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ABSTRACT

This paper provides the first comprehensive econometric analysis of the causes of bank distress during the Depression. We assemble bank-level data for virtually all Fed member banks, and combine those data with county-level, state-level, and national-level economic characteristics to capture cross-sectional and inter-temporal variation in the determinants of bank failure. We construct a model of bank survival duration using these fundamental determinants of bank failure as predictors, and investigate the adequacy of fundamentals for explaining bank failures during alleged episodes of nationwide or regional banking panics. We find that fundamentals explain most of the incidence of bank failure, and argue that "contagion" or "liquidity crises" were a relatively unimportant influence on bank failure risk prior to 1933. We construct upper-bound measures of the importance of contagion or liquidity crises. At the national level, we find that the first two banking crises identified by Friedman and Schwartz in 1930 and 1931 are not associated with positive unexplained residual failure risk, or with changes in the importance of liquidity measures for forecasting bank failures. The third banking crisis they identify is a more ambiguous case, but even if one views it as a bona fide national liquidity crisis, the size of the contagion effect could not have been very large. The last banking crisis they identify – at the beginning of 1933 – is associated with important, unexplained increases in bank failure risk. We also investigate the potential role of regional or local contagion and illiquidity crises for promoting bank failure and find some evidence in support of such effects, but these are of small importance in the aggregate. We also investigate the causes of bank distress measured as deposit contraction, using county-level measures of deposits of all commercial banks, and reach similar conclusions about the importance of fundamentals in determining deposit contraction.

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I. Introduction

One of the most vivid images of the Great Depression is that of a bank failing. It is an image of the Depression shared by scholars and the general public, and one to which many have attached a great deal of importance. Depositors and stockholders in banks frequently are portrayed both as victims of the economic collapse of 1929-1933, and as contributors to the size and duration of that collapse. But the causes of banking distress during the Depression remain highly controversial.

Perhaps the central unresolved question about the causes of bank distress during the Depression is the extent to which the waves of bank failures and deposit contraction (which together define bank distress) reflected “fundamental” deterioration in bank health, or alternatively, “panics” or sudden crises of systemic illiquidity that may have forced viable banks to fail. The causes of bank distress are particularly relevant from the perspective of public policy. To the extent that bank distress was not due to fundamental bank weakness, policy actions to protect threatened banks via Fed or government loans or other assistance might have prevented failures and deposit contraction.

A. The Causes of Bank Failures During the Depression

The list of fundamental shocks that may have weakened banks is a long and varied one. It includes declines in the value of bank loan portfolios produced by rising default risk in the wake of regional, sectoral, or national macroeconomic shocks to bank borrowers, as well as monetary policy induced declines in the prices of the bonds held by banks.

There is no doubt that adverse fundamental shocks relevant to bank solvency were contributors to bank distress; the controversy is over the size of these fundamental shocks – that is, whether banks experiencing distress were truly insolvent or simply illiquid.

Friedman and Schwartz (1963) are the most prominent advocates of the view that bank failures resulted from unwarranted “panic” and that failing banks were in large measure illiquid rather than insolvent. Consider the following passages from Friedman and Schwartz. Referring to the “first banking crisis of October 1930,” they write:

> A contagion of fear spread among depositors, starting from the agricultural areas, which had experienced the heaviest impact of bank failures in the twenties. But such contagion knows no geographical limits. The failure of 256 banks with $180 million of deposits in November 1930 was followed by the failure of 352 with over $370 million of deposits in December (all figures seasonally adjusted), the most dramatic being the failure on December 11 of the Bank of United States with over $200 million of deposits. That failure was of especial importance. The Bank of United States was the largest commercial bank, as measured by volume of deposits, ever to have failed up to that time

> in U.S. history. Moerover, though an ordinary commercial bank, its name had led many at home and abroad to regard it somehow as an official bank, hence its failure constituted more of a blow to confidence than would have been administered by the fall of a bank with a less distinctive name. In addition, it was a member of the Federal Reserve System. The withdrawal of support by the Clearing House banks from the concerted measures sponsored by the Federal Reserve Bank of New York to save the bank – measure of a kind the banking community had often taken in similar circumstances in the past – was a serious blow to the System's prestige….under the pre-Federal Reserve banking system, the final months of 1930 would probably have seen a restriction [of convertibility of deposits]…By cutting the vicious circle set in train by the search for liquidity, restriction would almost certainly have prevented the subsequent waves of bank failures that were destined to come in 1931, 1932, and 1933….After all, the Bank of United States ultimately paid off 83.5 per cent of its adjusted liabilities at its closing on December 11, 1930, despite its having to liquidate so large a fraction of its assets during the extraordinarily difficult financial conditions that prevailed during the next two years (pp. 308-311).

Clearly, Friedman and Schwartz attached great importance to the banking crisis of late 1930. They also identified two other banking crises in 1931 – from March to August 1931, and from Britain's departure from the gold standard (September 21, 1931) through the end of the year. The fourth and final banking crisis they identify occurred at the end of 1932 and the beginning of 1933, culminating the nationwide suspension of banks in March. While the fourth banking crisis was the most dramatic and visible example (and the only one to result in nationwide bank suspension of operations), the first three crises in 1930 and 1931 are the ones to which Friedman and Schwartz attach the most importance from a macroeconomic standpoint. The 1933 crisis and suspension was the beginning of the end of the Depression, but the 1930 and 1931 crises (because they did *not* result in suspension) were, in Friedman and Schwartz's judgement, important *sources of shock to the real economy* that turned a recession in 1929 into the Great Depression of 1929-1933.

How did Friedman and Schwartz reach these conclusions? It is somewhat difficult to pinpoint the Friedman and Schwartz argument and evidence on the question of bank solvency, since it is based on a broad range of qualitative historical judgements and "pictures" of data rather than on formal logic or formal empirical tests. This is not intended as a criticism, but rather as a caution to our readers that our statements about their work involve an element of interpretation.

Friedman and Schwartz's (1963) summary of the aggregate trends for the macroeconomy and the banking sector focuses on the extreme severity of the banking crisis (the incidence of bank suspension) and the accompanying decline in deposits and the money multiplier:

> From the cyclical peak in August 1929 to the cyclical trough in March 1933, the stock of money fell by over a third…. More than one-fifth of the commercial banks in the United States holding nearly one-tenth of the volume of deposits at the beginning of the contraction suspended operations because of financial difficulties. Voluntary liquidations, mergers, and consolidations added to the toll, so that the number of commercial banks fell by well over one-third. The contraction was capped by banking holidays in many states in early 1933 and by a nationwide banking holiday…. There was no precedent in U.S. history of a concerted closing of all banks for so extended a period over the entire century (p. 299).

Friedman and Schwartz (1963) recognize that interlinkages between the banking sector and the real sector complicate arguments about causality:

> …the decline in the stock of money and the near-collapse of the banking system can be regarded as a consequence of nonmonetary forces in the United States, and monetary and nonmonetary forces in the rest of the world. Everything depends on how much is taken as given (pp. 300-301).

Nevertheless, they argue that Federal Reserve errors of commission (decisions to tighten) and omission (failure to address the problem of banking "panic" and bank illiquidity) were central causes of the economic collapse of the Depression. Our interest is in the second aspect – the question of whether the banking collapses were unwarranted panics that forced solvent but illiquid banks to fail.

In essence, the Friedman and Schwartz argument is based upon the suddenness of banking distress during the panics that they identify, and the absence of collapses in relevant macroeconomic time series prior to those banking crises. Figures 1-4 reproduce Charts 27-30 from Friedman and Schwartz (1963, p. 309). These charts seem to tell a clear story. The time series movements of aggregate personal income, aggregate industrial production, wholesale prices, long-term government bond yields, and aggregate stock prices do not move adversely prior to banking crises in ways that seem capable of explaining the incidence of banking crises (and the collapses of the stock of bank deposits that occur in the wake of the banking crises). This is the essential evidence Friedman and Schwartz focus upon to defend their view of banking crises as unwarranted panics.

But there are reasons to question Friedman and Schwartz's view of the origins and avoidability of the banking crises of the Depression. One indication that the Depression era banking crises may have been dissimilar from pre-World War I panics is suggested by Calomiris and Gorton's (1991) observation that the "panics" during the Depression were unusual in their cyclical timing (compared to pre-World War I panics). Pre-Depression panics occurred at cyclical peaks, and were clearly traceable to sudden increases in uncertainty about bank health.

The major panic episodes occurred following a sudden decline in asset prices of sufficient magnitude that coincided with a sudden worsening of bank loan quality (measured by seasonally adjusted growth in the liabilities of failed businesses). [1] The four Friedman-Schwartz banking crises of 1930-1933, in contrast, occurred in the middle or at the trough of the Depression, long after the initial bad news about a cyclical turnaround in 1929.

Furthermore, pre-Depression panics were moments of temporary confusion about which (of a very small number of banks) were insolvent. In contrast, as Temin (1976) and many others have noted, the waves of bank failure during the Depression marked a continuation of the severe banking sector distress that had gripped agricultural regions throughout the 1920s. Of the nearly 15,000 bank disappearances that occurred between 1920 and 1933, roughly half predate 1930. And massive numbers of bank failures occurred during the Depression era outside the crisis windows identified by Friedman and Schwartz (notably, in 1932). Wicker (1996, p. 1) estimates that "[b]etween 1930 and 1932 of the more than 5,000 banks that closed only 38 percent suspended during the first three banking crisis episodes." Recent studies of the condition of the Bank of United States indicate that it too was insolvent, not just illiquid, in December 1930 (Lucia 1985, Friedman and Schwartz 1986, Trescott 1992, O'Brien 1992, Wicker 1996). So there is some prima facie evidence that the banking distress of the Depression era was more than a problem of panic-inspired illiquidity.

