from the authors upon request, provides a formal discussion of our survival duration model.

The results of our survival duration model are reported in Table 4. The results are qualitatively similar to those for the logit model in Table 1, although, of course, coefficients in the two models are of opposite sign. As shown in Table 4, our survival duration model is capable of approximating the gaps in time between nonpanic failures and panic failures. Table 5 illustrates that the model overpredicts survival duration on average for both panic failures and nonpanic failures. That is, using the same scor-

[9] We also examined the breakdown of interest paid according to each category of debt. Differences in total deposit risk show up in withdrawals of demand deposits from banks, in changes in relative weights attached to various types of debt, and in overall debt costs, but not in demand deposit interest rate differences. Other research examining links between bank-failure risk and demand deposit interest rates during the Great Depression has also failed to find a positive relationship between demand deposit interest rates and bank-failure risk. George J. Benston (1964) analyzed banks during the period 1929–1935 and found no significant positive relationship between demand deposit interest rates and failure risk. As in our sample, he sometimes found a negative (and insignificant) relationship between the two. One explanation for these findings is provided by Gary B. Gorton and George G. Pennacchi (1990), who argue that some bank depositors may be very unwilling to accept increased risk on their accounts. Risk-intolerant depositors may prefer to adjust to changes in bank riskiness via changes in the quantity of balances they hold with a bank rather than changes in the interest paid on those balances.

TABLE 4—SURVIVAL MODEL RESULTS

	Out-of-sample	In-sample
Dependent variable: Log of time elapsed (in days) from December 31, 1931		
Number of observations	86	114
Number of panic failures	0	28
Number of nonpanic failures	18	18
Log-likelihood	−39.32	−84.36
Restricted (slopes = 0) log-likelihood	−67.08	−117.30
Chi-squared statistic (k − 1 df)	55.51	65.88
Significance level	3.65E-10	2.85E-12
Variable name	Coefficient *Standard error*	Coefficient *Standard error*
Constant	1.77 *5.21*	4.53*** *1.76*
Bank size (log of total assets)	0.53 *0.42*	0.13 *0.12*
Ratio of reserves to demand deposits	2.69*** *0.98*	1.44*** *0.39*
Real estate loan share	−0.61 *1.62*	0.58 *0.72*
Ratio of other real estate owned to illiquid assets	−4.95 *7.29*	0.04 *3.33*
Ratio of net earnings to net worth	10.52** *6.07*	7.41*** *2.40*
Long-term debt	−12.15*** *3.63*	−5.80*** *1.10*

* Statistical significance at $\alpha = 0.10$.
** Statistical significance at $\alpha = 0.05$.
*** Statistical significance at $\alpha = 0.01$.

ing model (based on December 1931 characteristics), and allowing for time variation in the hazard function, we estimate mean survival duration for nonpanic failures of 192 days, compared to 349 days for panic failures, while the actual respective survival means were 107 and 177 days. But the model accurately estimates the relative health of panic and nonpanic failures. Our model predicts that nonpanic failures survive (on average) 60 percent as long as panic failures, and in fact they averaged 55 percent of the survival time of panic failures. Thus our model does not underpredict panic failures relative to nonpanic failures, as one would expect if panic failures were unwarranted and nonpanic failures were warranted. In other words, when one accounts for the time-varying probability of failure for all banks, the model does as well estimating cross-sectional hazards during the panic as prior to the panic.

