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ABSTRACT

Studies of pre-Depression banking argue that banking panics resulted from depositor confusion about the incidence of shocks, and that interbank cooperation avoided unwarranted failures. The Great Depression -- with its concentration of bank failures at particular times and places -- has been viewed as an exception. The June 1932 Chicago panic was a dramatic example of a banking panic during the Great Depression. This paper uses individual bank data to address the question of whether solvent Chicago banks failed during the panic as the result of confusion by depositors. Chicago banks are divided into three groups: panic failures, failures outside the panic window, and survivors. The characteristics of these three groups are compared to determine whether the banks that failed during the panic were similar ex ante to those that survived the panic or whether they shared characteristics with other banks that failed.

Each category of comparison -- the market-to-book value of equity, the estimated probability or failure or duration of survival, the composition of debt, the rates of withdrawal of debt during 1931, and the interest rates paid on debt -- leads to the same conclusion: banks that failed during the panic were similar to others that failed and different from survivors. The special attributes of failing banks were distinguishable at least six months before the panic and were reflected in stock prices, failure probabilities, debt composition, and interest rates at least that far in advance. We conclude that failures during the panic reflected relative weakness in the face of common asset value shock rather than contagion. Other evidence points to cooperation among solvent Chicago banks a key factor in avoiding unwarranted bank failures during the panic.

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I. Bank Panics and Bank Failures, Before and During the Depression

Recent work on banking theory and history has helped to define the potential information externalities that can give rise to "rational" bank panics (Calomiris and Gorton, 1991, Bhattacharya and Thakor, 1993, and Kaufman, 1994). According to recent theoretical models of panics, when depositors lack information about the incidence of an observable shock across banks they may have an incentive to withdraw their deposits and wait until the "dust settles" and the identity of troubled banks is revealed. Depositors may choose to withdraw their funds from the banking system en masse even if they know that the size of the fundamental disturbance is small relative to the size of aggregate bank capital. Calomiris and Schweikart (1991) and Calomiris and Gorton (1991) argue that this framework is useful for explaining the major U.S. banking crises of 1857, 1873, 1884, 1890, 1893, 1896, and 1907.

This literature emphasizes that bank panics can be socially costly -- through the consequent disruptions to the payment system and supply of credit that attend the contraction in bank liabilities, the failure of banks, and the suspension of convertibility of bank debt. As Calomiris and Gorton (1991) point out, however, bank failures were typically not the result of panics during the national banking era. Panics were temporary moments of confusion that were brought to an end once solvent and insolvent banks were distinguished.

Interbank cooperation can prevent the externalities that cause panics from producing unwarranted failures of solvent banks during panics. Several recent papers have argued that interbank cooperation was helpful during pre-Depression bank panics.[1] Cooperation primarily took the form of liquidity assistance among banks. This occurred within city-based clearing houses, and (to a lesser extent) across locations through correspondent relations.

Commenting on interbank lending to stem unwarranted bank runs, Nicholas (1907, p. 26) argues that banks protected one another against uninformed runs; only when banks were truly insolvent (as judged by other banks) were they forced to close, and this typically occurred before uninformed depositors could act.

The recent literature on bank panics and their social costs has largely ignored the 1930s. Despite the large numbers of bank failures during the 1930s -- and concentrations of failures at particular locations over short intervals of time -- some historians of American banking have argued that the banking collapse of the 1930-1933 may not fit the definition of a "true" banking panic (or series of panics). Instead the simultaneous collapses of many banks during the Depression may have reflected large, sudden asset value reductions that rendered many banks insolvent.

The nationwide panics of the pre-Depression era all occurred just after business cycle peaks, and followed both large declines in the stock market and large increases in the liabilities of failed businesses. Calomiris and Gorton (1991) show that whenever stock prices fell by more than 8 percent and (seasonally-adjusted) liabilities of business failures increased by more than 50 percent, a major bank panic ensued. Such circumstances always gave rise to a panic, and panics never occurred otherwise. In contrast, the episodes of sudden collapse during the 1930s did not occur at cyclical peaks, but in the middle of a sustained nationwide depression. Furthermore, Wicker (1993) argues that the bank failures of 1930 and 1931 were largely extensions of the regional banking problems of the 1920s, which produced thousands of bank failures among banks that were vulnerable to the decline of commodity prices and land values -- a decline that began in 1920 and continued into the Great

Depression (see Calomiris, 1990). White (1984) and Thies and Gerlowski (1993) analyze bank failures during the 1930s and reach a similar conclusion. Wigmore (1987) argues that the nationwide banking crisis of early 1933 was a special event that differed both from pre-Depression panics and from the banking collapse of 1929-1932. He links the 1933 nationwide run on banks to expected departure from the gold standard, rather than a panic produced by perceived problems in bank portfolios.

While there is general agreement among historians that the bank failures of the 1930s did not coincide with or reflect nationwide panics of the same type that occurred during the national banking era, it is still possible that local and regional panics, occurring at different times in different places, could have had large social costs. Saunders and Wilson (1993) examine deposit withdrawal rates across banks and argue that depositor withdrawals during 1931 and 1932 were large for both ex ante solvent and insolvent banks, and that differences in withdrawal rates were small between the two groups of banks. They base this argument on a comparison of withdrawal rates from ex post failed and surviving banks. Saunders and Wilson interpret this as evidence for the importance of contagion effects. Our findings of significant patterns of cross-sectional variation in deposit withdrawal rates for Chicago banks (discussed below) are somewhat at odds with the evidence reported by Saunders and Wilson. More fundamentally, there are theoretical grounds to question their view that a similarity between withdrawal rates of failed and surviving banks implies widespread depositor confusion, and the related notion that depositor confusion entailed large social costs. First, solvent and insolvent banks alike can experience withdrawals for reasons unrelated to bank failure risk. For example, declines in prices and income during the Depression should have

reduced desired nominal money balances at all banks, irrespective of failure risk. Second, rational depositors may run banks with small probabilities of failing in a world where failures are not perfectly predictable. Calomiris and Gorton (1991) argue that it is rational for depositors to run banks when failure probabilities exceed a minimum threshold (say, 10 percent). If 10 percent of those banks actually fail, that means that depositors correctly forecasted failure probabilities, not that 90 percent of banks experienced withdrawals because of depositors' confusion (the Saunders and Wilson view).[2] Third, the Saunders and Wilson measure of withdrawals does not distinguish gradual withdrawals from sudden withdrawals, and the two can have opposite effects on bank stability. Gradual withdrawals of deposits in reaction to increases in the probability of insolvency can stabilize a bank by reducing leverage (and hence deposit risk), by encouraging banks to increase liquid asset ratios, and by limiting future vulnerability to sudden deposit withdrawals. Fourth, if clearing houses and correspondent banks were able to insure solvent banks against the threat of unwarranted withdrawals of funds, temporary depositor confusion about bank insolvency may have had small costs, as interbank assistance prevented the closure of solvent banks experiencing withdrawals by uninformed depositors.

In this paper we consider the question of whether banks failed during the Great Depression because they experienced common exogenous declines in asset values, or because of contagions of fear that swept banks away irrespective of their fundamental solvency. We address this question by focussing on one of the clearest and most important instances of a bank panic during the Great Depression: the Chicago panic of June 1932. We employ data from individual bank failure experience, balance sheets, income and expense statements, and

stock prices for failing and surviving Chicago banks around the time of the panic. We analyze the 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, or alternatively, whether they differed from survivors and shared characteristics with other banks that failed outside the panic window. To the extent that panic bank failures were like non-panic failures and unlike survivors, we argue, panic failures cannot be attributed to contagion.

II. The June 1932 Banking Crisis in Chicago

As Figures 1 and 2 show, mid-to-late June of 1932 witnessed an unparalleled concentration of bank failures in Chicago, whether measured by the number or total assets of failed banks. In contrast, 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 (Figure 3). 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).

Some contemporary chroniclers and economic historians have viewed the June banking crisis in Chicago as an important example of how contagion and runs on an entire banking system can cause widespread bank failure. Such views have shaped the regulation and protection of the banking industry ever since the 1930s. In 1932, the crisis received national attention, and contemporary reports seem to support the notion that at least some depositors ran solvent as well as insolvent banks en masse. The *Commercial and Financial Chronicle* (July 2, 1932, pp. 70-71) provided a detailed account of the runs experienced by

Chicago banks, which forced some banks to fail. These reports emphasized that long lines of individual depositors formed at banks, and described the depositors as mostly "women, [who] as they walked away with their deposits ... clutched [their] pocketbooks under both arms." Interestingly, some banks that experienced large withdrawals (including First Chicago and Continental) were able to withstand their "runs" and remain open, while for other banks (including one "loop" bank -- the Chicago Bank of Commerce), the runs forced closure.

James (1938) argues that the panic was triggered by several factors, including declines in real estate values, falling local utility stocks and other corporate assets, and a well-publicized local case of bank fraud and mismanagement. John Bain, a local real estate developer who owned a chain of banks, was found to have borrowed more than $1.75 million from his own banks to fuel real-estate speculation. It was also discovered that one of the banks was founded with no capital, but with temporary loans from other banks in the same chain. On June 9 the 12 banks in the chain failed to open for business (James, 1938, p. 1033; 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 were roughly $3.5 million, compared to total deposits of $13 million (*Chicago Tribune*, June 24, p.9). In a separate case, Francis Karel, President of First American National, was arrested on bank fraud charges, also on June 23.

In addition to these problems, the Chicago municipal government had been undergoing significant strain since 1931. The government failed to make payments on its municipal bonds in January 1932, and beginning in 1931 intermittently withheld pay from

government workers or issued scrip. In March 1932, payments to city workers were suspended indefinitely (*Chicago Tribune*, June 26, p.A17). The city government's revenue problem weakened the banks in two ways. First, on the asset side, it meant that the flow of revenue to bank bondholders was interrupted, and that Chicago banks were called upon to purchase illiquid tax warrants to help keep the municipal government afloat; second, it meant that city workers were forced to draw down their bank deposits to pay normal living expenses. Not surprisingly, the delegation of Chicago city officials and citizens visiting Congress to request federal government assistance for the city in June 1932 included many prominent bankers. They saw the viability of the banking system and the liquidity of the city as closely related. The request for $80 million in aid was rebuffed by Congress on June 22 (*Chicago Tribune*, June 23, p.1).

At the same time, the earlier failure of the Insull utility empire also created liquidity strains for its stockholders. After the failure of the Insull group, three committees of aggrieved stockholders formed to sue for damages. On June 22, the court refused to hear their complaints. Insull's debtholders also suffered wealth loss and illiquidity. Not until June 29 did the court rule to liquidate the Insull group's assets in full (*Chicago Tribune*, June 30, p.23).

By June 23, bank depositors had witnessed, in a matter of two weeks, the collapse of some of the largest businesses in their city, an enormously costly case of bank fraud, a new arrest on bank fraud charges, and the denial of relief to their city government by federal authorities. It is not surprising that depositors became increasingly concerned over those weeks about the ability of banks to pay out their deposits.[3]

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 (Figure 4). The dramatic withdrawals from downtown banks began on June 22 and reached their peak on Friday, June 24. 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.