But how can one attribute bank failures during the Depression to fundamentals when Friedman and Schwartz's evidence (shown in Figures 1-4) indicates no prior changes in macroeconomic fundamentals? One possibility is that Friedman and Schwartz omitted important aggregate measures of the state of the economy relevant for bank solvency. For example, measures of commercial distress and construction activity, as we will argue below, may be useful indicators of fundamental shocks.

A second possibility is that aggregation of fundamentals masks important sectoral, local, and regional shocks that buffeted banks with particular credit risks. The most important

[1] Furthermore, banking distress in the 1930s did not provoke collective action by banks (clearing house actions to share risks or suspend convertibility), as had been the case in the pre-Fed era. Friedman and Schwartz argue that "…the existence of the Reserve System prevented concerted restriction, both directly and indirectly: directly, by reducing the concern of stronger banks, which had in the past typically taken the lead in such a concerted move, since the system provided them with an escape mechanism in the form of discounting; and indirectly, by supporting the general assumption that such a move was made unnecessary by the establishment of the System." (p. 311). Another possibility is that collective action was not warranted (i.e., solvent banks were not threatened by the failures of insolvent banks). Collective action remained feasible, as illustrated by the behavior of Chicago banks in June 1932, but Friedman and Schwartz see these as exceptions. See James (1938) and Calomiris and Mason (1997) for details on the Chicago panic and the role of collective action in resolving it.

challenge to Friedman and Schwartz's aggregate view of bank distress during the Depression has come from the work of Wicker (1980, 1996). Using a narrative approach similar to that of Friedman and Schwartz, but relying on data disaggregated to the level of the Federal Reserve district and on local newspaper accounts of banking distress, Wicker argued that it was incorrect to identify the banking crisis of 1930 and the first banking crisis of 1931 as national panics comparable to those of the pre-Fed era. According to Wicker, the proper way to understand the process of banking failure during the Depression is to disaggregate, both by region and by bank, because heterogeneity was very important in determining the incidence of bank failures. Once one disaggregates, it becomes apparent that at least two of the banking crises of 1930-1931 were largely regional affairs. Wicker's analysis of the third banking crisis (beginning September 1931) also shows that bank suspensions were concentrated in a very few locales, although he regards the nationwide increase in the tendency to convert deposits into cash as evidence of a possible nationwide banking crisis in September and October 1931. Wicker agrees with Friedman and Scwhartz that the final banking crisis (of 1933), which resulted in universal suspension of bank operations, was nationwide in scope.

Wicker (1980, 1996) argues that the failures of November 1930 reflected a combination of regional shocks and the specific risk exposures of a small subset of banks, linked to the fortunes of the failed Nashville-based Caldwell & Co., the largest investment bank in the South at the time of its failure, and one with a controlling interest in many commercial banks in the South. Many of the banks that failed in the South in late 1930 were either affiliates of Caldwell or its correspondents. Wicker (1996, p. 29) writes that:

> The Northeast was unaffected by the November [1930] crisis; there were not suspensions in the Boston, New York, and Philadelphia Federal Reserve Districts, and only one closing in San Francisco, three in Dallas, and four in Cleveland. Richmond and Atlanta accounted for 15 percent of the suspensions and roughly one-third of the deposits of closed banks. The failure of Caldwell and Company was directly or indirectly responsible for over one-half of the bank closings in the St. Louis, Richmond, and Atlanta Federal Reserve Districts in November. The November crisis was region specific. There was no nationwide run on the banks nor universal loss of confidence in the US banking system. Moreover, there were no repercussions in the central money markets, in either New York or Chicago.

Wicker shows that the center of the crisis shifted North in December 1930, but only two banks (the Bank of United States in New York, and Bankers' Trust in Philadelphia) accounted for the bulk of suspended deposits. Both in November and December, changes in currency-to-deposit ratios were temporary and region-specific. There was no national flight to cash in late 1930. Nor, Wicker concludes, did the closure of the Bank of United States have significant repercussions in New York City, or for banks with business dealings with the Bank of United States, partly because of expansionary open market purchases by the New York Fed in December 1930. Peter Temin (1989, p. 50) reached a similar conclusion about the "panic" of 1930:

> I now think that I should have gone further than I did a dozen years ago. The events of late 1930 do not merit the appellation that Friedman and Schwartz bestowed on them.

Referring to Caldwell & Co. and the Bank of United States, Temin (1989, p. 50) cites fundamental causes underlying their failures:

> Both of the banks had undergone reckless expansion in the late 1920s, and their overblown empires collapsed under the pressure of the emerging Depression.

Similarly, Wicker argues that the banking crisis of April-August 1931 is traceable to suspensions that were highly regionally concentrated. He also finds that the flight to currency during this period (for which he provides improved, disaggregated estimates) was confined to those same regions. Between April and August 1931, 563 banks failed with deposits amounting to $497 million. Two of the twelve Federal Reserve Districts (Chicago and Cleveland) contained two-thirds of the suspended bank deposits, and bank suspensions in Toledo and Chicago alone account for three-fourths and one-fourth, respectively, of suspended bank deposits in those two Districts.[2] Wigmore (1985, p. 203) shares Wicker's view that there was no nationwide banking crisis beginning in April 1931.

Wicker's analysis of the second banking crisis of 1931 (which he dates as beginning in September and ending in October) provides a less clear picture of the geographic scope of bank distress. From the perspective of bank suspensions it was highly geographically concentrated. Nevertheless, conversion of deposits into cash was a nationwide phenomenon.

Like the previous two crises, the incidence of bank failure in September and October 1931 is highly geographically concentrated (in the states of Ohio, Pennsylvania, West Virginia, Missouri, and Illinois), and as before, particular cities dominated the list of failures (Philadelphia, Pittsburgh, and Chicago are the most important examples). The Pittsburgh bank failures account for 84 percent of the deposits of suspended banks in the Cleveland District in September 1931. Philadelphia bank failures account for 74 percent of the deposits of suspended banks in the Philadelphia District in October 1931 (Wicker 1996, p. 80). Chicago bank failures

[2] Chicago, Wicker (1996, p. 69) argues, was uniquely vulnerable in the 1930s (the only city to experience three waves of banking crisis during 1931-1932), owing to its peculiar history as a reserve center city with strict unit banking, which had seen expansion of small banks in the suburbs during the 1920s with undiversified loan portfolios tied to speculative real estate expansion (see also James 1938, Esbitt 1986, and Calomiris and Mason 1997).

only accounted for 11 percent of the deposits of suspended banks in September 1931, owing to the large number of Illinois bank failures in that month outside of Chicago. To quote Wicker (1996, pp. 74-75), “it would not be imprudent to conclude that multibank failures within one town or city within a one week interval were not numerous.”

The timing and location of the bank suspensions in September and October 1931 is also significant. In large part, they preceded the October 9 Federal Reserve discount rate increase, to which Wicker (in contrast to Friedman and Schwartz) attaches little importance. Bank failures did coincide with the departure of Great Britain from gold, but as Wicker points out, it would be hard to explain why the pressures of an external drain on gold would cause bank failures in West Virginia, Missouri, Pennsylvania, Illinois, and Ohio, while leaving the major cities of the Northeast (and New York, in particular) unaffected. As Wicker (1996, p. 103) states, “[t]here is…no direct link between the gold crisis and the mini panics in Pittsburgh and Philadelphia in late September and early October.” Wicker (p. 101) is unable…

> …to identify a single bank suspension, large or small, that can be traced directly to events connected with Britain’s departure from gold. Why depositors in the interior of the country should have been expected to have reacted differently from depositors in New York City banks with some foreign securities exposure is puzzling to consider.

Wicker (1996) seems to be of two minds about the September-October 1931 banking crisis. On the one hand, as the above passages indicate, he finds no evidence of a nationwide banking crisis. Indeed, he writes that:

> The September-October banking crisis did not have its origin in the New York money market; there was no crisis in the central money market. Bank suspensions were negligible and the runup of short-term interest rates was moderate. (p. 103)

And yet, Wicker considers September-October 1931 a national banking crisis because of the increase in the conversion of deposits into currency during that period. Of course, as he recognizes, much of that conversion may have reflected an external drain rather than a domestic hoarding of cash, and therefore, it is hard to argue from the rise in currency alone that the public lost confidence in banks nationwide, particularly given the lack of widespread increases in bank suspensions nationwide. We conclude, therefore, that according to Wicker’s analysis, the “panic” of September-October 1931 was a questionable national event from the standpoint of bank failure risk.

In contrast, the banking crisis that culminated in the bank holidays of February-March 1933 was indisputably a national event. It resulted in the suspension of at least some bank operations (bank “holidays”) for nearly all banks in the country by March 6. These were not bank suspensions of the classical variety. During the panics of the national banking era, banks suspended operations and failures were few. Not so during the bank holidays of early 1933. Indeed, early 1933 was a time of high failure risk in our sample (see Figure 5). An important question is whether the collapse of banks in early 1933 reflected fundamental deterioration in bank condition in preceding months, or a contagion of fear that brought down healthy as well as insolvent banks.