C. *Further Evidence the Panic Entailed Low Social Costs*

The duration survival model results are consistent with the view that only observably insolvent banks failed during the panic. But these findings do not constitute a formal rejection of the weak form of the null

TABLE 5—MEANS AND MEDIANS OF DURATION PREDICTIONS (IN DAYS FROM DECEMBER 31, 1931), BY CLASS OF BANK

	In-sample duration		Actual duration	
	Mean	Median	Mean	Median
Nonpanic failures				
Score	192	168	107	131
Standard error	24	25	NA	NA
Number	18	18	18	18
Panic failures				
Score	349	253	177	177
Standard error	49	38	NA	NA
Number	28	28	28	28
Survivors				
Score	1,482	688	NA	NA
Standard error	308	99	NA	NA
Number	68	68	68	68
t-statistics for tests of differences				
Panic, survivors	2.35***	2.78***	NA	NA
Panic, nonpanic	2.46***	1.66**	NA	NA
Nonpanic, survivors	2.15**	2.69***	NA	NA

* Significant at $\alpha = 0.10$.
** Significant at $\alpha = 0.05$.
*** Significant at $\alpha = 0.01$.

hypothesis—that some solvent banks failed during the panic, and that the social costs from these failures were important. To investigate that possibility, we take a closer look at panic failures, particularly at "outliers" that appear (on the basis of observable traits in December 1931) to have been healthy institutions. Examination reports on the condition of these outliers reveal deep problems in these institutions prior to the panic, which were publicly known but not captured by 1931 balance sheet ratios. In many cases, bank fraud and accounting irregularities explain why banks that failed during the panic appear stronger statistically (on the basis of 1931 accounting data) than they did to contemporaries, for whom their problems were common knowledge by mid-1932.

Table 6 presents data on the distributions of logit scores for the three groups of banks using in-sample and out-of-sample estimation. Note that *none* of the panic failures has an out-of-sample score that is as low (that is, as good) as the top quartile of survivors. The minimum (best) out-of-sample score of the panic failures is 0.00059, and the cutoff for the lowest (best) quartile of survivors is 0.00025. Only six panic failures had out-of-sample logit scores that were lower than or equal to the median of survivors.

Were these six panic failures examples of banks that were solvent but allowed to fail by their fellow bankers? If so, were the social costs of those failures high? It is easier to answer the second question. These six banks collectively represented a trivial proportion of the bank assets of Chicago (1.2 percent of total assets as of December 1931), and while it is

TABLE 6—DISTRIBUTIONAL ANALYSIS OF LOGIT SCORES FOR *EX POST* PANIC FAILURES AND SURVIVORS

	In-sample p(fail), panic failures	Percent of survivors estimated below that probability (in-sample logit)	Out-of-sample p(fail), panic failures	Percent of survivors estimated below that probability (out-of-sample logit)
Minimum	0.048	0.311	0.001	0.326
25th percentile	0.448	0.782	0.038	0.697
Median	0.626	0.910	0.175	0.832
75th percentile	0.701	0.932	0.469	0.929
Maximum	0.905	0.988	0.906	1.000
	In-sample p(fail), survivors	Percent of panic failures estimated below that probability (in-sample logit)	Out-of-sample p(fail), survivors	Percent of panic failures estimated below that probability (out-of-sample logit)
Minimum	0.000	0.000	0.000	0.000
25th percentile	0.040	0.000	0.000	0.000
Median	0.162	0.038	0.006	0.139
75th percentile	0.403	0.222	0.074	0.300
Maximum	0.943	1.000	0.821	0.918

conceivable that some of them were solvent banks, the social costs of their demise cannot have been very large.

To answer the first question we explored the specific circumstances of these six panic failures and their financial condition prior to failure. We searched the records of the OCC for any relevant examinations and correspondence with respect to the two national banks included in the group of six (South Ashland National Bank and Standard National Bank). We were able to locate information about both of these banks. Prior to the panic, both of these banks had experienced large loan losses and were under investigation by the U.S. Attorney General and the OCC for fraud.