James argues that interbank cooperation, and the intervention of informed third-parties, resolved the crisis. In one dramatic scene, Melvin Traylor, the President of First National, brought an end to the run on First Chicago with an impassioned defence of his bank. Traylor suggested that depositors should "talk to the Federal Reserve Bank" and other informed bank observers who would attest to the soundness of the bank. After that speech, Traylor and other prominent bankers from Chicago and New York met as a group to devise a plan to defend the solvent Chicago banks from runs. One of the Chicago banks, Central Republic Bank and Trust Company -- which had suffered a substantial drain by June 25 -- was on the verge of voluntary liquidation. Fearing the "spillover" effects of such a decision, Traylor and other prominent bankers managed to persuade the Chairman of Central Republic (General Charles Dawes) to continue operating by offering an arrangement to infuse Central Republic with new liquidity.

The initial plan provided for $10 million in backup 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. RFC liquidity support for the Chicago banks -- like all RFC lending during this period -- was fully collateralized by very high-quality assets; credit risk on the RFC loan to Central Republic was likely borne in greatest part by the contributing Chicago banks.[4] Importantly, the RFC agreed to allow municipal tax warrants -- $30 million of which had been sold to loop banks (*Chicago Tribune*, June 25, p. 6) -- to qualify as collateral for its loan. After the crisis had passed, to reassure depositors further, Chicago banks' reports of condition were published on July 2 in the *Chicago Tribune*, pp.18-24).

This account of the crisis leaves unresolved whether the banks that failed during the panic were those most likely to be insolvent, or whether failing banks simply lacked the protection of the clearing house or correspondent banks for other reasons. In the following sections we address that question.

III. Failures and Survivors During the Panic

In our empirical work, we examine the ex ante observable attributes of three groups of banks: non-panic bank failures (banks that failed between January and July 1932), banks that failed during the panic (June 20-June 28), and banks that survived through July 1932. The dates we chose for the panic reflect James' (1938) discussion, newspaper accounts of the beginning and end of the panic, and the daily movements of the stock prices of the 10 loop banks reported in the *Chicago Tribune*, which reached their nadir on June 27. As shown in Table A2, adding a few days to either end of our chosen panic interval would not

substantially affect the sample of panic failures. We ask whether failures of banks during the panic reflected the continuation of the same process that underlay other failures, or whether panic failures were observably similar to panic survivors. We focus on five ex ante measures of bank condition -- (1) the ratio of market value of equity to the book value of equity or assets, (2) the estimated probability of failure, or expected survival duration, of banks, (3) the debt composition of banks, (4) the rate of decline in bank assets and deposits, and (5) the interest promised on bank debts. The 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. Our data sources, simple correlations among the various bank characteristics we analyze, and a listing of some of the characteristics of the banks in our sample are reported in the Data Appendix, and in Tables A1 and A2.

Market-to-Book Value Ratios

Figure 5 plots the mean market-to-book value ratios of the three separate groups of Chicago banks, based on stock price data reported in the *Bank and Quotation Record of the Commercial and Financial Chronicle*. Standard deviations for each group are represented by the bracketed areas about the mean of each plot. The striking fact illustrated by Figure 5 is that as early as January 1931 the banks that survived the June panic appeared to be a separate 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 pre-panic period (January 1931-May 1932) the market-to-book value ratios of panic failures were closer on average to those of pre-panic failures than to panic survivors.

By February 1932, most of the panic failures had ratios less than unity. Figure 5 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.

Figure 6 plots the percentage of surviving banks, and all banks, with ratios of the market value of equity to the book value of assets less than 10 percent for the period January 1931 through July 1932. Clearly, a greater proportion of surviving banks had large capital buffers going into the panic. This is a rough (and possibly overstated) measure of the percentage decline in assets that would eliminate remaining equity. The measure may be overstated because withdrawals from banks during 1932 could have reduced total assets; thus the true denominator of this ratio may have been falling for riskier banks prior to the panic. There are no available data on the decline in bank assets at that time.

Failure Predictions

We estimate the probability of failure using a logit model of the links between bank characteristics (e.g., balance sheet ratios) and bank failure. We also estimate a survival duration model, which is similar to the logit model except that it forecasts the length of time the bank will survive rather than the probability it will fail.[5] 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 in ways that were unpredictable ex ante.[6] To avoid (or at least minimize) this problem, we report logit failure forecasts constructed from both "in-sample" and "out-of-sample" estimation. 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 non-panic failures, and thus prevents special unpredictable events during the panic from influencing predictions of failure.[7]

Our in-sample and out-of-sample logit results are reported in Tables 1a, 1b, and 1c. In Table 1a, 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 (a measure of low-risk liquid assets relative to demandable debt where liquid assets are defined as cash and government securities), the real estate loan share (defined as the ratio of loans on real estate to total illiquid assets, defined as total assets less all cash and securities), 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). In arriving at this specification, we constrained ourselves to include one measure of each of the following ratio concepts: bank size, asset liquidity, exposure to real estate market risk, non-performing loans (real estate owned), recent bank performance (retained earnings/net worth), and bank liability composition (because, as we discuss below, reliance on long-term debt was necessary for higher-risk banks). We experimented with the definitions of variables to construct each of these measures, but retained measures of the basic concepts even if they did not prove statistically significant.

We also experimented with including two other variables, which are omitted from

Table 1a: the ratio of book net worth to assets, and the percentage changes in deposits and assets of banks from December 1930 to December 1931. In neither case did the regressors prove significant or affect our other results. The rates of decline of assets and deposits are highly correlated with bank failure, but they are also highly correlated with other regressors (see Table A1), and added no explanatory power to our regressions. In the case of the book net worth ratio, the estimated coefficient was positive (contrary to our expectation). This is consistent with results from earlier work on similar data by White (1984, 126). This puzzling result is reversed when one uses market, rather than book, values to define the equity ratio. In Tables 1b and 1c, we restrict our sample to banks for which we have stock price information, and add to our list of regressors the ratio of the *market* value of net worth to the *market* value of assets (assuming par valuation for debt). We also redefine the earnings to net worth ratio using the market rather than the book value of net worth. The market equity to asset ratio has the predicted negative sign and is sometimes statistically significant.

The logit results in Tables 1a, 1b, and 1c 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 non-panic failures. The variable coefficients that are most significant in the logits are of the expected signs. Banks with higher reserve ratios, higher ratios of retained earnings to net worth, higher net worth ratios, and larger proportions of demandable debt were less likely to fail.

Figures 7a and 7b plot the failure probabilities of the in-sample and out-of-sample logits from Table 1a against one another, and indicate each type of bank (non-panic failure,

panic failure, and survivor). Not surprisingly, the observations (and especially the panic failures) tend to lie above the 45 degree line -- that is, by construction, including panic failures when estimating model coefficients increases the estimated failure probabilities for banks. Interestingly, however, the ordinal ranking of banks' failure probabilities (within and across the three classes) is quite robust to whether the in-sample or out-of-sample model is used. Similar plots using estimated probabilities from Tables 1b and 1c (not reported here) provide the same picture.

We report survival regressions in Tables 2a, 2b, and 2c -- which estimate the number of days the bank will survive beyond December 31, 1931. The results are quite similar to the logits (with coefficients of opposite sign, since the dependent variable is the survival time of the bank rather than the probability of failure). Figures 8a and 8b plot the in-sample predicted durations of survival against the out-of-sample predicted durations from Table 2a. As before, the rankings are similar, although in these plots (by construction) observations tend to lie below the 45 degree line.

Table 3 reports the mean and median predicted failure probabilities and durations for the logit and survival duration models by category of bank (panic failure, non-panic failure, and survivor), and the significance levels of tests for differences across categories in means and medians. These results indicate that the banks that failed during the panic were less risky than banks that failed outside the panic and more risky than survivors. Results using predicted values from in-sample and out-of-sample regressions are similar, although (by construction) the in-sample results show less of a difference between panic and non-panic failures compared to either as against survivors. Overall, our results are consistent with the

notion that failures during the panic were a continuation of the same process that underlay other failures. The relatively late timing of panic failures can be explained by their lower ex ante risk relative to the banks that failed earlier.

Interestingly, 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 0.019 in the out-of-sample logit. The eleven surviving Chicago banks of that size or greater (including all the important loop banks) had an average estimated probability of failure of 0.0005 and none had an estimated failure probability in excess of 0.003. This suggests that the clearing house properly discriminated in its decisions about which banks to protect and which to allow to fail, and that the clearing house was willing to allow even large insolvent banks to fail based on objective criteria.[8]

Debt Composition and Deposit Withdrawals

Detailed data on the composition of bank liabilities are available for all banks in our sample, either from Federal Reserve or state call reports. Tables 4a and 4b present data on the liability composition of banks as of December 1931, divided into groups in two ways -- by the probability of failure (divided into high, medium, and low risk using the out-of-sample logit model), and according to actual failure experience (survivors, panic failures, and non-panic failures). Two interesting patterns emerge.

First, the shares of the various debt categories vary systematically with the risk of failure. The shares of demand deposits of the public and deposits of banks are decreasing in the probability of failure, while the shares of time deposits and "borrowed money" (defined

as bills payable and rediscounts) are increasing in failure risk. One interpretation of this finding -- which is consistent with observed differences in deposit withdrawal rates across categories during 1931 reported in these tables -- is that demandable debt is withdrawn relatively early when banks become risky (long-term debts do not give depositors the option of costless early withdrawal). Additionally, banks that suffer large withdrawals of demandable debt are forced to raise additional funds through bills payable and rediscounts (essentially the CD market of that era). Banks with a low probability of failure virtually never used this high-cost means of raising funds. Other studies have found that the share of "borrowed money" is a reliable predictor of bank failure during the 1920s and 1930s (Wheelock, 1992, Mason, 1994).

Second, the liability shares of panic failures are between those of survivors and those of non-panic failures, and indicate a liability profile of a medium-to-high insolvency risk bank. Although significance levels of tests for differences in means are sometimes low, given the small sample size, the patterns are consistent with viewing panic failures as banks that were considered riskier than survivors at least as early as December 1931. In particular, panic failures experienced larger withdrawals than survivors in 1931, and were forced to rely on borrowed money from an early date.

Interest Rates on Debt

Interest rates on debt should indicate debtholders' perceptions of the risk of bank failure. For a small sample of Chicago banks (31) which 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), which we report in Tables 4a and 4b. The banks are grouped, as before, both according to failure risk and failure experience. It is important to keep in mind that our reported interest rate differences likely understate the true differences as of late 1931; the interest paid on each category of debt was paid over the last six months of 1931, and therefore, may not provide an accurate picture of interest rates paid in December 1931. Interest rates on borrowed money (the marginal source of funds for high-risk banks) are significantly higher for medium- and high-risk banks, and the cost of funds on this category of debt far exceeds the costs paid on demand deposits and time deposits (which are of shorter maturity). The interest rates on time deposits increase with bank failure risk, but differences are small and insignificant. Surprisingly, the interest paid on demand debt is lower for high-risk banks. This likely reflects sample-selection bias; as we argued before, the higher the risk of failure, the more demand deposits leave the bank -- only the uninformed ("risk-inelastic") demand depositors remain. This interpretation is consistent with the significantly lower withdrawal rates of deposits for low-risk banks during 1931, shown in Table 4b.

Banks failing during the panic paid interest rates in 1931 that were identical on average to non-panic failures, and different from survivors. Interest rates paid (by debt category) for panic failures and non-panic failures matched those of high- and medium-risk banks. Despite small sample size and weak statistical significance, the results on interest rates provide additional evidence that panic failures and non-panic failures were viewed as similarly high-failure risk categories of banks as early as 1931.