It is certainly conceivable that a sudden shock, rather than irrational contagion, may have been the cause of bank distress prior to the bank holidays of 1933. Wigmore (1987) emphasizes external currency drain and the expectation of the departure from the gold standard, not concerns over domestic bank solvency, as the precipitating event that led to the March 6 declaration of a national bank holiday. According to that view, an expected change in exchange rate policy was the source of a profound and sudden attack on banks. Widespread deposit withdrawal also weakened banks’ fundamentals through its influence on the money supply and asset prices. Wicker (1996) accepts the importance of the external drain in early 1933, but argues that Wigmore underestimates the importance of the regional crisis that gripped midwestern banks (beginning with Michigan banks) in early 1933 for precipitating the national crisis.

From the regionally disaggregated perspective of Wicker’s findings, the inability (visible in Figures 1-4) to explain the timing of bank failures using aggregate time series data (which underlay the Friedman Schwartz view that banking failures were an unwarranted and autonomous source of shock) would not be surprising even if bank failures were entirely due to fundamental insolvency. Failures of banks were local phenomena in 1930 and 1931, and so may have had little to do with national shocks to income, the price level, interest rates, and asset prices.

The unique industrial organization of the American banking industry is of central importance to the Wicker view of the process of bank failure during the Depression. Banks in the United States (unlike banks in other countries) did not operate throughout the country. They were smaller, regionally isolated institutions. In the United States, therefore, large region-specific shocks might produce a sudden wave of bank failures in specific regions even though no evidence of a shock was visible in aggregate macroeconomic time series.

Microeconomic studies of banking distress have provided some useful evidence on the reactions of individual banks to economic distress, which bears on these macroeconomic debates. White (1984) showed that the failures of banks in 1930 were best explained as a continuation of the agricultural distress of the 1920s, and were traceable to fundamental disturbances in agricultural markets. Calomiris and Mason (1997) studied the Chicago banking panic of June 1932 (a locally isolated phenomenon). They found that the panic resulted only in a temporary unwarranted contraction of deposits; local fundamentals determined both the long-run contraction of bank deposits and which Chicago banks failed before and during the panic.

Calomiris and Wilson (1998) studied the behavior of New York City banks during the interwar period, and in particular, analyzed the contraction of their lending during the 1930s. As in White (1984) and Calomiris and Mason (1997), Calomiris and Wilson (1998) find that banking distress was an informed market response to observable weaknesses in individual banks, traceable to ex ante bank characteristics.

Taken together, these studies suggest that local fundamentals played a large role in generating banking distress during the Depression. Existing microeconometric contributions, however, suffer three weaknesses from the standpoint of the larger macroeconomic questions that underlie much of the interest in the origins of banking distress during the Depression. First, they rely upon limited samples. Analysis of banks in particular locations, or at particular times, may paint a misleading picture of the causes of banking distress for the country as a whole during the Depression. Second, some of the previous microeconomic studies have used sources that contain a limited set of bank characteristics, and which exclude characteristics that are likely to be important in modeling bank distress (as indicated by the results of Calomiris and Mason 1997, which show the advantage of including a relatively rich set of characteristics).

Third, none of the microeconometric studies has tried to measure the relative importance of fundamentals and "contagion" for explaining bank failures at the regional or national level. This is an important omission. The fact that regional shocks were important (as argued by Wicker and others) does not in itself disprove the Friedman-Schwartz view that runs on banks resulted in large part from panic. Indeed, Wicker – who disputes the existence of nationwide panics in 1930 and 1931 – argues that local and regional panics contributed to bank failures over and above fundamental regional shocks.

This paper assembles a rich disaggregated dataset capable of linking fundamental sources of bank weaknesses – individual bank portfolio and liability structure and condition, and local, regional, and national economic shocks – to the process of bank failure. We construct a survival duration model of banks that relates information about the timing of individual bank failures to the characteristics of individual banks, and to the changing local and national economic environment in which they operated. A detailed, disaggregated model of the fundamental determinants of bank failure makes possible the evaluation of the relative importance of contagion for generating banking distress.

B. Summary

To summarize our objectives, we seek (1) to gauge the extent to which the attributes of specific banks, in concert with the fundamental local or national shocks that buffeted those banks can explain the timing and incidence of bank failures, (2) to evaluate the importance of "contagion" – nationally or locally – as a cause of bank failure during the Depression, and (3) to identify the extent to which particular banking crises were national or regional events.

Our investigation of the causes of banking distress relies upon the fact that the U.S. banking system was geographically fragmented. In most states, banks were not free to operate branches (the so called "unit" banking restriction). Even in states that permitted branching within the state, branching was often limited, and in all cases, branching was not allowed outside the state.[3] Geographic fragmentation of banking permits one to identify location-specific and bank-specific determinants of failure for a large sample of banks, and to investigate whether the failures of banks located nearby affected the probability of a bank's failure (a local contagion effect).

The remainder of this paper is organized as follows. Section II briefly describes the data set (a detailed description is provided in the data appendix to Calomiris and Mason 2000), and defines and explains the limits of our investigation – that is, why we confine our attention to certain measures of economic performance, and to Fed member banks' behavior. Section III contains our analysis of the causes of bank failure using data on individual banks. Specifically, in Section III we construct a survival duration model for banks and consider the significance of bank characteristics, shocks to the economic environment, and various measures of "contagion" or "panic" for reducing the probability of bank survival. As a complement to the analysis of Section III, Section IV investigates the determinants of annual deposit growth at the county level. Section V summarizes our results and concludes.

II. Data

Our data set contains a wide variety of variables that differ by frequency, geographic scope, and level of disaggregation. In this section we describe briefly the definitions and sources for our data, and explain the limits of our sample.

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[3] See Calomiris (2000) for a review of the history of unit banking restrictions and their costs.

With the help and support of the St. Louis Fed and the University of Illinois, Urbana-Champaign, and subsequently, with funding from the National Science Foundation, we assembled bank-level balance sheet and income statement data from microfilm records of "call reports" of Federal Reserve member banks (see Mason 1998 for an overview of the call report data we collected). We designed our data collection effort to (1) track the experience of individual banks over time, and (2) to relate their failure or balance sheet changes to a detailed set of prior, individual bank characteristics and the existing local economic environment in which the banks operated. Thus, in addition to call report data we also collected data on the timing of bank failures, changes in the names of banks over time, and a wide variety of county-level, state-level, and nationwide measures of economic environment (see the data appendix in Calomiris and Mason 2000 for a more detailed description).

Our data can be usefully grouped into four categories, which differ according to their degree of disaggregation: bank-level, county-level, state-level, and nation-level data. Table 1 provides a list of the variables used and their definitions. Table 5 provides summary statistics for these variables.

A. Bank-Specific Data

Bank-specific data include balance sheet and income statement information, bank identifier variables, and information on bank exit (receivership or voluntary liquidation). Our data on failures for Fed member banks identify the date at which banks were placed into receivership or were closed by voluntary liquidation. All results reported below combine receivership and voluntary liquidation into a single measure of bank failure. Results not reported here show slight differences in results for the two categories taken separately, and thus little advantage to analyzing them separately.

Many banking studies have had to rely on bank suspension rather than liquidation as their measure of bank failure. Suspensions are typically employed because data on bank failures, both for numbers and deposits of failed banks, are not readily available at the regional or national level, especially for observations at greater than annual frequency. Data on suspensions can provide a misleading picture of bank failure. In some cases, suspensions were temporary and suspended banks quickly reopened (Calomiris 1992). Furthermore, suspension is not consistently defined in the literature. The Federal Reserve series on bank "suspensions," published in *Banking and Monetary Statistics (1976),* mixes suspensions (of state-chartered banks) and liquidations (of national banks).

The distinction between suspension and failure is particularly important during early 1933 – a time when virtually all banks "suspended" operations during state and national bank holidays, but during which only some of those banks failed. Developing a data base on bank failures makes it possible to investigate the role of contagion in bank failures during early 1933, which is not possible using suspension data. Understanding the determinants of the large number of bank failures in early 1933 is a crucial and omitted part of the history of bank distress during the Depression.

The main obstacle to collecting comprehensive bank failure data at high frequency is the absence of readily available information for non-Fed member banks (hereinafter referred to as non-member banks). Given that our data on balance sheets and income statements only include member banks, this limitation was not a problem from the standpoint of analyzing the failure experiences of banks in our sample.

Even though our sample includes nearly all Fed member banks, one can question whether that sample of banks is representative, given the large number of excluded non-member banks. It is worth noting that non-member banks were much smaller on average than member banks, so their number exaggerates their importance. As of June 30, 1929, non-member banks comprised 15,797 of the 24,504 banks in existence (of which 7,530 were national banks and 1,177 were state-chartered member banks). But non-member banks only accounted for 27 percent of banking system deposits ($13.2 billion of the total $49.0 billion).[4] The broad patterns of growth of member and non-member banks are similar in loans and deposits, although non-member banks grew more slowly in the period 1921-1929 (loans grew by an average of 27 percent for non-member banks, as opposed to 42 percent for member banks) and shrank more quickly from 1929 to 1932 (non-member banks' loans declined by an average of 48 percent, compared to a 35 percent decline for member banks). These patterns reflect in large part the consolidation wave produced by agricultural distress in the 1920s (which was reflected in the greater growth of member banks) and the greater continuing vulnerability of small, non-member banks in the 1930s. Exit rates were higher for non-member banks than for member banks during the Depression; non-member banks fell as a proportion of total banks from 63 percent of the number of banks in June 1929 to 57 percent by June 1933.[5] Nevertheless, our sample of member banks includes a large number of failed institutions. There were 7,498 Fed member banks in our

[4] Data are from Federal Reserve Board (1976), pp. 22-23.
[5] Data are from Wicker (1996), pp. 15, derived from Federal Reserve Board (1976), pp. 22-23, 72, 74.

sample as of the end of December 1929. 1,528 banks in our sample (including banks that entered after December 1929) had failed by the end of the 1933 (that is, were placed into receivership or were voluntarily liquidated).