The records we discovered for South Ashland clearly indicate that this bank was on the verge of failure at least two months prior to the panic, and possibly earlier. While the bank was closed on June 24 and placed in the hands of a receiver on June 27, South Ashland's Vice President, Guy Brown, had written to the OCC as early as June 2 to announce that the bank had decided on May 25 to liquidate itself in response to an April 27 examination by the Comptroller's office. That examination revealed that the bank had experienced large unaccounted losses that left its capital impaired, and placed it in violation of its charter. The Deputy Comptroller wrote that "the officers and directors have been operating the bank along unsound lines." In particular, the Deputy Comptroller criticized the bank's management for allowing a large loan to the bank's Director/Manager that produced an enormous loss for the bank. The examiner, in his May 5 letter to the OCC, wrote: "This bank is now under the incompetent management of Director James G. Hodgkinson, who dominates the policies; he is absolutely broke and the manner in which he has furthered his own interests is most reprehensible. A report on his operations has been made to the United States District Attorney." The details of the examination reveal fraudulent activities, including check kiting by Hodgkinson.

Standard National Bank was also involved in a case of fraud. Its Vice President, who was also the Vice President of another bank that failed during the panic (People's National Bank and Trust Co.) confessed to appropriating

bank funds to finance his speculation in the stock market. The individual and the two banks were all under investigation by the OCC and the U.S. Attorney General as early as October 1931.

South Ashland and Standard are interesting examples of banks whose accounts as of December 1931 do not provide pictures of their true position prior to the panic. While their scores in our models are very strong, their condition according to the examiners was extremely weak. It is possible that some or all of the four state bank outliers may be explicable in similar terms. After all, if the strength of a six-month-old balance sheet were enough to conclusively indicate a bank's strength, asymmetric-information panics could never occur.

The Comptroller's examination reports indicate that information about fraud and risk taking by banks that failed during the panic surfaced between December 1931 and April 1932. Clearly, investors in bank stock detected special problems in the banks that failed during the panic in those same months. As Figure 1 shows, the market-to-book value ratios for panic failures fell sharply from January through April 1932. The market-to-book ratio of surviving banks did not decline nearly as precipitously.

The wealth of OCC file material we discovered led us to search for the examination records of the other national banks in our sample that failed during the June panic. It is difficult to quantify the statements of examiners (to convert them to scores), but it is easy to summarize their content. We were able to locate information for all but one of the other national banks that failed during the panic. In every case for which we have records, the bank examiners had indicated extreme problems at the bank at least as early as the end of April 1932. Following are excerpts from (or synopses of) the examiner's remarks about each of these banks:

(1) Jackson Park National Bank (Unpublished examination report, April 27, 1932): "... the condition of this institution remains highly unsatisfactory from every angle. It will be noted criticized assets have increased materially since last examination."

(2) National Bank of Woodlawn (Unpublished examination report, April 25, 1932): "The report of an examination ... completed April 25 ... shows a bond depreciation ... which greatly exceeds the bank's entire capital, surplus, and undivided profits ... ."

(3) Bowmanville National Bank (Unpublished examination report, Letter of April 6, 1932): "The report of the examination ... completed February 25 shows such an unsatisfactory condition it is requested that you hold a meeting with the directors or a committee thereof and ascertain whether or not something further can be done to strengthen the bank, after which this office would be advised fully of the conclusions reached ... the solvency of [the bank] is questioned in view of the doubtful and loss items and the bond depreciation."

(4) Midland National Bank (Unpublished examination report, April 27, 1932): "This little institution is struggling along probably as best as could be expected under the circumstances ... Loss of $1,000,000 in deposits within a year has just about taken away earning capacity." "The report ... shows a bond depreciation of $162,004 and losses of $16,041 in loans, which consume the surplus fund, undivided profits and reserve for contingencies and impair the bank's capital to the extent of $67,414."

(5) Hyde Park-Kenwood National Bank (Unpublished examination report, February 10, 1932): "The report of an examination of your bank completed December 28 ... shows an exceedingly unsatisfactory condition and that you are confronted with a serious situation. This conclusion is based upon the slow and doubtful assets ... shown in the report; the fact that practically all of the bank's bonds and securities are pledged and the bank is now a heavy borrower, the Chief Examiner advising that the total borrowings on January 28 amounted to $684,000 due to the heavy decline in deposits."