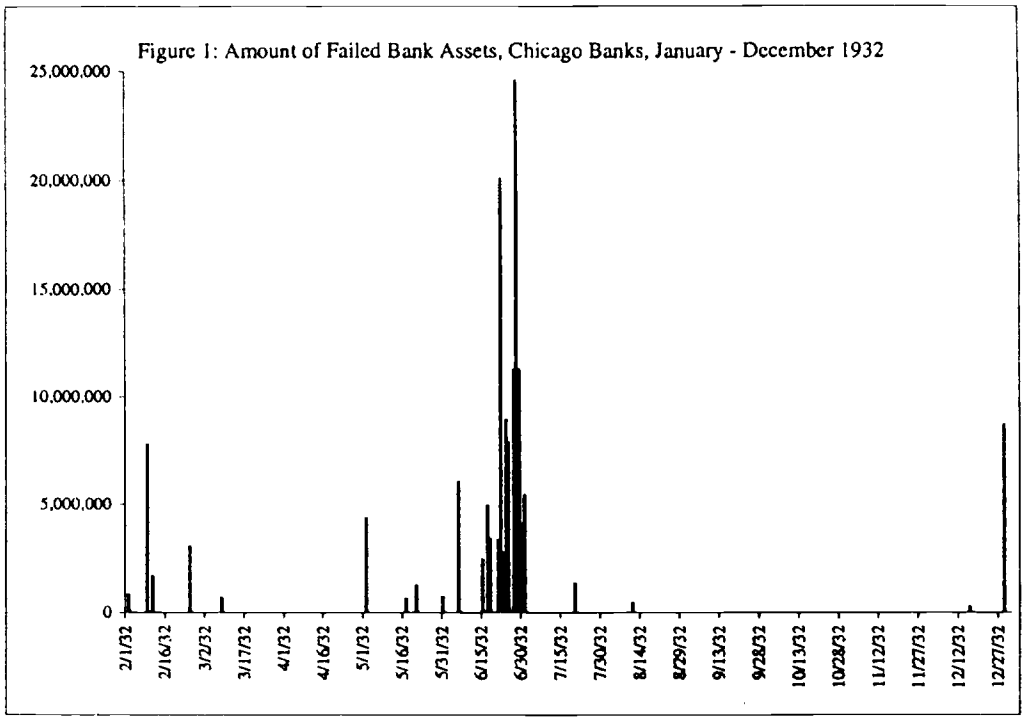
IV. Conclusion

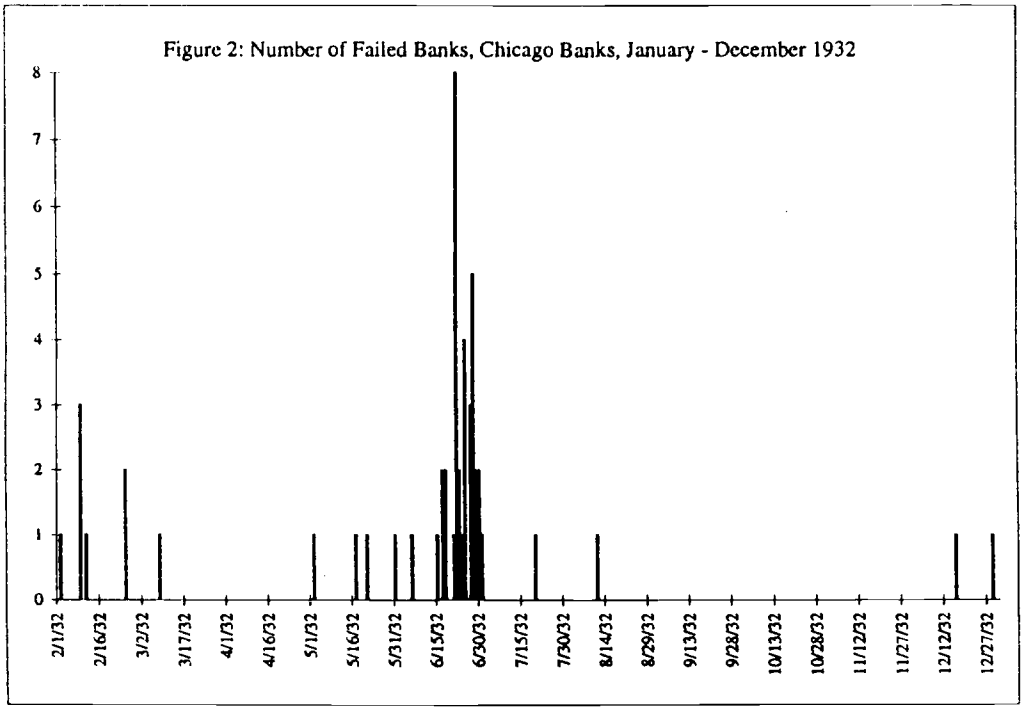
We have compared the attributes of banks that failed during the Chicago panic of June 1932 to those of banks that failed at other times in early 1932, and to those of banks that survived the period. Each of our categories of comparison -- the market-to-book value of equity, the estimated probability of failure or duration of survival, the composition of debt, the rates of withdrawal of debt during 1931, and the interest rates paid on debt -- lead to the same conclusion: banks that failed during the panic were similar to others that failed and different from survivors. The special attributes of failing banks were distinguishable at least six months before the panic and were reflected in stock prices, failure probabilities, debt composition, and interest rates at least that far in advance.

We conclude that failures during the panic reflected relative weakness in the face of a common asset value shock rather than contagion. That does not mean contagion was absent, nor does it mean that the run on Chicago banks is a myth. Rather, we think it means that -- consistent with James' (1938) account of the management of the banking crisis -- contagion was short-lived and not very costly. The limited duration and costs of contagion reflected the cooperative intervention by the Chicago clearing house, which protected its solvent members 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. As in many other examples of banking panics prior to the Depression (Calomiris and Gorton, 1991, Calomiris and Schweikart, 1991, Calomiris, 1993), bank failures in Chicago in June 1932 were not a costly consequence of panic-induced contagion or confusion on the part of depositors about the riskiness of banks. Indeed, it may have been that

identifying and closing insolvent banks helped to resolve the depositor information problems that had threatened solvent banks with runs during the panic.

Was the Chicago panic of June 1932 representative of 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 the 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. If the costs of contagion were not high (as the evidence from the Chicago panic suggests), that would have important implications for bank regulatory policy. For example, deposit insurance and bank bailouts since the Depression have been motivated in part by the perception that bank failures during the Depression were a costly consequence of contagion, rather than the inevitable result of the observable insolvency of individual banks.





Note: Figures 1 and 2 include only those banks that filed statements with the Federal Reserve System, Comptroller of the Currency, or the state banking commissioner for December 31, 1931.

Figure 3: Total Bank Suspensions in Illinois, the Chicago Federal Reserve District, and the US, Monthly, June 1931-December 1932

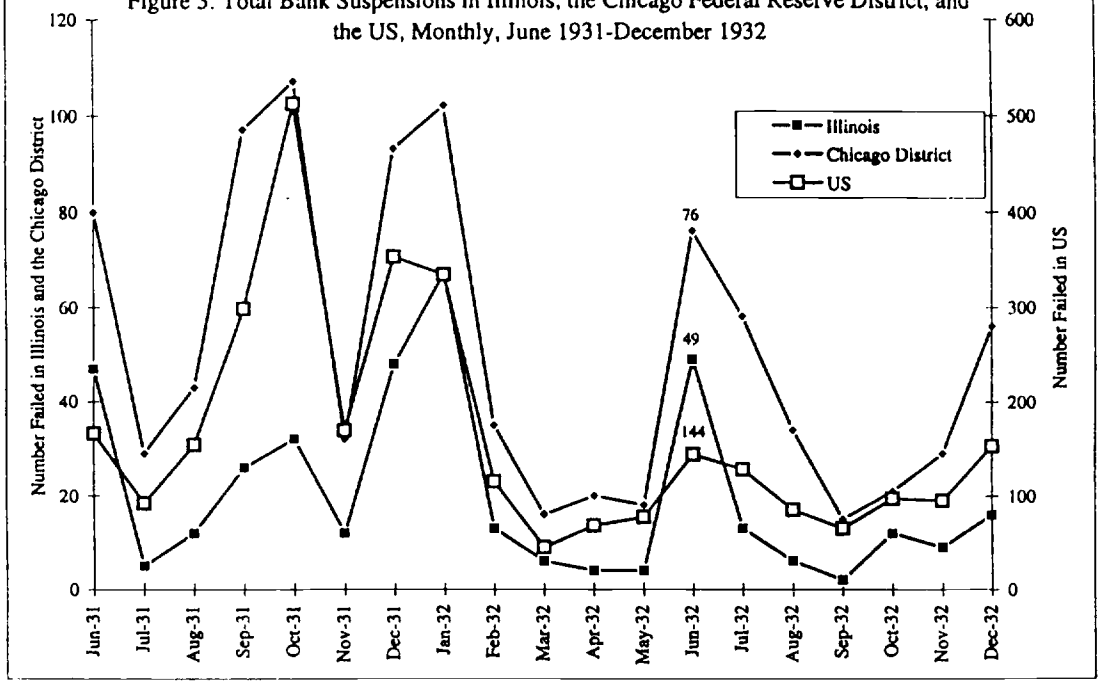


Figure 4: Percent Change in Total Deposits of Weekly Reporting Banks in Chicago and New York City, June 1931 - December 1932