Thus our sample of member banks comprises a large segment of the banking sector, and is likely to provide a reliable picture of the experience of banks during the Great Depression, although the exclusion of non-member banks reduces the bank failure rate. From an aggregate standpoint, the variation over time in bank failures apparent in Figure 5 using our definition (the hazard rate of survival for member banks) is quite similar to the pattern in Figure 4 (which defines the failure process using the deposits of all suspended commercial banks). In particular, our measured raw hazard rate of failure increases markedly during the episodes of banking crisis identified by Friedman and Schwartz.

To further investigate the representativeness of our sample of Fed member banks, in our empirical work we compare our findings on bank failures for individual member banks with results from analogous (but more aggregated) regressions using suspensions data for all banks and find similar patterns. Furthermore, in county-level analysis of deposit growth (for which total bank deposits are available) we rely on data for all bank deposits rather than deposits of only member banks.

Our data on individual bank balance sheets and income statements are limited to observations from two call dates (specifically, the end of December 1929 and the end of December 1931). In 1947, the Federal Reserve System decided to make microfilm copies of call report records for selected dates before authorizing the destruction of the original call reports (for a full description, see Mason 1998). Balance sheet data record asset and liability positions on those dates, and income statements record categories of income for the previous six months (July-December 1929, or July-December 1931). These records are quite detailed, and allow us to observe categories of assets, liabilities, expenses, and other variables at a fine level of disaggregation. Call reports also contain information on the number of branches operated by each bank.

Our analysis of bank failure risk for individual banks is for 1930-1933. The beginning of this period is dictated by the starting date for our balance sheet data (i.e., December 1929). The end of this period is dictated by the events of early 1933, which saw the suspension of bank operations through bank holidays, first at the state level via a series of actions by the various state authorities in February and March 1933, and finally at the federal level in March 1933. March 1933 was the end of the last wave of sudden bank failure during the Depression, the time when the U.S. departed from the gold standard, and marked the beginning of the recovery of 1933-1937.

The number of banks that failed in the legal sense (i.e., that were placed into receivership or voluntarily liquidated) in March 1933 understates the true number of failures at that time. Many banks that had suspended in early 1933 remained in limbo until the regulatory authorities and the RFC determined whether to assist them and whether to permit them to become members of the FDIC. The large number of bank failures in late 1933 and early 1934 (see Figure 5), therefore, might be best viewed as delayed reactions to the shocks of early 1933. In our empirical analysis of bank failures below, we discuss this problem in more detail.[6]

B. County-Level Data

Information about the economic attributes of particular counties are available from Census data for 1930. These data include demographic information, data on different categories of economic activity, unemployment, investment, and a wide variety of other variables (see the data appendix in Calomiris and Mason 2000 for a fuller description). County-level economic circumstances pertaining to agriculture include data on agricultural investment in land, buildings and equipment, the size distribution of farms, and the proportion of agricultural value added in the various categories of agricultural production (proxied by the proportion of value added in a category, or by the amount of land devoted to a category).

The disadvantage of these county-level data is their low frequency. In essence, these data allow us to model the effects of average county characteristics in our analysis, but do not permit us to track changes in important aspects of the local economic environment over time.

County-level data on bank deposits and on the deposits of suspended banks are available on an annual basis from the Federal Deposit Insurance Corporation (as described in the data appendix to Calomiris and Mason 2000). These data are of use to us for two purposes. First, because they provide an alternative county-level aggregate measure of bank distress (suspensions of all banks, as opposed to failures of member banks), these FDIC data are useful for purposes of investigating how such changes in definition might affect our findings. Second, we use county-level deposit data to analyze the determinants of deposit growth in Section IV.

C. State-Level Data

From the standpoint of the bank survival analysis of Section III, the primary advantage of state-level data as measures of economic conditions is their high frequency. We construct two state-level measures for this purpose: the dollar value of new construction projects – monthly building permit values (building expenditures for which permits are granted) reported in *Bradstreet's Weekly* – and quarterly measures of the liabilities of failed businesses at the state level from a combination of information reported in *Dun's Review* and in *Bradstreet's Weekly,* as discussed in detail in the data appendix to Calomiris and Mason (2000). The building permit series is given for a set of 215 cities in the United States. We aggregated these up to the state level to provide a monthly index for each state.

Annual state-level data on production income (from Slaughter 1937) are used to normalize our state-level measures of building permits and business failures. We also experimented with including annual state-level production income in our survival risk analysis, but we found that it offered no additional explanatory power, and so we exclude it from the regressions reported in Section III.

D. National-Level Data

At the monthly frequency, many data series that are potentially useful for tracking fundamental changes relevant for bank condition are only available at the national level. To investigate the potential effects of bond yield changes on the value of banks' securities portfolios we use the monthly series on government bond yields, constructed by the Federal Reserve Board (1976, pp. 429, 468). National liabilities of failed businesses are from *Dun's Review.* Given the importance attached to agricultural shocks we also collected data on monthly changes in an agricultural price index, defined as the log difference of a monthly index of all agricultural products based on 30 items, from the U.S. Department of Agriculture's *Farm Real Estate Situation*.

We also experimented with including additional county-level characteristics (involving manufacturing sector shares), and with including a monthly national index of industrial production. These variables never proved significant in our empirical work, and so we omit them here.

E. Regional and Temporal Variation in Bank Failure and Aggregate Economic Activity

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[6] Over the course of 1933, banks would be examined and either permitted to survive or forced to close. For discussions of bank resolution policy during 1933, see Upham and Lamke (1934), Kennedy (1973), Wicker

Tables 2-4 provide information about variation over time and across states in the incidence of bank failure. Tables 2a and 2b report quarterly numbers of failures and deposits of banks that failed, by state, using our sample of Fed member banks. Tables 3a and 3b express these quarterly state-level measures of bank failure as fractions of total banks, or total bank deposits, in each state at the end of 1929. The data reported in Tables 2 and 3 have not been collected or reported in previous studies. For purposes of comparison, Tables 4a and 4b provide state-level data analogous to Tables 3a and 3b, based on FDIC suspension data for all banks, on an annual basis. Consistent with Wicker's account (which was based on bank suspension data at the level of Federal Reserve Districts, and newspaper accounts from a sample of cities), the bank failure process varies substantially not only over time but also by state.

Figures 5-8 report various macroeconomic time series alongside our measure of Fed member banks' conditional failure hazard. These data confirm Friedman and Schwartz's view (shown in Figures 1-4) that aggregate macroeconomic indicators provide a poor explanation for the timing of bank failures in the aggregate. The only macroeconomic indicator that shows sudden change similar to that of bank failures is the liabilities of failed businesses, and it does not show increases prior to the first three panic episodes identified by Friedman and Schwartz, although it often does move in parallel to bank failure risk. The evidence presented in Tables 2-4 and Figures 5-8 shows that our aggregate indicators and our sample of Fed member banks provide a picture of the timing of total bank failures, the relationship between aggregate bank failures and macroeconomic aggregates, and the regional and temporal distribution of bank failures that are similar to those in Friedman and Schwartz (1963) and Wicker (1996). Visual inspection of aggregate variables indicates that they are not very helpful in predicting the Friedman and Schwartz crisis windows, and the cross-sectional variation emphasized by Wicker's discussion of suspensions at the Fed District level is quite visible in the pattern of bank failures at the state level.

These Tables and Figures provide prima facie evidence for the desirability of disaggregating the analysis of bank failure and examining connections between fundamental determinants of bank weakness (using county, state, and national level indicators of economic activity, and data on individual bank condition) and the probability of bank failures.

III. Modeling Bank Failure: Fundamentals and Contagion

(1996), and Mason (2000b).

Our bank failure data, which track the specific dates of each bank failure, allow us to model each bank's daily failure hazard as a function of various fundamentals, including bank-specific variables observed at earlier call report dates, county characteristics, and state- and national-level time series observed at relatively high frequency. Detailed descriptions of the survival duration methodology can be found in Keifer (1988), Lancaster (1990), and Imbens (1994). One of the advantages of the survival hazard model is its flexibility in using data observed at different levels of aggregation and different frequencies. County-level variables exert a constant effect on the hazard rate, bank-specific variables (observed biannually at call report dates) affect the hazard rate for two years, and state- and national-level quarterly or monthly series affect the hazard rate on a monthly or quarterly basis.

Our model of the determinants of failure uses many of the same bank-level determinants that were found to be useful in Calomiris and Mason (1997) to explain bank failures during the Chicago panic of June 1932. Our model of bank failures throughout the country over several years differs, however, from that earlier paper (which focused on failures occurring in one city during a brief time interval); in the empirical analysis here we include county-level, state-level, and national-level variables in addition to bank-specific characteristics. Our sample period for dating bank failures is from January 1930 to December 1933, and our fundamentals (on which the predictions of survival or failure are based) are observed from January 1930 through March 1933.