(6) Ravenswood National Bank (Unpublished examination report, April 18, 1932): "The report of an examination of

> your bank completed April 18 ... discloses several unsatisfactory conditions as set out by the examiner throughout the report and itemized on page 11, the correction of which should be effected as rapidly as possible. The report shows a high percentage of the bank's loans to be in very unsatisfactory condition ... .'' By May 9, accounting fraud was also discovered to have taken place by a former employee.

These qualitative statements about national banks that failed during the panic reinforce the evidence from Tables 2 and 3 that panic failures were among the weakest banks in the system at the time of the panic.[10]

III. Conclusion

We have compared the attributes of banks that failed during the Chicago panic of June 1932 to those of banks that failed at other times in early 1932, and those of banks that survived the period using a variety of standards of comparison. Comparisons of the market-to-book value of equity, the estimated probability of failure or duration of survival, the rates of withdrawal of debt during 1931, and the interest rates paid on borrowed money lead to the same conclusion: failures of banks during the panic reflected the continuation of the same process that produced failures before the panic. The special attributes of failing banks are distinguishable months before the panic and were reflected in stock prices, failure probabilities, the opinions of bank examiners, debt composition, and interest rates.

We conclude that failures during the panic reflected the relative weakness of failing banks in the face of a common asset value shock rather than contagion. The panic was precipitated by exogenous asset-price decline, and the banks that failed during the panic were among the weakest banks in the city. While asymmetric information between depositors and banks precipitated a general run on banks, our evidence suggests that this asymmetric-information problem did not produce failures of solvent banks.

If the risk of solvent banks failing during an asymmetric-information panic is not high (as the evidence from the Chicago panic suggests), that could have important implications for bank regulatory policy. Deposit insurance and government assistance to banks since the Depression have been motivated in part by the perception that bank failures during the Depression were a consequence of contagion, rather than the insolvency of individual banks. If private interbank cooperation, buttressed by liquidity assistance from the monetary authority (like the assistance provided by the RFC to the Chicago clearinghouse), are adequate to preserve systemic stability, then a far less ambitious federal safety net might be desirable (Calomiris, 1990).

Our findings lend support to James's (1938) account of the role of interbank cooperation in mitigating the costs of the banking crisis. The limited duration and costs of contagion may have reflected the cooperative intervention by the Chicago clearinghouse, which used its liquid assets to protect at least one solvent bank from unwarranted attack until the runs by uninformed depositors subsided. Absent such cooperation, the failure experience during the panic of June 1932 could have been very different. Our evidence suggests, somewhat contrary to the portrayals in Friedman and Schwartz (1963) and Bernanke (1983), that clearinghouses continued to serve an important function during the Great Depression, and did not see the Fed or the RFC as ''reliev[ing] them of the responsibility of fighting runs'' (Bernanke, 1983 p. 260). How far can one generalize from these conclusions? Was the Chicago panic of June 1932 representative of

[10] The Chicago Bank of Commerce, the largest bank to fail during the panic and the only Chicago Loop bank to fail, had an estimated probability of failure of 0.00572 in the out-of-sample logit, and an estimated probability of failure of 0.448 in the in-sample logit. Four panic failures had lower out-of-sample estimated probabilities of failure than the Chicago Bank of Commerce, and seven panic failures had lower in-sample estimated probabilities of failure. The panic failures with lower estimated failure probabilities (for which we have examination reports) were viewed as severely troubled banks by examiners. While it is not possible to determine whether the Bank of Commerce was solvent or insolvent during the panic using its logit or survival scores alone, we are able to say that its scores were not unusual relative to panic failures that were perceived by examiners as troubled institutions.

other banking panics during the Great Depression? Because panics and waves of bank failure were scattered across time and location during the Great Depression, we believe answering that question will require analysis of other local panics, using detailed bank-level data similar to those we have analyzed for the Chicago panic. Defining and analyzing those events is an important area for future research on the causes of bank failures during the Depression.

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