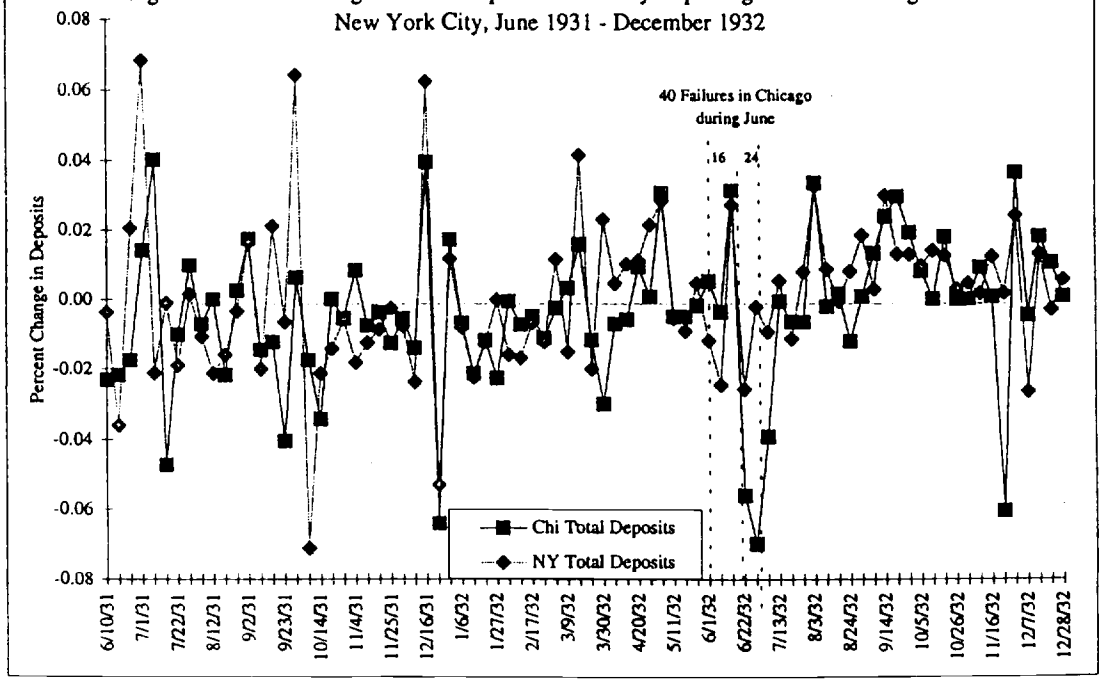


Figure 5: Stock Price Movements of Listed Banks, January 1931 - July 1932

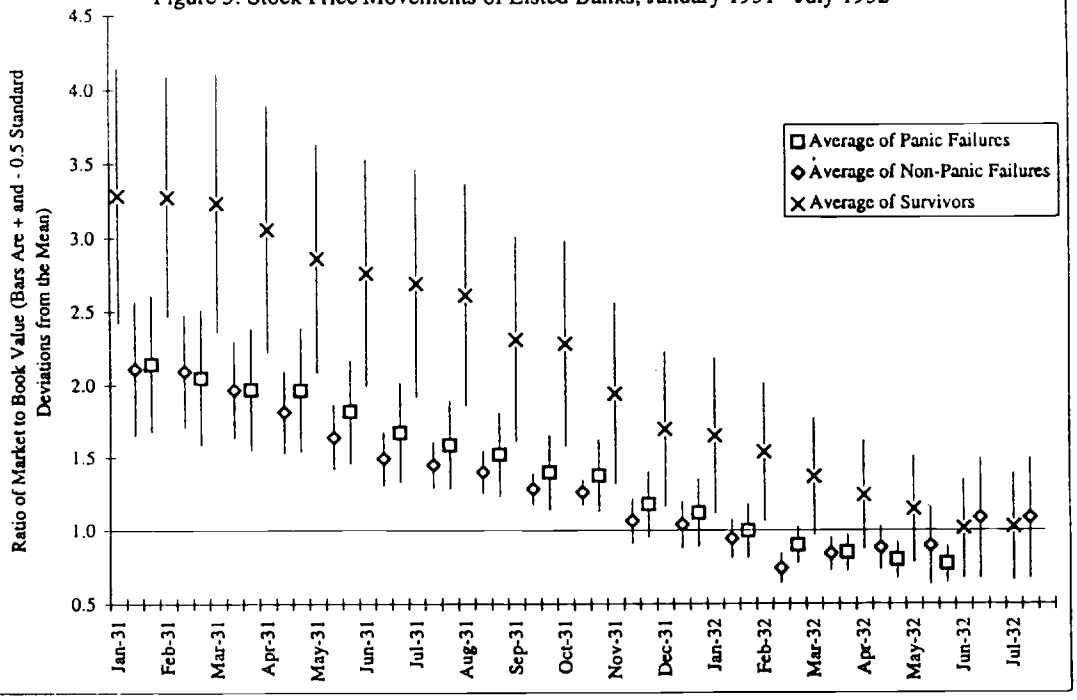


Figure 6: Proportion of Banks With Ratios of Market Value of Equity to Book Value of Total Assets Less Than or Equal to 0.10