Our explanatory variables are expressed as ratios (rather than log ratios) to avoid omitting from the sample observations with a value of zero. In results not reported here, we defined our regressors as log ratios, and this transformation did not affect our results much, but did reduce our sample size. For the high-frequency state-level and national-level variables we included only one lagged value of each, based on some experimentation to find the lag length with the greatest explanatory power. Below we report results using lags of five months for state-level building permits, national-level agricultural prices, and national-level liabilities of failed businesses, and three quarters for state-level liabilities of failed businesses. We also experimented with using moving averages of these variables. The results described below for the influence of other variables are robust to variation in the specific lag structures of the high-frequency variables. The definitions of the variables used in the regressions are given in Table 1 and summary statistics for these variables are provided in Table 5.

Table 6 presents survival duration results for the period January 1930 through March 1933. Including bank failures in 1933 in our study posed a problem that required us to exercise judgement about the "correct" timing of the failure of banks. As noted above, bank holidays were declared at the state- and national-levels in February and March 1933, which entailed the partial suspension of bank operations for periods of time. Many banks failed during and immediately after the bank holidays. Some banks that did not reopen in March 1933 after suspension remained in a state of regulatory limbo for several months. Many of these banks failed in late 1933 after the regulators (and the RFC) decided not to approve them for membership in the FDIC, which began operation in January 1934. The decision to permit banks to reopen sometimes followed approval of assistance from the RFC, and Mason (2000a) finds empirical evidence that preferred stock assistance from the RFC (which began in 1933) did help banks to avoid failure.

Thus the meaning and the timing of bank failures become less clear after February 1933. In particular, some banks that failed after March 1933 could be deemed reasonably to have failed in March, and some banks that did not fail could be deemed to have been rescued by the RFC's new preferred stock program. In our survival analysis we had to decide whether to treat banks that failed between April and December 1933 as having failed in March 1933, or having failed on their official date of failure. There are merits to both ways of dating failures. On the one hand, the decision to date bank failures using official dates has the benefit of capturing the fact that banks that failed later in 1933, even if they were insolvent in March 1933, likely were a bit healthier than those that were closed in March 1933. On the other hand, there is strong qualitative evidence that the failure process changed as the result of the creation of the FDIC (which began to operate in January 1934) and RFC preferred stock assistance beginning in March 1933, and that exploiting differences in timing of failure within 1933 is at least as likely to create measurement error as to reduce it. We ran the survival model using both ways of identifying failure dates after March 1933 and found that the results did not differ qualitatively. Below we report results that preserve the actual failure dates in 1933 when computing survival hazard. The one result that does change dramatically using the alternative definition of failure dates, not surprisingly, is the size and significance of the March 1933 indicator variable, as we discuss below.

Our model of bank survival posits that the duration of survival (measured in days) depends on fundamentals, which are measured at up to monthly frequency. Our data on failure or survival end at the end of 1933, and so the survival status of banks after December 1933 is treated as unknown. For each month from January 1930-March 1933 the future survival paths of banks are regressed on fundamentals to compute the predicted survival hazard function (i.e., the coefficients for the model).

The first column in Table 6 reports results for what we term the "basic model," which includes fundamentals and a time trend. The next eight columns in Table 6 report variations on the basic model that test for the possible presence of "panic, contagion, or illiquidity crises."

We consider four types of variables to capture illiquidity crises, contagion, or panics. First, we include national-level indicator variables for specific panic windows identified by Friedman and Schwartz (1963). Second, we add regional panic indicator variables to capture the regional panics identified by Wicker (1996), and the Chicago 1932 panic. Calomiris and Mason (1997) show that Chicago did indeed suffer a panic in June 1932, but that runs on banks during the panic did not result in the failures of solvent banks. We include the Chicago panic variable not to test for contagion-induced failures there (since our tests here are less informative for answering that question than our earlier paper) but rather to gauge the extent to which indicator variables may exaggerate the extent to which panics induced bank failures because of missing location-specific fundamental indicators, as we discuss further below. Third, we include a measure of local contagion (NEARFAILS) to capture the effect of the failure of nearby banks for predicting a bank's probability of failure. Fourth, we consider "interaction effects" related to panics. Specifically, we investigate whether measures of bank liquidity or linkages among banks through interbank deposits had special effects on bank failure hazard during episodes identified as panics by prior authors.

The use of panic indicator variables, interaction effects, or nearby failures to test for contagion in producing unwarranted bank failures is a "one-sided" test, by which we mean that it is capable of rejecting, but not proving, the presence of a contagion effect. The significance of any of the four types of panic/contagion indicators implies one of two possibilities: (1) an increased probability of failure that is unrelated to long-run fundamentals (i.e., an unwarranted failure related to temporary illiquidity or contagion), or (2) an incomplete model of fundamentals, where the elements missing in the model matter more for the failures of banks in some times and places than for others. For example, finding a negative residual in our survival model for a particular month may mean that a panic in that month caused failures, or it may mean that our model lacks a fundamental that was important during that month. Finding no significant negative residual or special liquidity interaction effects during a Friedman-Schwartz panic window, however, provides evidence against the view that contagion or illiquidity produced bank failures in that month that cannot be explained by fundamentals.

Similarly, regional indicators and intereaction effects, and the NEARFAILS variable, provide one-sided tests of local or regional contagion; the absence of significance indicates no residual failures associated with particular regions, or occurring in the neighborhood of other failed banks, but the significance of these effects may simply indicate the absence of important local or regional fundamentals in the model. The potential for making false inferences from these indicators warrants emphasis, especially in light of the fact that all of these indicators were constructed based on ex post observations of bank failures. If our fundamental model is incomplete (as it surely is), then indicator variables and interaction effects for specific dates constructed from ex post observations of failures could prove significant even in the absence of true contagion.

It is also important to note that indicator variables are uninformative about the particular mechanism through which illiquidity or contagion produces bank failure. Significant unexplained residuals for particular times and places may indicate failures caused by an external drain (as in a flight from the dollar) that produces exogenous withdrawal pressure on banks. Some historians have argued that mechanism may have been important in the fall of 1931 and in early 1933. Alternatively, unexplained residual effects may indicate "panic" in reaction to a "contagion of fear" about bank solvency (that is, a massive loss of confidence in the domestic banking system). While we will sometimes refer to the indicator variables as "panic" or "contagion" indicators for convenience, it is important to bear in mind that – particularly in the case of the nationwide indicator variables for the fall of 1931 and early 1933 – our measures of possible panic/contagion/illiquidity do not distinguish possible effects of a loss of confidence in domestic banks from a crisis produced by a run on the currency.

A. Indicators of Bank Failure Risk

Before reviewing the results in Table 6, we first explain the logic underlying the fundamental predictors of survival (see also Calomiris and Mason 1997). According to basic finance theory, the probability of insolvency should be an increasing function of two basic bank characteristics: asset risk and leverage. Liquidity of assets relative to liabilities may also be a factor influencing the risk of failure.

Our measures of fundamental bank attributes capture variation in bank asset risk, leverage, and liquidity. Banks that are larger (higher LTA) are better able to diversify their loan portfolios, reducing their asset risk. Thus, ceteris paribus, large banks should have lower failure risk (higher survival hazard). Banks that achieve their size through a branching network

(LNBRANCH) should also be more diversified, ceteris paribus. There is substantial evidence for the stabilizing effects of branching in U.S. banking history (Calomiris 2000). Nevertheless, as contemporaries during the Depression and Calomiris and Wheelock (1995) note, some of the largest branching networks in the U.S. collapsed during the 1930s, indicating that the 1930s may have been something of an exception from the standpoint of the stability of branching banks. Many large branching banks were active acquirers during the 1920s, taking advantage of windows of opportunity provided by the distress of unit banks. Many of those acquirers, therefore, were in a vulnerable position (i.e., they had just acquired a relatively weak portfolio of assets) at the beginning of the 1930s.

State-chartered banks operate under different regulations, and in general were given greater latitude in lending. Thus, it may be that national banks were constrained to have lower asset risk than state banks.

Measures of the proportions of different categories of assets (NCA_TA, LD_OtherNCA, LIQLOANS, and DFB_LA) capture the degree of ex ante asset risk, and the liquidity of assets. Loan losses (LOSSX) and real estate owned (REO_NCA) are ex post measures of asset quality.

Bank net worth relative to assets (NW_TA) measures the extent of leverage using book values. Book values are imperfect measures of net worth, but market values are not available for most of the banks in our sample. The structure of bank liabilities (captured here by various ratios of components of deposits relative to total deposits) also provides information about bank failure. Calomiris and Mason (1997), among others, have found that weak banks were forced to expand their reliance on high-cost categories of debt (that is, debt held by relatively informed parties), and that the ratio of bills payable to total deposits (BPR_TD) was a very useful indicator of fundamental weakness. The average interest rate paid on deposits (INTCOST) is a direct measure of bank default risk, but a lagging measure (dependent on the frequency of deposit rollover).

The bank market power variable is included to capture the potential role of "rents" related to a bank's market power for boosting the market value of bank net worth, and therefore, reducing the effective leverage ratio of the bank. Ramirez (2000) found this variable was useful in predicting failures of banks in Virginia and West Virginia in the late 1920s.

We also include a measure of the exposure of the bank's securities portfolio to changes in bond yields (BONDYLDxSEC), to capture what we call the "Temin effect." Temin (1976, p. 84) writes that:

The principal reason usually given for [post-1930] bank failures is the decline in the

> capital value of bank portfolios coming from the decline in the market value of securities.

Wicker (1996, p. 100) disputes that view, and argues instead that bank loan quality was the dominant source of fundamental shock that led to bank failures. Our model includes measures of loan quantity and quality, but we also include BONDYLDxSEC to capture bank vulnerability to changes in bond yields.

Some county-level characteristics take account of the shares of various elements of the agricultural sector in the county economy, and the extent to which agricultural investment grew during the 1920s. That emphasis reflects the view of Wicker (1996), White (1984), and others that much of the distress suffered by banks during the 1930s was a continuation of the distress suffered in agricultural areas during the 1920s. Other county-level, state-level and national-level variables (including unemployment, building permits, business failures, and agricultural prices) capture general economic conditions in the county, state, and country.[7]

B. Regression Results for the Bank Survival Model

The results for the basic model (column (1) of Table 6) show that many fundamentals have explanatory power for bank survival (failure). Generally, coefficients are of the predicted sign and highly significant. Bank size (LTA) is positively associated with survival. Higher net worth is also associated with longer survival. A reliance on demandable debt rather than time deposits, where the demandable debt ratio is the sum of demand deposits held by the public and interbank deposits relative to total deposits ((DD+DTB)_TD), lowers survival probability. But interbank deposits have a much larger effect than demand deposits of the public. The interbank deposits effect is given by the sum of the coefficients on (DD+DTB)_TD and on DTB_TD (that is, the sum of -0.164 and -0.478). Non-demandable debt from informed creditors (bills payable or rediscounts), however, has the largest effect on survival probability of any debt category. Bills payable or rediscounts from official sources enters with a coefficient of -1.490, while such debt

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[7] One potential concern is reverse causation – that is, the possibility that business failures or building permits are endogenous to shocks originating in the banking sector. For example, it is possible that panics produce declines in building and increases in business failures, which in turn predict future bank distress (either because of serial correlation in bank distress, or because of fundamental links from economic activity to banking distress). That problem is mitigated, but not eliminated, by our use of lagged values of high-frequency fundamentals. Calomiris and Mason (2000) address the question of the dynamic relationship among bank failures, business failures, and building permits at the state level. We find little effect of autonomous shocks to bank failures on other variables, and little serial correlation in the bank failure process. Thus, those results support the assumed exogeneity of fundamental determinants of bank failure.

from private sources has a somewhat larger effect (the sum of the two coefficients, -1.490 and -0.126).

State-chartered banks (STBANK) were less likely to fail, ceteris paribus, than national banks. This is a somewhat surprising result for which we lack a clear interpretation. Nevertheless, we are able to say that constraints on the lending of national banks likely were not very important for limiting their relative risk. Our interpretation of the state-chartered indicator variable is not complicated by possible selectivity bias related to a bank's choice of location (i.e., that state banks were more present in certain counties) because we include a separate variable (PCT_STBANK) to capture the propensity of banks in a given county to be state-chartered, and therefore, we control for location-specific selectivity-bias. That control variable has a negative sign, indicating that counties with a greater proportion of state-chartered banks suffered higher bank failure rates, ceteris paribus.

Branching (LNBRANCH) is negatively related to survival duration, after controlling for other effects (including size). This result may reflect the unusual vulnerability of branching banks in the early 1930s. In future work, we plan to investigate the extent to which prior acquisitions by branching banks may explain this result (as discussed above).

Consistent with Ramirez's (2000) findings for Virginia and West Virginia in the late 1920s, greater market power (MKTPWR) lowers failure risk.

Consistent with Wicker's (1996) emphasis on loan quality as a source of fundamental problems, more lending and lower bank asset quality (measured either ex ante by NCA_TA, LD_OtherNCA, and LIQLOANS or ex post by REO_NCA) is associated with lower survival. We found no differences in failure risk associated with the composition of cash assets (which we define as the sum of cash, reserves at the Fed, government securities, and deposits due from banks). We report the results for the ratio of due from banks relative to total cash assets (DFB_LA), where the coefficient measures the effect of increasing the relative share of due from banks in total cash assets. It has an insignificant positive effect on survival duration.

Higher debt interest cost is associated with lower survival rates, but this is not a significant or robust result. The insignificance of higher debt interest cost reflects the collinearity of interest cost with other regressors that capture asset risk, leverage, and debt composition. In the absence of those other variables, it is a significant predictor of failure risk.

Banks with relatively high securities portfolios suffered greater risk of failure when bond yields rose, as predicted by Temin (1976), but the effect is not significant in the basic model. Note, however, that the size of the coefficient on (BONDYLD)x(SEC) is larger and often significant in other regressions in Table 6, specifically in regressions that include indicator variables for the first three months of 1933 (that is, regressions other than (1), (3), and (6)). This result has an intuitive interpretation; when one controls for the most important episode of nationwide panic or illiquidity crisis (during which a flight to quality would have raised the price of government securities, but not other securities held by banks), the Temin effect on the average securities portfolio should be stronger.

Thus our results on the effects of bank portfolio composition on failure risk indicate that, in a sense, both Temin and Wicker were correct: banks with more lending, and riskier lending, were more vulnerable than other banks, ceteris paribus, but to the extent banks had securities portfolios, rising bond yields increased their failure risk.

Some county characteristics are highly significant. Higher unemployment (UNEMP30) lowered bank survival rates. More agriculture, per se, does not appear to have been a problem. In fact, a reliance on agriculture as a source of income was associated with *increased* survival rates. But the composition of agricultural production and the relative health of the agricultural sector made a difference for bank survival. In counties where agriculture was an important and healthy sector, as indicated by the interaction of the percent of income earned from crops and the investment in agricultural capital during the 1920s ((DAGLBE)x(PCT_CROPINC30)), bank survival rates were higher. The extent that a county's agricultural income was based in grains (VALGR_INC_CROP30), as opposed to pasture (PCT_ACRES_PAST30), did not enter significantly. A greater presence of small farms in a county (SMFARM30) had a negative, but not a highly significant or robust effect on bank survival.

At the state level, the effect of lagged monthly building permits (STBUILDPERM_lag5) on bank survival proves positive and highly significant, while lagged quarterly liabilities of business failures does not prove significant. At the national level, monthly liabilities of business failures has a negative sign but is not highly significant. Monthly agricultural price change is insignificant in the basic model, but becomes significant when panic indicator variables are added (in columns (2), (4), (5), (7), and (8)).

Column (2) of Table 6 shows the result of including indicator variables for Friedman-Schwartz national banking crises alongside our other variables. Owing to the complexity of the suspension and failure process in early 1933, the 1933 crisis indicators are divided into three separate monthly indicator variables for January, February, and March. Column (3) of Table 6 includes indicator variables for the three regional panics identified by Wicker. Column (4) of Tables 6 includes both the Friedman-Schwartz and the Wicker crisis indicator variables. Column

(5) adds interactive effects related to due from banks to the specification of Column (4). Column (6) adds the June 1932 Chicago panic indicator alone to our basic model. Column (7) adds the Chicago panic indicator and the NEARFAILS variable to the Column (5) specification. Column (8) drops many of the insignificant regressors from Column (7). Column (9) is the same as Column (8), but includes only banks in the principal 215 cities in the United States, which permits a comparison of the determinants of failure in rural and urban areas.

In Column (2), and in all other specifications, we find that the indicator variables for two of the four Friedman-Schwartz panics (those of late 1930 and mid-1931) are *positive* and, in one case, significant. That is, contrary to Friedman and Schwartz, those episodes were times of unusually high bank survival, after controlling for fundamentals, not episodes of inexplicably high bank failure. We view this result as indicative not of "irrational exhuberance" on the part of depositors during those episodes, but of an incomplete model of fundamentals. The indicator variable for the September-November 1931 period is significant and negative in Column (2), as are the indicator variables for January and February 1933. The indicator for March 1933 is insignificant. If we had assigned all bank failures for April-December 1933 to March 1933 (which we argue, on balance, against doing above) the only qualitative difference in our results is the indicator variable for March 1933, which becomes much larger in absolute value and significant. Thus, unsurprisingly, one cannot reject the possibility that March bank failures resulted from contagion if one includes many banks that failed after March in the definition of March failures.

The results in Columns (3) and (4) support (but do not prove) Wicker's view that sudden waves of bank failure unrelated to observable fundamentals (prior to 1933) were largely regional affairs. Two of Wicker's regional indicators prove negative and significant (for late 1930 and for September-October 1931). An indicator for the third regional panic identified by Wicker (that is, mid-1931) enters with the wrong sign and is not significant. In Column (4), in the presence of the Wicker regional indicator for the fall of 1931, the Friedman and Schwartz national indicator for that episode declines in magnitude and becomes statistically insignificant.

Conclusions based on the magnitude and significance of indicator variables for panics could conceivably provide a misleading picture of the effects of panic episodes on the bank failure process. For example, even if panics are episodes in which liquidity matters a great deal for the incidence of bank failure, and in which indicators of fundamental solvency do not matter as much as during non-panic episodes, panic indicator variables might not prove negative and significant in a regression that assumes regression coefficients are constant.