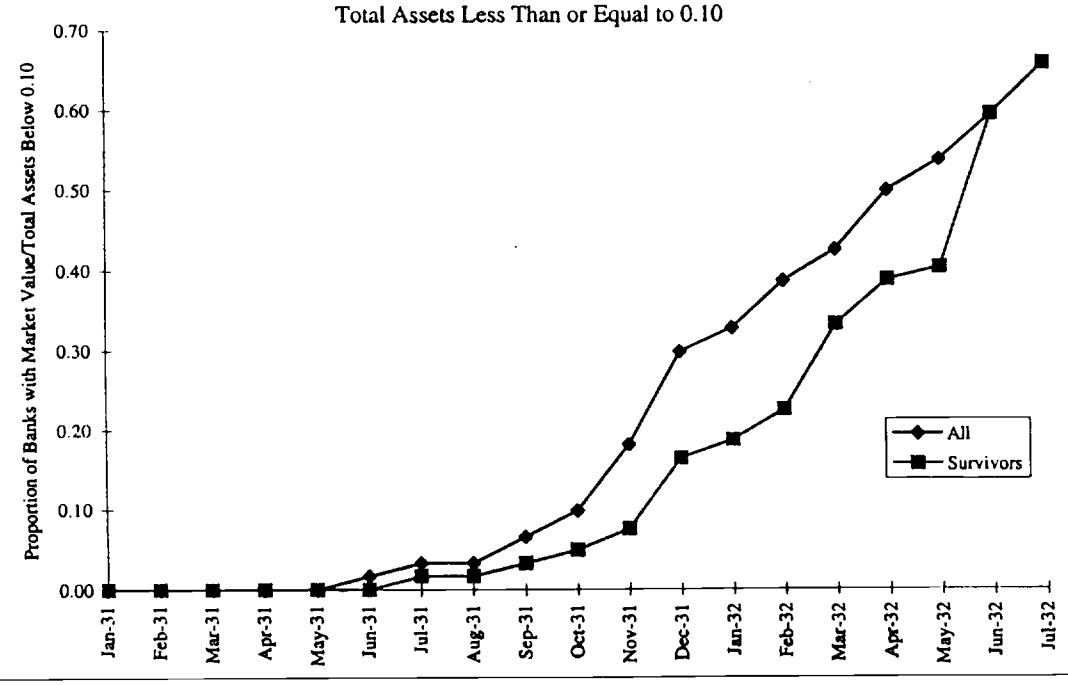


Figure 7a: Logit Characterization of All Failures

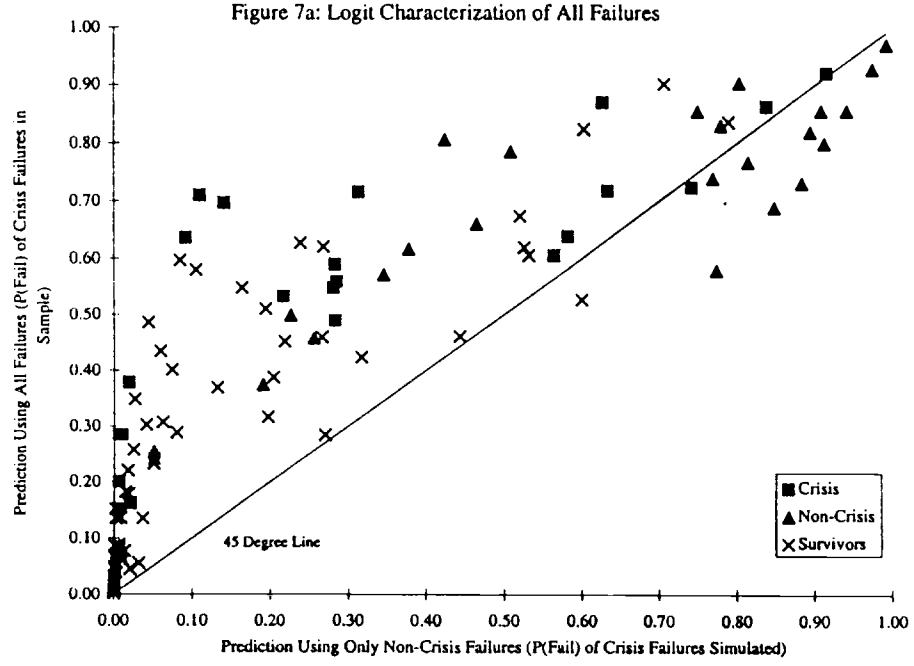


Figure 7b: Logit Characterization of Crisis Failures

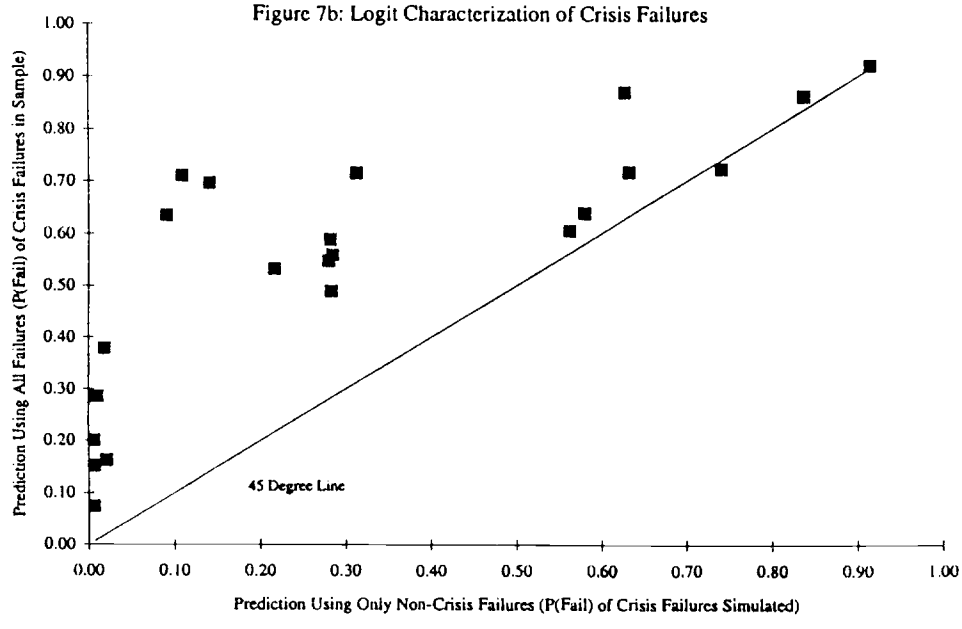


Figure 8a: Survival Characterization of All Failures

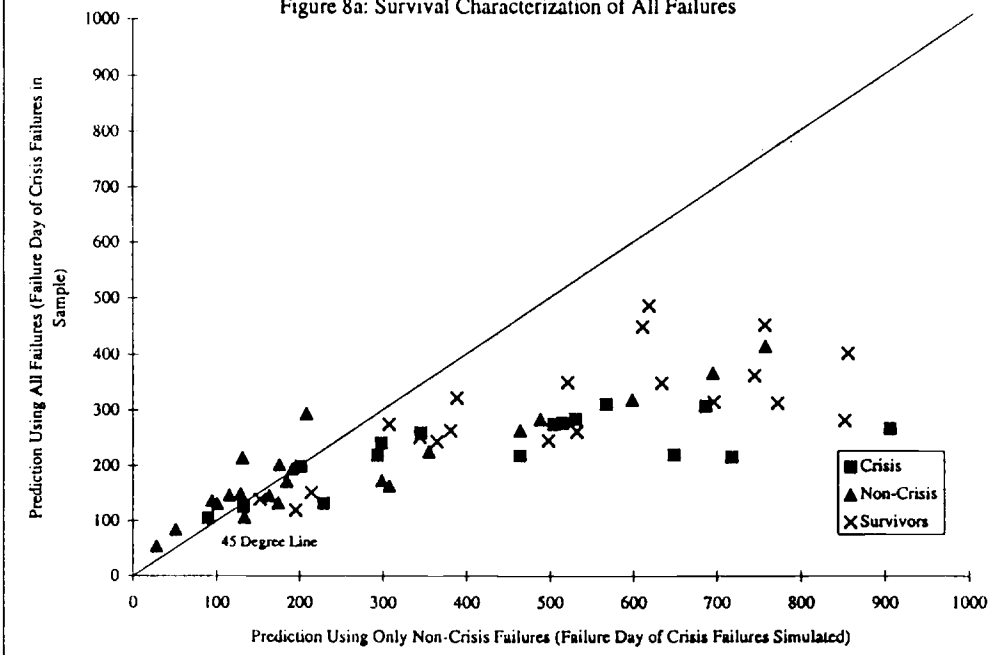


Figure 8b: Survival Characterization of Crisis Failures

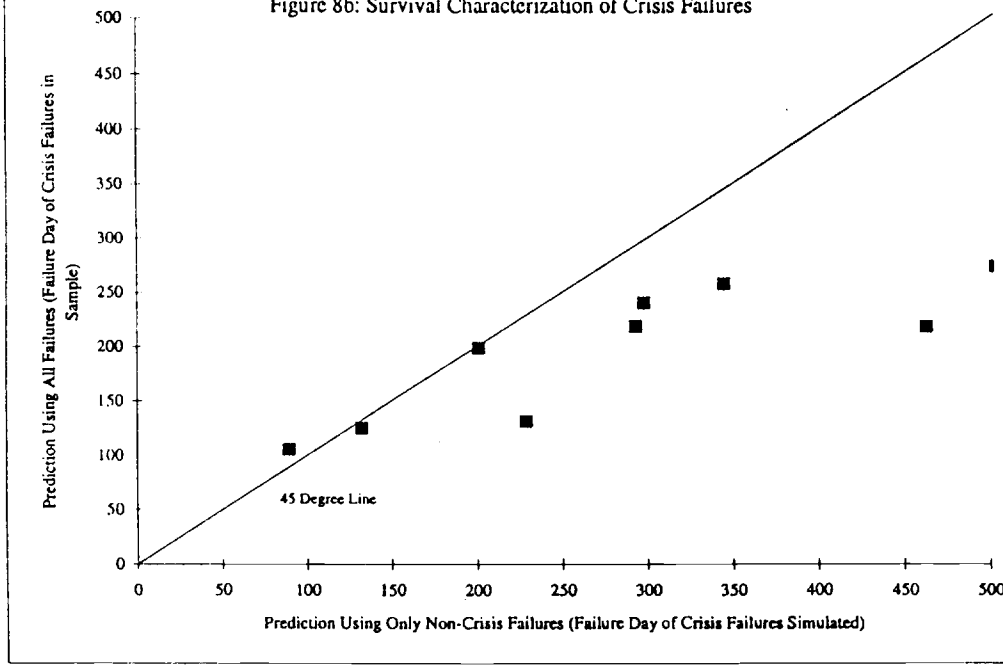


Table 1a: Logit Model Results Without Book Value of Net Worth

	Out of Sample	In Sample
Number of Observations	92	115
Number of Panic Failures	0	23
Number of Non-Panic Failures	23	23
Log-Likelihood	-25.21	-52.29
Restricted (Slopes=0) Log-L.	-51.73	-77.40
Chi-Squared Statistic (k-1 df)	53.05	50.21
Significance Level	5.08E-10	3.62E-09

N[0,1] used for significance levels.

	Coefficient	Std. Error	t-ratio	Coefficient	Std. Error	t-ratio
Constant	1.28	5.36	0.24	3.52	3.57	0.99
Bank Size (Log of Total Assets)	-0.52	0.37	-1.39	-0.35	0.23	-1.50
Ratio of Reserves to Demand Deposits	-4.22	1.48	-2.85	-3.11	0.83	-3.74
Real Estate Loan Share	1.71	2.35	0.73	-2.26	1.56	-1.45
Ratio of Other Real Estate Owned to Illiquid Assets	10.13	11.38	0.89	1.08	8.23	0.13
Ratio of Net Earnings to Net Worth	-15.99	4.20	-3.81	-9.14	2.22	-4.12
Long-Term Debt	20.21	4.99	4.05	12.25	2.60	4.72

	Predicted 0	Predicted 1	Total		Predicted 0	Predicted 1	Total
Actual 0	62	7	69	Actual 0	56	13	69
Actual 1	8	15	23	Actual 1	12	34	46
Total	70	22	92	Total	68	47	115

Table 2a: Survival Model Results Without Book Value of Net Worth

	Out of Sample	In Sample
Dependent Variable: Log of Time		
Number of Observations	96	115
Number of Panic Failures	0	23
Number of Non-Panic Failures	23	23
Log-Likelihood	-47.954	-85.585

	Coefficient	Std. Error	t-ratio	Coefficient	Std. Error	t-ratio
Constant	3.70	2.82	1.32	3.72	1.59	2.34
Bank Size (Log of Total Assets)	0.35	0.21	1.66	0.20	0.10	1.89
Ratio of Reserves to Demand Deposits	2.30	0.81	2.85	1.55	0.39	3.99
Real Estate Loan Share	-0.28	1.35	-0.21	0.87	0.67	1.31
Ratio of Other Real Estate Owned to Illiquid Assets	-4.66	5.46	-0.85	0.46	3.46	0.13
Ratio of Net Earnings to Net Worth	8.18	4.37	1.87	4.54	1.33	3.42
Long-Term Debt	-10.48	2.61	-4.02	-6.09	1.13	-5.41

Table 1b: Logit Model Results Using Market Value of Net Worth as of January 1932

	Out of Sample	Out of Sample
Number of Observations	48	48
Number of Panic Failures	0	0
Number of Non-Panic Failures	9	9
Log-Likelihood	-10.47	-8.97
Restricted (Slopes=0) Log-L.	-23.16	-23.16
Chi-Squared Statistic (k-1 df)	25.39	28.39
Significance Level	2.89E-04	1.87E-04

N[0,1] used for significance levels.

	Coefficient	Std. Error	t-ratio	Coefficient	Std. Error	t-ratio
Constant	-8.37	10.85	-0.77	-0.36	12.41	-0.03
Bank Size (Log of Total Assets)	-0.06	0.65	-0.09	-0.64	0.83	-0.77
Ratio of Reserves to Demand Deposits	-5.74	2.76	-2.08	-6.66	3.60	-1.85
Real Estate Loan Share	8.97	5.62	1.60	11.56	7.70	1.50
Ratio of Other Real Estate Owned to Illiquid Assets	10.45	33.39	0.31	-7.05	42.27	-0.17
Ratio of January Market Value of Net Worth to Total Assets				-26.72	18.59	-1.44
Ratio of Net Earnings to January Market Value of Net Worth	-23.73	18.24	-1.30	-39.84	26.34	-1.51
Long-Term Debt	23.44	10.59	2.21	35.23	18.57	1.90

	Predicted 0	Predicted 1	Total		Predicted 0	Predicted 1	Total
Actual 0	37	2	39	Actual 0	37	2	39
Actual 1	4	5	9	Actual 1	3	6	9
Total	41	7	48	Total	40	8	48

Table 2b: Survival Model Results Using Market Value of Net Worth as of January 1932

	Out of Sample	Out of Sample
Dependent Variable: Log of Time		
Number of Observations	48	48
Number of Panic Failures	0	0
Number of Non-Panic Failures	9	9
Log-Likelihood	-16.555	-16.223

	Coefficient	Std. Error	t-ratio	Coefficient	Std. Error	t-ratio
Constant	5.21	4.32	1.21	4.13	5.55	0.74
Bank Size (Log of Total Assets)	0.22	0.28	0.80	0.26	0.36	0.72
Ratio of Reserves to Demand Deposits	2.19	1.44	1.52	1.93	1.43	1.35
Real Estate Loan Share	-2.46	3.14	-0.78	-2.23	3.29	-0.68
Ratio of Other Real Estate Owned to Illiquid Assets	-7.41	18.33	-0.40	-5.34	16.56	-0.32
Ratio of January Market Value of Net Worth to Total Assets				3.72	6.80	0.55
Ratio of Net Earnings to January Market Value of Net Worth	8.57	9.46	0.91	8.76	10.30	0.85
Long-Term Debt	-7.67	4.90	-1.57	-7.54	5.26	-1.44

Table 1c: Logit Model Results Using Market Value of Net Worth as of January 1932

	In Sample			In Sample		
Number of Observations	62			62		
Number of Panic Failures	14			14		
Number of Non-Panic Failures	9			9		
Log-Likelihood	-27.29			-24.19		
Restricted (Slopes=0) Log-L.	-40.89			-40.89		
Chi-Squared Statistic (k-1 df)	27.19			33.38		
Significance Level	1.34E-04			2.24E-05		
N[0,1] used for significance levels.						
	Coefficient	Std. Error	t-ratio	Coefficient	Std. Error	t-ratio
Constant	1.98	6.40	0.31	7.82	7.61	1.03
Bank Size (Log of Total Assets)	-0.19	0.39	-0.50	-0.46	0.46	-1.00
Ratio of Reserves to Demand Deposits	-4.73	1.71	-2.78	-4.54	1.80	-2.53
Real Estate Loan Share	0.71	2.30	0.31	1.08	2.55	0.42
Ratio of Other Real Estate Owned to Illiquid Assets	7.83	18.89	0.42	4.84	20.17	0.24
Ratio of January Market Value of Net Worth to Total Assets				-22.85	10.80	-2.12
Ratio of Net Earnings to January Market Value of Net Worth	-4.73	5.92	-0.80	-7.31	6.63	-1.10
Long-Term Debt	9.36	3.80	2.46	11.59	4.48	2.59
	Predicted 0	Predicted 1	Total	Predicted 0	Predicted 1	Total
Actual 0	33	6	39	33	6	39
Actual 1	8	15	23	8	15	23
Total	41	21	62	41	21	62

Table 2c: Survival Model Results Using Market Value of Net Worth as of January 1932

	In Sample			In Sample		
Dependent Variable: Log of Time						
Number of Observations	62			62		
Number of Panic Failures	14			14		
Number of Non-Panic Failures	9			9		
Log-Likelihood	-39.292			-36.542		
	Coefficient	Std. Error	t-ratio	Coefficient	Std. Error	t-ratio
Constant	5.10	2.10	2.44	3.24	2.47	1.31
Bank Size (Log of Total Assets)	0.07	0.13	0.50	0.15	0.15	0.98
Ratio of Reserves to Demand Deposits	1.80	0.82	2.21	1.47	0.78	1.89
Real Estate Loan Share	-0.45	0.78	-0.58	-0.34	0.92	-0.36
Ratio of Other Real Estate Owned to Illiquid Assets	-2.14	6.52	-0.33	-2.13	7.14	-0.30
Ratio of January Market Value of Net Worth to Total Assets				6.84	5.07	1.35
Ratio of Net Earnings to January Market Value of Net Worth	2.43	2.60	0.94	2.82	2.65	1.07
Long-Term Debt	-3.48	1.75	-1.99	-3.60	2.07	-1.74

Table 3: Means and Medians of Failure Probability and Duration Predictions (In Days from December 31, 1931), By Class of Bank

	In Sample Logit		Out of Sample Logit		In Sample Duration		Out of Sample Duration	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Non-Panic Failures								
Average	0.711	0.768	0.647	0.773	212	173	314	184
Standard Error	0.038	0.040	0.061	0.069	23	30	65	40
Number	23	23	23	23	23	23	23	23
Panic Failures								
Average	0.537	0.588	0.303	0.280	371	274	1,377	567
Standard Error	0.051	0.060	0.062	0.080	53	37	322	96
Number	23	23	23	23	23	23	23	23
Survivors								
Average	0.255	0.165	0.119	0.019	1,338	738	16,545	2,668
Standard Error	0.030	0.046	0.024	0.017	191	130	4,051	618
Number	68	68	68	68	68	68	68	68
t-statistics for Tests of Differences								
Panic, Survivors	4.790***	4.906***	3.407***	4.796***	2.92***	2.055***	2.169***	1.966***
Panic, Non-Panic	2.719***	2.492***	3.962***	4.683***	2.754***	2.134***	3.239***	3.685***
Non-Panic, Survivors	8.191***	7.32***	9.821***	15.398***	3.411***	2.508***	2.322***	2.327***