Thus, it is conceivable that our conclusions about the first three Friedman-Schwartz episodes could change if we took account of changes in regression coefficients during those episodes. To investigate that possibility, we relaxed the assumption that the coefficients on our fundamentals were constant, and allowed them to vary over time. Specifically, we allowed coefficients to change during the first three episodes identified by Friedman and Schwartz as panics. Our results did not support the view that indicators of liquidity mattered more during panics, or that indicators of fundamental insolvency mattered less during panics. Indeed, our failure risk model was remarkably stable. In the first Friedman-Schwartz episode (late 1930), three variables out of 28 showed somewhat significant changes in coefficients during the episode: the state bank indicator (a 0.0159 significance level), the ratio of private bills payable and rediscounts to total bills payable and rediscounts (a 0.0479 significance level), and interest cost (a 0.0263 significance level). In the second Friedman-Schwartz episode, no coefficient changes were significant. In the third episode, due from banks as a fraction of cash assets was significant (at the 0.0033 significance level).

Three facts are salient. First, randomly one should expect that three out of 84 regressors would be significant at the 0.0357 (that is, 1/28), and we found that only three variables were significant at that level. Second, different interaction variables were significant across episodes. Third, only one of the coefficients is possibly interpretable as a special panic liquidity effect – the negative effect for the interaction of the third episode with the due from banks variable, (FSPANIC-31b)x(DFB_LA). In other words, in the fall of 1931, banks that relied on deposits in other banks as a source of cash assets found that those assets were not perfect substitutes for other cash assets (cash, reserves at the Fed, and government securities).

To further investigate the role of the due from banks variable during alleged panics, in Columns (5) and (7) of Table 6 we include interaction effects that allow the coefficient on DFB_LA to vary during all the episodes identified by Friedman and Schwartz or by Wicker as panics. As Table 6 shows, this effect is only significant for (FSPANIC-31b)x(DFB_LA). Including that variable, however, changes the sign of the FSPANIC-31b indicator variable to positive, and reduces the overall combined effect of the two variables (when evaluated at the mean of DFB_LA). Overall, we concluded that our survival model was quite stable over time and that there was little to be gained from allowing coefficients to change during episodes of alleged panic.[8]

In results not reported here, we also experimented with disaggregation of the DFB_LA variable (which our data allow us to divide among accounts held in Chicago, New York, or other cities). We found that accounts held in Chicago entered negatively relative to those of other cities, but this result disappears in the presence of the indicator variable for the June 1932 Chicago banking panic. In other words, the illiquidity of money held *in* Chicago banks was mainly relevant only for the failure risk *of* Chicago banks, and only in one month of the sample.

With respect to local contagion, the NEARFAILS variable is significant in all survival regressions that include it, even when the Friedman-Schwartz and Wicker indicator variables are also included. The June 1932 indicator for Chicago is significant even when we include the NEARFAILS variable in the regression. Since Calomiris and Mason (1997) provide evidence against viewing bank failures in Chicago in June 1932 as the result of contagion, we view that finding as illustrating the danger of interpreting indicator variables as proof of contagion (rather than as evidence of missing fundamentals).

In Column (9), we investigate differences between city banks and rural banks. All variables are defined similarly to those of the previous regressions with one exception; building permits are defined at the level of the city in which the bank is located, rather than aggregated to the state level. Results are similar to those of Column (8), apart from differences in significance that may be attributable to the relatively small sample size of city banks (which comprise roughly one-fifth of our nationwide sample). The main differences between Columns (8) and (9) are as follows. Deposits held by banks (DTB_TD) has a smaller and insignificant sign in the city bank failure regression. Note that this result suggests that deposits held by rural banks in city banks were not a source of special illiquidity risk during the Great Depression. Other differences include the insignificance of county unemployment for city banks, the smaller and less significant coefficients for the Wicker-31b indicator and the indicator for the Chicago panic of June 1932. Perhaps not surprisingly, the latter effect indicates that in comparison to other cities, and using a model derived solely from the experience of city banks, there is less of an unexplained residual for Chicago bank failures in June 1932.

In summary, our results provide evidence against the Friedman-Schwartz view that the bank failures of late 1930 and 1931 were autonomous shocks produced by nationwide contagion

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[8] We also experimented with allowing regression coefficients to vary during January and February 1933. Only one of 28 regressors was possibly significant, the coefficient on total bills payable and rediscounts

or panic. Our results are consistent with (but do not prove) Wicker's (1996) view that regional rather than national contagion characterized the crises of late 1930 and late 1931, and they are consistent with (but do not prove) Friedman and Schwartz's and Wicker's view that bank failures in January-February 1933 resulted in part from nationwide panic. Our finding that local bank failures raise the probability that another local bank will fail is also consistent either with omitted local fundamentals or local bank contagion.

C. Placing an Upper Bound on the Importance of "Panic" Effects

Thus far we have argued that some indicators of local, regional, or national panic cannot be rejected. That is, some bank failures are not fully explained by a stable model of the bank failure process for the period 1930-1933. Late 1930 and late 1931 may have been episodes of regional panic. January and February 1933 may have been a time of nationwide panic. Local contagion effects may have been present throughout the sample period. As we have repeatedly noted, all of our tests of panic or contagion effects are "one-sided" and likely overestimate the true incidence of panic, since relevant fundamentals are likely omitted from our model.

Nevertheless, our estimates of local, regional, and national panic effects can be used to place an upper bound on the importance of estimated panic effects. Figures 9-11 plot the mean estimated survival duration (in days) for banks in our sample over time, using different estimation equations, with and without taking account of panic indicator variables. All the Figures display a rising trend, which reflects the rising average conditional survival probability of banks over our time period.

Figure 9 corresponds to Column (2) of Table 6, in which only the basic model cum Friedman-Schwartz indicator variables is used for the estimation. The upper line in Figure 9 is the mean survival estimate using all the basic regression coefficients, and the Friedman-Schwartz indicators for the late-1931 period and the early-1933 period (the indicators for late 1930 and mid 1931 are set at zero). The lower line in Figure 9 shows the average estimated survival duration if all the Friedman-Schwartz indicator variables are set at zero. Figure 9 shows that even if one wanted to argue that the late-1931 episode was a nationwide panic (contrary to the evidence presented above), it is still not an important episode of unexplained bank failure. In contrast, including indicators for January and February 1933 substantially reduces the predicted average survival duration in those months. We conclude that our upper bound estimate of the effects of national panic indicate potentially important effects from panics only in early 1933.

(BPR_TD) at the 0.0511 significance level.

Figure 10 corresponds to Column (3) of Table 6. As in Figure 9, the upper line is the prediction of the basic model plus the first and third Wicker indicator variables (as before, the indicator variable with the "wrong sign" is set at zero). The lower line shows the effect of omitting the Wicker indicators for the two episodes. Note that these effects, while substantial for the banks *in the affected regions*, are confined to those regions, and thus are not large for the nation as a whole. In the case of the 1930 regional episode, only 394 banks are affected by the indicator variable; in the case of the late-1930 regional episode, 1,714 banks are affected.

Figure 11 corresponds to Column (6) of Table 6. The upper line of the Figure includes the effects of all coefficients, while the lower line excludes the June 1932 Chicago indicator variable. The estimated effect on survival duration again is large *for affected banks*, but only 29 Chicago banks are affected.

The NEARFAILS variable can be used to gauge the potential importance of local contagion effects. In a survival regression that includes the basic model and NEARFAILS, the omission of NEARFAILS from the estimation of survival duration raises the average estimated survival duration of banks for each month in our sample period by an average of 0.2 percent.

We conclude that prior to January 1933, the effects of panics – whether national, regional, or local – contributed little to the failure risk of banks. A stable model of bank fundamentals can account for the bulk of regional and temporal variation in bank failure risk during the period 1930-1933.

Our conclusion that panic effects were not potentially important until January 1933 has three important implications for the literature on bank failures during the Great Depression. First, it implies a limited role for non-fundamental causes of bank failures during the Depression. January 1933 was quite late in the history of the Depression (which bottomed out in March 1933). Second, it implies that bank failures during the crucial period of 1930-1932, which saw substantial declines in bank assets and deposits, were not an autonomous shock, but rather an endogenous reflection of bank condition and economic circumstances. Third, the special circumstances of early 1933 – the origins of which Wigmore traces to a run on the dollar rather than a loss of confidence in the solvency of the banking system – suggest that the only nationwide episode that saw the sudden burst in bank failures unrelated to measures of fundamentals may have had little to do initially with a "contagion of fear," and more to do with expectations of Roosevelt's departure from gold, which in the event, were accurate. In other words, one could argue that the missing "fundamental" in the failure risk model was the probability of the government's departure from gold. That interpretation of the events of 1933 would suggest even less room for "contagions of fear" about bank condition as a contributing influence to bank failure during the Depression.

D. The Representativeness of Fed Member Banks

Finally, we investigate the representativeness of our sample (which is composed entirely of Fed member banks), and the extent to which results would differ if suspensions (as opposed to failures) were the measure of bank distress. In Table 7, we define suspension rates for all banks at the county level (measured as the deposits of suspended banks relative to the deposits of banks at the beginning of the year) for (1) the period 1930-1931, and (2) the period 1930-1932. We exclude 1933 because, as discussed above, temporary suspension was too widespread to serve as a meaningful cross-sectional indicator of bank distress. County-level characteristics from 1930 are the same as those included in Table 6. County-level bank characteristics (measured in December 1929) are the average of the characteristics of Fed member banks in our sample that reside in that county. We employ a simple average, which gives greater weight to smaller Fed member banks than a size-weighted average. This helps to compensate for the fact that our bank characteristic measures are derived only from Fed members, which on average are larger than non-members.