* Significant at α=0.10

** Significant at α=0.05

*** Significant at α=0.025

Table 4a: Deposit and Interest Rate Composition, By Class of Bank

	Demand Deposits	Due to Banks	Time Deposits	Borrowed Money	Interest on Demand Deposits	Interest on Bank Deposits	Interest on Time Deposits	Interest on Borrowed Money	Change in Total Assets	Change in Total Deposits
Survivors										
Mean	0.5098	0.0301	0.4600	0.0197	0.0027	0.0032	0.0115	0.0077	-0.3057	-0.2773
Standard Error	0.0226	0.0078	0.0245	0.0070	0.0003	0.0006	0.0009	--	0.0409	0.0829
Number of Obs.	68	68	68	68	18	12	18	1	63	11
Panic Failures										
Mean	0.5041	0.0217	0.4742	0.0846	0.0021	0.0018	0.0133	0.0229	-0.4156	-0.7206
Standard Error	0.0357	0.0065	0.0358	0.0182	0.0006	0.0006	0.0015	0.0055	0.0430	0.0805
Number of Obs.	23	23	23	23	8	4	9	6	23	8
Non-Panic Failures										
Mean	0.3940	0.0086	0.5974	0.1630	0.0022	0.0019	0.0129	0.0214	-0.5218	-0.8984
Standard Error	0.0292	0.0039	0.0287	0.0263	0.0008	0.0010	0.0009	0.0083	0.0304	0.2449
Number of Obs.	23	23	23	23	5	3	5	4	23	2
Tests of Differences Between Means (t-statistics)										
Non-Panic, Panic	2.38[illegible]	1.723**	2.685***	2.451***	0.120	0.128	0.193	0.158	2.016***	0.915
Panic, Survivor	0.131	0.597	0.301	4.067***	0.955	1.292*	1.063	--	1.511*	3.717***
Non-Panic, Survivor	2.728***	1.566*	3.026***	7.405***	0.651	0.991	0.757	--	3.07***	2.862***

* Significant at α=0.10
** Significant at α=0.05
*** Significant at α=0.025

Table 4b: Deposit and Interest Rate Composition, By Out-of-Sample Logit Probability of Failure

	Demand Deposits	Due to Banks	Time Deposits	Borrowed Money	Interest on Demand Deposits	Interest on Interbank Deposits	Interest on Time Deposits	Interest on Borrowed Money	Change in Total Assets	Change in Total Deposits
Low P(Fail)										
Mean	0.5550	0.0550	0.3900	0.0177	0.0028	0.0032	0.0115	0.0109	-0.2226	-0.3812
Standard Error	0.0343	0.0131	0.0362	0.0108	0.0003	0.0006	0.0010	0.0032	0.0621	0.1107
Number of Obs.	38	38	38	38	15	12	16	2	35	11
Medium P(Fail)										
Mean	0.5200	0.0081	0.4719	0.0286	0.0021	0.0021	0.0125	0.0338	-0.4154	-0.5562
Standard Error	0.0223	0.0024	0.0226	0.0084	0.0005	0.0008	0.0017	0.0103	0.0362	0.1653
Number of Obs.	38	38	38	38	8	3	8	2	36	4
High P(Fail)										
Mean	0.3809	0.0091	0.6100	0.1388	0.0022	0.0015	0.0134	0.0202	-0.4757	-0.6990
Standard Error	0.0215	0.0032	0.0212	0.0190	0.0006	0.0006	0.0006	0.0053	0.0303	0.1169
Number of Obs.	38	38	38	38	8	4	8	7	38	6
Tests of Differences Between Means (t-statistics)										
Medium, High	4.495***	0.247	4.464***	5.313***	0.160	0.617	0.539	1.204	1.283*	0.728
Low, Medium	0.857	3.524***	1.918**	0.800	1.376*	0.849	0.511	2.123***	2.702***	0.834
Low, High	4.302***	3.409***	5.242***	5.551***	1.081	1.547*	1.261	0.897	3.757***	1.828**

* Significant at α=0.10
** Significant at α=0.05
*** Significant at α=0.025

Note: 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. changes in total assets and deposits are from December 31, 1930 to December 31, 1931.

DATA APPENDIX

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 the original *Reports of Condition* filed with the Comptroller of the Currency and the Board of Governors of the Federal Reserve System. State non-member bank balance sheet data are from the compilation of *Statements of State Banks 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*.

Interest payments are available only for Fed member banks (from the *Reports of Condition*).

Table A1 reports correlation coefficients and corresponding t-statistics across various measured or estimated characteristics of banks. Table A1 includes banks from all the various sub-samples. Thus different correlation coefficients sometimes refer to different subsets of banks.

Table A2 lists the banks in our sample, their date of failure (if they failed during our sample period), the predicted failure probabilities and failure dates from our logit and

duration models, total assets as of December 31, 1931, and the change in total assets and total deposits from December 1930 to December 1931. We list the banks in our samples, as well as banks for which data were not available to permit estimation of failure risk, or measurement of changes in assets and deposits.

Table A1: Magnitude and Significance of Correlations

	Bank Size (Log of Total Assets)	Ratio of Reserves to Demand Deposits	Ratio of Real Estate Loans to Total Loans	Ratio of Other Real Estate Owned to Illiquid Assets	Ratio of Book Value of Net Worth to Total Assets	Ratio of January Market Value of Net Worth to Total Assets	Ratio of Net Earnings to Book Value of Net Worth	Ratio of Net Earnings to January Market Value of Net Worth	Ratio of Long-Term Debt to Total Assets	Ratio of Demand Deposits to Total Deposits	Ratio of Time Deposits to Total Deposits	Ratio of Interbank Deposits to Total Deposits	Ratio of Bills Payable and Rediscounts to Total Deposits	Ratio of Interest Paid on Demand Deposits to Total Demand Deposits	Ratio of Interest Paid on Bank Deposits to Total Bank Deposits	Ratio of Interest Paid on Time Deposits to Total Time Deposits	Ratio of Interest Paid on Borrowed Money to Total Borrowed Money	A Total Deposits(1930-31) as a Fraction of Total Deposits(1930)	Predicted Logit Probability of Failure (Including Panic Failures)
Ratio of Reserves to Demand Deposits	-0.13																		
t-Statistic	*-1.36*																		
Ratio of Real Estate Loans to Total Loans	-0.11	0.39																	
t-Statistic	*-1.23*	*4.54*																	
Ratio of Other Real Estate Owned to Illiquid Assets	-0.01	-0.53	0.03																
t-Statistic	*-0.16*	*-6.59*	*0.34*																
Ratio of Book Value of Net Worth to Total Assets	-0.44	-0.24	0.39	0.65															
t-Statistic	*-5.17*	*-2.58*	*4.52*	*9.04*															
Ratio of January Market Value of Net Worth to Total Assets	-0.24	0.37	-0.07	-0.24	-0.32														
t-Statistic	*-1.92*	*3.13*	*-0.51*	*-1.91*	*-2.61*														
Ratio of Net Earnings to Book Value of Net Worth	0.45	0.23	0.10	-0.44	-0.56	-0.15													
t-Statistic	*5.36*	*2.55*	*1.04*	*-5.21*	*-7.24*	*-1.16*													
Ratio of Net Earnings to January Market Value of Net Worth	0.48	-0.06	-0.07	-0.26	-0.45	-0.43	0.92												
t-Statistic	*4.21*	*-0.47*	*-0.58*	*-2.08*	*-3.87*	*-3.66*	*17.92*												
Ratio of Long-Term Debt to Total Assets	-0.62	0.52	0.47	-0.10	0.22	0.65	-0.25	-0.50											
t-Statistic	*-8.26*	*6.43*	*5.65*	*-1.07*	*2.35*	*6.54*	*-2.75*	*-4.44*											
Ratio of Demand Deposits to Total Deposits	0.50	-0.51	-0.42	-0.07	-0.26	-0.58	0.35	0.56	-0.95										
t-Statistic	*6.05*	*-6.35*	*-4.86*	*-0.75*	*-2.80*	*-5.48*	*3.90*	*5.28*	*-31.36*										
Ratio of Time Deposits to Total Deposits	-0.59	0.58	0.49	-0.17	0.17	0.72	-0.25	-0.54	0.97	-0.90									
t-Statistic	*-7.67*	*7.58*	*5.94*	*-1.84*	*1.85*	*7.95*	*-2.68*	*-4.94*	*44.26*	*-21.43*									
Ratio of Interbank Deposits to Total Deposits	0.70	-0.32	-0.34	0.42	-0.12	-0.40	-0.09	0.07	-0.62	0.35	-0.66								
t-Statistic	*10.28*	*-3.52*	*-3.85*	*4.95*	*-1.29*	*-3.35*	*-0.92*	*0.55*	*-8.33*	*3.92*	*-9.18*								
Ratio of Bills Payable and Rediscounts to Total Deposits	-0.41	-0.02	-0.04	0.28	0.36	-0.19	-0.11	0.03	0.37	-0.45	0.15	-0.09							
t-Statistic	*-4.75*	*-0.25*	*0.38*	*3.12*	*4.12*	*-1.53*	*-1.19*	*0.24*	*4.18*	*-5.30*	*1.65*	*-0.93*							
Ratio of Interest Paid on Demand Deposits to Total Demand Deposits	0.08	-0.53	-0.09	0.11	0.16	-0.51	0.10	0.04	-0.47	0.48	-0.41	0.19	-0.32						
t-Statistic	*0.46*	*-3.46*	*-0.49*	*0.61*	*0.90*	*-3.22*	*-0.57*	*0.22*	*-2.88*	*2.99*	*-2.47*	*1.08*	*-1.82*						
Ratio of Interest Paid on Bank Deposits to Total Bank Deposits	0.71	-0.10	-0.33	0.06	-0.43	-0.35	0.23	0.29	-0.50	0.29	-0.55	0.81	-0.05	0.24					
t-Statistic	*5.53*	*-0.53*	*-1.92*	*-0.34*	*-2.58*	*-2.05*	*1.29*	*1.67*	*-3.18*	*1.68*	*-3.59*	*7.61*	*-0.27*	*1.35*					
Ratio of Interest Paid on Time Deposits to Total Time Deposits	-0.29	0.06	0.05	0.35	0.45	0.19	-0.48	-0.43	0.22	-0.24	0.19	-0.09	0.20	-0.63	-0.49				
t-Statistic	*-1.65*	*0.36*	*0.28*	*2.05*	*2.78*	*1.08*	*-3.01*	*-2.76*	*1.23*	*-1.36*	*1.08*	*-0.52*	*1.12*	*-4.47*	*-3.05*				
Ratio of Interest Paid on Borrowed Money to Total Borrowed Money	0.31	-0.31	-0.15	0.78	0.28	-0.14	-0.26	-0.08	-0.23	0.02	-0.32	-0.61	0.26	-0.33	0.13	0.55			
t-Statistic	*1.79*	*-1.77*	*-0.82*	*6.78*	*1.59*	*-0.80*	*-1.45*	*-0.41*	*-1.30*	*0.11*	*-1.83*	*4.21*	*1.50*	*-1.89*	*0.73*	*3.58*			
A Total Deposits(1930-31) as a Fraction of Total Deposits(1930)	0.79	-0.01	-0.07	-0.35	0.31	0.10	0.58	0.47	-0.44	0.47	-0.35	0.31	-0.64	0.03	0.44	-0.30	-0.06		
t-Statistic	*5.56*	*-0.06*	*-0.31*	*-1.64*	*-4.44*	*0.45*	*3.10*	*2.29*	*-2.11*	*2.31*	*-1.65*	*1.42*	*-3.66*	*-0.13*	*2.15*	*-1.38*	*-0.25*		
Predicted Logit Probability of Failure (Including Panic Failures)	-0.61	0.23	-0.04	0.33	0.34	0.51	-0.56	-0.58	0.67	-0.66	0.58	-0.53	0.45	-0.10	-0.39	0.18	0.05	-0.54	
t-Statistic	*-8.14*	*-2.51*	*-0.44*	*3.70*	*3.78*	*4.56*	*-7.14*	*-5.48*	*9.53*	*-9.27*	*7.63*	*-3.74*	*5.40*	*-0.58*	*-2.34*	*1.01*	*0.26*	*-2.77*	
Predicted Survival Time of Banks (Including Panic Failures)	0.81	-0.05	-0.23	-0.29	-0.03	-0.35	0.76	0.79	-0.70	0.65	-0.66	0.48	-0.38	0.13	0.04	-0.49	0.01	0.72	-0.81
t-Statistic	*14.81*	*0.56*	*-2.47*	*-3.17*	*-8.49*	*-2.85*	*12.51*	*9.84*	*-10.33*	*9.10*	*-9.18*	*5.79*	*-4.28*	*0.72*	*4.58*	*-3.07*	*0.08*	*4.49*	*-14.85*

Note: Total Deposits above include borrowed money.

Table A2: Bank Failure Prediction Comparisons (Loop Banks in Bold Italics)

Name	National Bank	Failure Date (Panic Failures in Italics)	Predicted Probability of Failure (In Sample Logit)	Predicted Probability of Failure (Out of Sample Logit)	Predicted Failure Date (In Sample Survival)	Predicted Failure Date (Out of Sample Survival)	Total Assets	Δ Total Assets 1930-1931	Δ Total Deposits 1930-1931
Service St B	0	2/2/32	0.928	0.974	3/24/32	2/20/32	823,617	-0.424	-0.677
Kimbell Tr&S B	0	2/9/32	0.972	0.993	2/22/32	1/27/32	2,664,205	-0.442	-0.625
Depositors St B	0	2/9/32	0.819	0.895	5/28/32	5/7/32	4,249,938	-0.249	-0.393
West City Tr&S B	0	2/9/32	0.497	0.226	11/12/32	8/20/33	852,565	-0.473	-0.700
Stockmens Tr&S	0	2/11/32	0.579	0.773	10/18/32	7/26/32	1,662,981	-0.319	-0.559
Morgan Pk Tr&S	0	2/25/32	0.830	0.779	5/24/32	6/11/32	1,091,251	-0.363	-0.453
Wiersema St B	0	2/25/32	0.785	0.508	6/20/32	10/24/32	1,931,686	-0.490	-0.570
Kaufman St B	0	3/8/32	0.904	0.804	4/15/32	5/12/32	659,547	-0.402	-0.563
Pullman Tr&S B	0	5/2/32	0.856	0.941	5/15/32	4/3/32	4,331,746	-0.314	-0.237
Sherman St B	0	5/17/32	0.806	0.423	6/11/32	11/2/32	629,280	-0.391	-0.529
Douglass Nat'l B	1	5/21/32	-	-	-	-	1,244,192	-0.319	-0.485
Papanek-Kovac St B	0	5/[illegible]32	0.856	0.908	5/9/32	4/9/32	701,859	-0.394	-0.492
Citizens St B of Chgo	0	6/6/32	0.768	0.814	6/19/32	7/2/32	6,014,783	-0.449	-0.667
Alliance Nat'l B	1	6/15/32	0.571	0.345	10/9/32	5/2/33	2,432,943	-0.461	-0.681
United American Tr&S B	0	6/17/32	0.689	0.847	7/20/32	6/23/32	4,413,594	-0.414	-0.651
Empire Tr&S B	0	6/17/32	0.255	0.051	5/31/33	10/18/35	482,617	-0.495	-0.625
Devon Tr&S B	0	6/18/32	0.854	0.749	5/11/32	6/21/32	1,454,516	-0.096	-0.292
Prudential St S B	0	6/18/32	0.739	0.769	7/12/32	7/9/32	1,918,850	-0.503	-0.657
Home B&Tr Co	0	6/20/32	-	-	-	-	-	-	-
Bowmanville Nat'l B	1	*6/21/32*	0.870	0.627	5/10/32	8/16/32	3,332,911	-0.363	-0.472
Commonwealth Tr&S B	0	*6/22/32*	0.724	0.741	7/16/32	7/19/32	1,327,059	-0.403	-0.557
Chatfield Tr&S B	0	*6/22/32*	0.710	0.109	8/2/32	12/17/33	801,072	-0.167	-0.220
Kenwood St B	0	*6/22/32*	0.696	0.141	8/6/32	10/9/33	854,215	-0.147	-0.248
Fst Englewood St B	0	*6/22/32*	0.639	0.581	8/27/32	10/24/32	1,909,324	-0.429	-0.558
South Shore St B	0	*6/22/32*	0.559	0.285	10/2/32	5/29/33	1,206,982	-0.445	-0.577
Woodlawn Tr&S B	0	*6/22/32*	0.533	0.217	11/1/32	11/16/33	5,780,811	-0.379	-0.458
Cottage Grove St B	0	*6/22/32*	0.489	0.283	11/5/32	7/20/33	2,025,904	-0.367	-0.460
Reliance B&Tr Co	0	*6/22/32*	0.074	0.006	12/28/34	3/5/46	6,134,726	-0.437	-0.485
Universal St B	0	*6/23/32*	0.922	0.916	4/14/32	3/29/32	1,819,087	-0.299	-0.470
West Irving St B	0	*6/23/32*	0.863	0.838	5/4/32	5/11/32	938,722	-0.284	-0.500
Central Mfg District B	0	*6/24/32*	0.200	0.007	11/20/33	8/25/43	8,891,724	-0.259	-0.272
Jefferson Pk Nat'l B of Chgo	1	*6/25/32*	0.715	0.313	8/5/32	4/7/33	3,055,546	-0.362	-0.533
Nat'l B of Woodlawn	1	*6/25/32*	0.635	0.091	9/22/32	6/24/34	2,822,449	-0.326	-0.330
Ravenswood Nat'l B	1	*6/25/32*	0.588	0.283	9/30/32	5/18/33	1,128,487	-0.500	-0.542
Standard Nat'l B	1	*6/25/32*	0.285	0.010	6/18/33	9/8/39	879,507	-0.275	-0.363
Jackson Pk Nat'l B	1	*6/25/32*	-	-	-	-	-	-	-
Peoples Nat'l B&Tr Co	1	*6/27/32*	0.717	0.633	8/5/32	10/19/32	9,513,034	-0.424	-0.526
Midland Nat'l B	1	*6/27/32*	0.548	0.280	10/9/32	6/13/33	1,255,697	-0.413	-0.583
South Ashland Nat'l B	1	*6/27/32*	0.151	0.007	3/3/34	3/7/42	489,655	-0.399	-0.670
North Ave St B	0	*6/28/32*	0.605	0.563	9/14/32	12/10/32	4,490,482	-0.486	-0.561
Chgo B of Commerce	***0***	***6/28/32***	***0.378***	***0.019***	***3/31/33***	***8/26/38***	***12,725,778***	***0.328***	***1.088***
Congress Tr&S B	0	*6/28/32*	0.285	0.007	7/4/33	10/19/41	3,030,516	-0.379	-0.403
Phillip St B&Tr Co	0	*6/28/32*	0.162	0.021	2/5/34	1/5/39	3,494,550	-0.253	-0.280
Old Dearborn St B	0	*6/28/32*	-	-	-	-	818,564	-0.806	-1.000
Union B of Chgo	0	*6/28/32*	-	-	-	-	-	-	-
Logan Sq. St&S B	0	6/29/32	0.659	0.464	8/12/32	12/20/32	1,528,737	-0.516	-0.595
Kaspar American St B	0	6/29/32	0.457	0.256	12/30/32	11/25/33	9,727,706	-0.372	-0.416
Madison Sq St B	0	6/30/32	0.800	0.912	5/26/32	4/24/32	1,883,994	-0.392	-0.547
Division St B	0	6/30/32	0.374	0.191	2/16/33	1/26/34	2,181,720	-0.345	-0.506
Hyde Pk-Kenwood Nat'l B	1	7/1/32	0.615	0.377	9/19/32	4/8/33	5,395,527	-0.416	-0.480
Adams St B	0	7/20/32	0.731	0.883	8/1/32	5/9/32	1,338,130	-0.483	-0.555

Table A2: Bank Failure Prediction Comparisons (Loop Banks in Bold Italics)

Name	National Bank	Failure Date (Panic Failures in Italics)	Predicted Probability of Failure (In Sample Logit)	Predicted Probability of Failure (Out of Sample Logit)	Predicted Failure Date (In Sample Survival)	Predicted Failure Date (Out of Sample Survival)	Total Assets	Δ Total Assets 1930-1931	Δ Total Deposits 1930-1931
Burnside Tr&S B	0	8/11/32	0.461	0.443	11/15/32	1/22/33	432,210	-0.267	-0.352
Parkway St B	0	11/14/32	-	-	-	-	262,714	-0.579	-1.000
Unity Tr&S B	0	12/16/32	0.627	0.239	8/31/32	5/12/33	461,542	-0.327	-0.400
Liberty Tr&S B	0	12/29/32	0.451	0.219	12/26/32	1/13/34	8,685,132	-0.138	-0.269
Amalgamated Tr&S B	0	12/31/32	0.619	0.525	9/7/32	12/9/32	2,731,244	-0.058	-0.014
Austin St B	0	12/31/32	0.459	0.266	12/12/32	9/25/33	4,478,435	-0.367	-0.415
Belmont-Sheffield Tr&S B	0	12/31/32	0.401	0.074	1/16/33	12/24/34	824,937	-0.472	-0.562
Beverley St S B of Chgo	0	12/31/32	0.369	0.132	2/3/33	5/5/34	801,849	-0.352	-0.413
Aetna St B	0	12/31/32	0.056	0.032	1/27/35	12/18/38	1,436,880	-0.573	-0.627
Boulevard Bridge B	0	12/31/32	0.086	0.001	2/25/35	5/13/64	12,177,423	-0.137	-0.132
Banco di Napoli Tr Co	0	12/31/32	0.006	0.000	5/3/44	8/2/45	1,535,766	2.413	-
Capital St S B	0	-	-	-	-	-	-	-	-
Central Republic B&Tr Co	***0***	-	***0.049***	***0.001***	***9/21/36***	***2/11/84***	***209,936,111***	-	-
Central Tr Co of IL	0	-	-	-	-	-	-	-	-
Chgo City B&Tr Co	0	-	0.039	0.003	6/14/36	6/10/56	12,936,037	-0.252	-0.292
Chgo Joint Stock Land B	0	-	-	-	-	-	-	-	-
Chgo Title & Tr Co	0	-	-	-	-	-	-	-	-
Chgo Tr Co	0	-	-	-	-	-	-	-	-
Continental IL B&Tr Co Chgo	***0***	-	***0.027***	***0.000***	***6/28/38***	***9/23/37***	***1,008,463,768***	***-0.193***	***0.021***
Cosmopolitan St B	0	-	0.241	0.051	7/25/33	9/11/36	6,826,287	-0.464	-0.509
Drexel St B	0	-	0.547	0.164	11/6/32	2/10/34	5,006,175	-0.302	-0.340
Drovers Nat'l B	1	-	0.008	0.000	9/4/42	12/31/99	16,845,437	-0.088	-0.080
Drovers Tr&S B	0	-	0.220	0.018	10/21/33	8/23/39	7,521,134	-0.096	-0.106
East Side Tr&S B	0	-	0.527	0.600	9/29/32	11/2/32	1,091,357	-0.344	-0.597
Edgewater Tr&S B	0	-	0.232	0.051	7/27/33	9/18/35	299,578	-0.538	-0.644
Edison Pk St S B	0	-	0.387	0.204	3/22/33	9/1/33	371,217	-0.326	-0.637
Fst Nat'l B of Chgo	***1***	-	***0.006***	***0.000***	***11/12/45***	***12/31/99***	***547,417,024***	-	-
Fst Nat'l B of Englewood	1	-	0.045	0.020	10/25/35	12/13/41	6,535,351	-0.135	-0.154
Fst Union Tr&S B	0	-	0.010	0.001	5/25/42	12/31/99	223,759,344	0.270	0.339
Fst-Tr Joint Stockland B	0	-	-	-	-	-	-	-	-
Geringer & Storkan Inc	0	-	-	-	-	-	-	-	-
Halsted Exchange Nat'l B	1	-	0.028	0.000	5/16/37	5/3/83	787,019	-0.130	-0.218
Halsted Street St B	0	-	0.510	0.194	11/8/32	11/26/33	2,459,384	-0.306	-0.371
Hamilton St B	0	-	0.136	0.036	1/4/34	3/13/37	604,834	-0.444	-0.569
Harris Tr&S B	***0***	-	***0.028***	***0.000***	***2/23/38***	***12/31/99***	***111,694,211***	***-0.094***	***-0.025***
Heitman Tr Co	0	-	-	-	-	-	-	-	-
Howard Ave Tr&S B	0	-	0.836	0.789	5/18/32	5/31/32	640,216	-0.580	-0.742
I.C. B&Tr Co	0	-	0.579	0.105	10/7/32	5/1/34	1,537,516	-0.223	-0.274
Illinois Tr&S B	0	-	-	-	-	-	103,536	0.000	-
Lake Shore Tr&S B	0	-	0.349	0.027	4/12/33	9/5/37	8,027,157	-0.232	-0.236
Lake View Tr&S B	0	-	0.002	0.000	1/16/52	12/31/99	8,797,961	-0.322	-0.379
Lawndale Nat'l B	1	-	0.901	0.707	4/27/32	7/13/32	5,326,340	-0.200	-0.222
Lawndale St B	0	-	0.288	0.081	5/12/33	6/8/35	2,808,685	-0.429	-0.997
Madison-Kedzie Tr&S B	0	-	0.596	0.085	10/16/32	11/21/34	8,560,730	-0.264	-0.312
Main St B	0	-	0.016	0.000	7/20/38	4/25/78	447,330	-0.203	-0.373
Mayfair St S B	0	-	-	-	-	-	-	-	-
Mercantile Tr&S B	0	-	0.065	0.002	7/17/35	5/9/59	10,271,243	-0.222	-0.233
Merchandise B&Tr Co	0	-	0.152	0.002	4/10/34	9/24/51	5,310,117	0.196	0.262
Merchants Loan & Tr Co	0	-	-	-	-	-	104,224	-0.001	-
Metropolitan St B	0	-	0.082	0.007	12/9/34	4/5/44	1,354,650	-0.511	-0.609
Mid-City Tr&S B	0	-	0.179	0.018	1/3/34	11/4/39	9,169,867	-0.409	-0.431

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Name	National Bank	Failure Date (Panic Failures in Italics)	Predicted Probability of Failure (In Sample Logit)	Predicted Probability of Failure (Out of Sample Logit)	Predicted Failure Date (In Sample Survival)	Predicted Failure Date (Out of Sample Survival)	Total Assets	Δ Total Assets 1930-1931	Δ Total Deposits 1930-1931
Midway St B	0	-	0.182	0.014	1/9/34	11/14/38	539,129	-0.221	-0.376
Mt Greenwood Tr&S	0	-	-	-	-	-	-	-	-
Mutual Nat'l B	1	-	0.033	0.001	2/11/37	9/28/76	3,866,577	-0.369	-0.429
Nat'l Builders B	***1***	-	***0.021***	***0.000***	***7/16/38***	***12/31/99***	***5,743,365***	***-0.189***	***-0.271***
Northern Tr Co	***0***	-	***0.013***	***0.000***	***1/4/41***	***12/31/99***	***104,598,130***	***0.342***	***0.544***
Norwood Pk Tr&S B	0	-	0.823	0.603	5/30/32	8/1/32	365,123	-0.515	-0.607
Oak Pk Tr&S B	0	-	0.258	0.025	8/16/33	3/14/38	7,638,692	-	-
Peoples Tr&S B	0	-	0.046	0.000	7/2/36	11/27/90	28,612,700	-0.141	-0.149
Personal Loan & S B	***0***	-	-	-	-	-	***10,593,026***	***-0.140***	***-0.201***
Pioneer Tr&S B	0	-	0.068	0.008	3/12/35	11/15/44	5,884,453	-0.417	-0.503
Roseland Nat'l B of Chgo	1	-	0.136	0.008	3/30/34	9/27/41	764,804	-0.351	-0.607
Safety St B	0	-	0.002	0.000	9/17/53	12/31/99	189,399	-0.598	-0.987
Sears Community St B	0	-	0.620	0.268	9/16/32	6/15/33	2,243,361	-	-
Second Security B	0	-	0.303	0.041	5/18/33	9/10/36	4,832,796	-0.200	-0.233
Security B	0	-	0.307	0.063	5/26/33	12/27/35	6,799,893	-0.303	-0.318
Sixty-Third & Halsted St S B	0	-	0.056	0.003	7/22/35	4/27/49	1,225,138	-0.446	-0.579
Skala St B	0	-	0.316	0.198	3/26/33	1/26/34	956,047	-0.392	-0.471
South Central St B	0	-	0.088	0.006	8/11/34	2/9/43	299,228	-0.376	-0.677
South Chgo S B	0	-	0.073	0.005	2/8/35	4/24/47	5,489,021	-0.392	-0.518
St B of Chgo	0	-	-	-	-	-	211,228	0.043	-
St B of Clearing	0	-	0.077	0.013	11/21/34	1/22/41	1,120,746	-0.120	-0.086
St B of West Pullman	0	-	0.423	0.317	12/13/32	6/4/33	785,324	-0.406	-0.519
Stock Yards Nat'l B	1	-	0.018	0.000	7/25/39	12/31/99	18,462,284	-0.115	-0.121
Stock Yards Tr&S B	0	-	0.605	0.531	9/19/32	1/15/33	9,123,114	-0.066	-0.071
Straus Nat'l B&Tr Co	***1***	-	***0.008***	***0.000***	***6/30/42***	***12/31/99***	***13,622,434***	***0.038***	***0.014***
Terminal Nat'l B	***1***	-	***0.135***	***0.002***	***6/4/34***	***10/27/50***	***6,369,938***	***-0.285***	***-0.315***
Union St B of Chgo	0	-	-	-	-	-	-	-	-
Union Tr Co	0	-	-	-	-	-	237,155	0.056	-
University St B	0	-	0.433	0.059	1/6/33	6/10/35	2,258,037	-0.255	-0.307
Upper Ave B	0	-	0.139	0.005	4/6/34	1/3/45	3,319,157	0.199	0.260
Uptown St B	0	-	0.486	0.044	12/17/32	11/28/35	3,699,813	-0.217	-0.243
West Side Nat'l B of Chgo	1	-	-	-	-	-	-	-	-
West Side Tr&S B	0	-	0.673	0.519	8/30/32	12/29/32	10,720,043	-0.151	-0.167
West Thirty-Fst St B	0	-	0.285	0.270	4/29/33	9/9/33	519,728	-0.445	-0.509
Western St B	0	-	0.061	0.012	7/17/35	8/3/42	2,067,181	-	-

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NOTES

1. See Gorton (1985), Calomiris and Kahn (1991), Calomiris and Gorton (1991), Calomiris and Schweikart (1991), and Calomiris (1993).

2. Calomiris and Kahn (1991) and Calomiris, Kahn, and Krasa (1994) emphasize that deposit withdrawals can act as a preemptive closure mechanism to prevent large losses to depositors. Gorton and Pennacchi (1990) argue that bank depositors will not tolerate significant increases in the risk of bank assets (even if banks remain solvent) because increased risk can undermine the liquidity of bank deposits. Thus, large withdrawals of deposits may coincide with relatively small increases in the riskiness of bank assets, particularly for highly leveraged banks.

3. James (1938, pp. 1032-1033) also notes the bizarre, unexplained role of anti-bank "propaganda" during the panic, which took the form of "mysterious" phone calls to depositors and the widespread circulation of anonymously authored pamphlets. The source of this campaign was never discovered, but two possibilities are discussed by James. The first is a "Marxist group of agitators" who may have sought to bring about social upheaval; the second is opposition to Melvin Traylor, who was becoming increasingly involved in Democratic party politics. James favors the latter view because so much of the propaganda was directed against First Chicago.

4. Mason (1994) 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 common view at the time that because of the strict collateral requirements on RFC lending, RFC assistance often increased the credit risk faced by bank depositors.

5. We use a logistic probability density function in estimating survival duration, following Kiefer (1988) and Lancaster (1990).

6. For example, if the panic was a common shock to all banks, and a low-probability event, then the level of reserves might do an excellent job of "forecasting" failure (using "in-sample" data from the panic) even if the banks that failed during the panic did not have higher ex ante probabilities of failing.

7. Another approach we considered to solving the problem of ex post bias in failure forecasts is to construct a structural model of bank failure, using the Black-Scholes (1973) option pricing model to estimate the ex ante probability of bank failure. Given data on market values of equity and debt at a point in time and the volatility of asset values at the same point in time, one can compute the probability of failure of any bank under the assumptions of Black and Scholes (normally distributed asset returns, and a given maturity of debt). In principle, one could estimate the probability of any bank's failure over a given time horizon beginning in December 1931 by combining bank balance sheet data and stock price data. To implement this approach requires reliable data at high frequency on stock prices to estimate the volatility of stock values at a point in time. For all but eleven of the largest Chicago banks (all but one of

which survived the panic) reliable data are not available even at monthly frequency for the purpose of estimating volatility. Often stock price quotations show no change for one or two months, which we interpret as evidence of the lack of trading during that interval rather than the constancy of value. Even reliable monthly data (say, for the year 1931) would be inadequate to construct believable estimates of the volatility of bank stock at the end of 1931 (a much more volatile environment than earlier in the year).

8. Only two loop banks showed large (greater than 15 percent) stock price reductions during the panic -- the Bank of Commerce and Central Republic. The former's price was reported in the range of 9-11 (for a $20 par value) from June 18 through June 24. On June 25, the share price ceased to be reported in the *Tribune*, and on June 28 it was formally placed into receivership. Central Republic -- the bank that received the large loan from the other Chicago banks and the RFC -- saw its stock price fall from the range of 47-50 on Saturday June 25 to a range of 4-5 on Monday June 27. Afterwards, its price rebounded rapidly.