Our county-level results in Table 7 are quite similar to our bank-specific findings in Table 6 (although, of course, coefficients are opposite in sign, since we are measuring suspension rates, not survival hazard). The size and significance of coefficients increase when 1932 is included in our sample period, as does the adjusted R-squared. We interpret these findings as indicating that the failure processes for Fed member banks are broadly representative of the banking system as a whole, and that fundamental weaknesses traceable to the economic environment and bank characteristics in 1929 and 1930 remained important as predictors of bank distress as late as 1932.

IV. Deposit Growth

Deposit growth provides an alternative measure of bank distress. According to Friedman and Schwartz, and others, not only did bank panics produce widespread failures of banks, they also resulted in large, sudden deposit withdrawals. Thus, it would be informative to measure the extent and timing of bank deposit growth during the Depression, to compare deposit growth during periods of alleged panic with deposit growth during other times, and to investigate the extent to which deposit growth, like bank failure, can be explained by a stable model of bank fundamentals.

Unfortunately, disaggregated data are not available on bank deposits at sufficiently high frequency to perform such tests. Annual data on deposits of all commercial banks at year end, however, are available at the county level. Figures 12-15 plot the distribution of deposit growth across counties for the periods 1929-1930, 1930-1931, 1931-1932, and 1929-1932. These Figures also distinguish deposit growth experience in 1930 and 1931 for counties that were located in states identified by Wicker as experiencing regional panics during those years.

Perhaps the most interesting fact to note about county-level deposit growth is the large variation across counties. In fact, Figure 12 shows that in 1930 7.4 percent of counties experienced positive deposit growth, and Figure 13 shows that in 1931 3.7 percent of counties experienced positive growth. In both cases, levels of deposits were measured just after episodes described as national panics by Friedman and Schwartz, and Friedman and Schwartz pointed to widespread deposit shrinkage as an important consequence of national panic. Figures 12 and 13 tell a different story, one in which regional differences in deposit growth are large.

The regions identified by Wicker as particularly hard hit show lower deposit growth. In 1930, "Wicker-panic" regions averaged deposit growth of –22.6 percent, compared to –13.5 percent for other regions. In 1931, Wicker-panic regions averaged –22.9 percent deposit growth, compared to –21.8 percent elsewhere.

Table 8 reports regression results for deposit growth at the county level. Regressors include county characteristics, as well as measures of Fed member bank characteristics in the county. Many of the variables used to predict failure in Tables 6 and 7 enter as significant predictors of deposit growth, including bank size, the prevalence of state-chartered banks, the loan-to-asset ratio, the liquidity of loans, loan losses, real estate owned, net worth, demandable debt, due from banks, the percent of acreage in pasture, unemployment, building permits, and business failures (definitions and summary statistics for all variables are provided in Tables 1 and 5).

In some specifications of deposit growth for 1930 and 1931 we included indicator variables for counties located in states identified by Wicker as suffering regional panics. We find that, after controlling for fundamental determinants of deposit growth as best we can, these counties experienced significantly lower residual deposit growth than other counties. In that sense, our results for deposit growth mirror those for bank failure; they are consistent with (but again, do not prove) Wicker's view that regional panics produced unwarranted declines in bank deposits.

The limitations of our deposit data – which are county-specific and annual – preclude the detailed analysis we were able to undertake of bank failures. Nevertheless, insofar as we are able to reach conclusions, they are broadly similar to those of Section III, and reinforce our earlier emphasis on disaggregation and fundamental determinants of bank distress. Deposit growth displayed substantial regional variation during the Depression, and can be forecasted reasonably well on the basis of fundamentals. In 1930 and 1931 there is some evidence of regional panic, but in the affected counties, the residuals associated with panic are small (-6.4% growth in 1930 and -2.7% in 1931), and in the aggregate these effects are small.

V. Conclusion

We are able to identify close links between fundamentals and the likelihood of individual bank failure from 1930 through 1933. Fundamentals include both the attributes of individual banks, and the exogenous local, regional, and national economic shocks that affected their health. We also develop a set of tests for the presence of liquidity crises or contagion. In addition to regressors that capture fundamental determinants of bank distress, we include indicator variables to capture residual effects of alleged national and regional panic episodes identified by Friedman and Schwartz (1963) and Wicker (1996). This approach is capable of rejecting, but not convincingly confirming, the incidence of panics. We find no evidence that bank failures were induced by a national banking panic in the first three episodes Friedman and Schwartz identify as panics (late 1930, mid 1931 and late 1931). We do find, however, that in January and February 1933 there is a significant increase in bank failure hazard that is not explained by our model of fundamentals.

Indicator variables for the states identified by Wicker as suffering regional crises in 1930 and 1931 indicate significant region-specific increases in the probability of bank failure that are not explained by our model of fundamentals in two of the three cases identified by Wicker (late 1930 and late 1931). At the local level, we find that the failure of nearby banks (NEARFAILS) is associated with an increase in the probability of bank failure.

When we find evidence consistent with the presence of panics our results have two possible interpretations: either that illiquidity crises occurred and resulted in some unwarranted bank failures (as Friedman and Schwartz and Wicker have argued) or that our model of the fundamental causes of bank failures is incomplete. The results of our earlier study of the

Chicago banking panic of June 1932 (Calomiris and Mason 1997) indicated that banks in Chicago in June 1932 did not fail due to an illiquidity crisis or panic, but rather as the result of fundamental shocks that were local and sudden. That example leads us to believe that it is quite possible that the significance of the January-February 1933 panic indicators, the NEARFAILS variable, and two of the Wicker panic indicators result from a failure to fully model changes in relevant economic conditions. In future work, we intend to take a closer look at bank failures during the regional crises of 1930 and 1931, and at the January-February 1933 nationwide experience, to investigate that possibility.

Our results indicate a much smaller role for contagion and liquidity crises in explaining the bank failures of 1930-1932 (and the contraction of the money stock that accompanied them) than that envisioned by Friedman and Schwartz (1963). The regional panics identified by Wicker had small and temporary effects on average bank failure hazard in the aggregate. And the effect of local contagion was similarly small in its importance. To the extent that nationwide panic may explain bank failures, its role is relatively late in the sequence of events of the Depression and brief (lasting a matter of weeks in early 1933), and involved a small proportion of the bank failures during the period 1930-1933.

In Section IV we examine banking distress from the perspective of deposit contraction. Our findings there corroborate those of Section III. Deposit growth at the county level displays substantial cross-sectional variation in 1930 and 1931, which is largely traceable to fundamental determinants that also predict bank failure. Counties located in regions identified by Wicker as experiencing regional panics show significantly higher deposit shrinkage after controlling for fundamentals, but these possible panic effects account for a very small percentage of aggregate deposit growth. These results confirm those of Section III. Together, our findings from Sections III and IV suggest that disaggregated analysis of bank failures and deposit shrinkage leads to substantially different conclusions from those of earlier studies, including a much smaller role for contagion in understanding bank distress during the Great Depression.

With respect to the policy implications of our findings, it is important to distinguish macroeconomic and microeconomic policies. On the one hand, there can be little doubt that expansionary open market operations in 1930 and 1931 (or departure from the gold standard in 1931, when many other countries did so) could have avoided macroeconomic collapse in 1931-1933, and therefore, would have substantially mitigated bank distress. On the other hand, given the importance of fundamental sources of bank failure, it is doubtful whether – short of a bank bailout – the Federal Reserve System, state governments, or the national government could have done much in the way of microeconomic lender of last resort *liquidity* assistance (either through collateralized lending or temporary suspension of convertibility) to rescue failing banks during 1930-1932.

Even if episodes of regional or national contagion or liquidity crises had produced many bank failures in the 1930s, as a practical matter it may have been difficult to arrange microeconomic assistance for banks, and possibly counterproductive to do so. Mason (2000a) finds that Reconstruction Finance Assistance was only helpful in protecting banks from failure after the change in policy in 1933 that allowed the RFC to make subsidized purchases of bank preferred stock (a form of bailout). Liquidity assistance (collateralized loans), whether through the RFC or the Fed, actually reduced the probability of bank survival, which Mason (and contemporary observers) suggested was the consequence of subordinating depositors' claims on banks to those of the authorities.

On the other hand, the fact that the only nationwide episode during which panic indicators are significant (early 1933) coincided with substantial external drain (the alleged run on the dollar in early 1933) suggests that liquidity assistance targeted to individual banks might have been helpful in January 1933, particularly if it had been combined with expansionary monetary policy and an immediate departure from the gold standard.[9] If early 1933 was a real liquidity crisis, and if the pressure faced by banks reflected pressures unrelated to concerns about domestic bank solvency, then the subordination of depositors by the lender of last resort might have had little adverse effect on banks, at least in dealing with the specific shock of a run on the dollar.

[9] If Wigmore is right about the run on the dollar in early 1933, one could argue that lender of last resort assistance and expansionary monetary policy in early 1933 would have been ineffectual in stemming the outflow from the banks without an immediate departure from gold.

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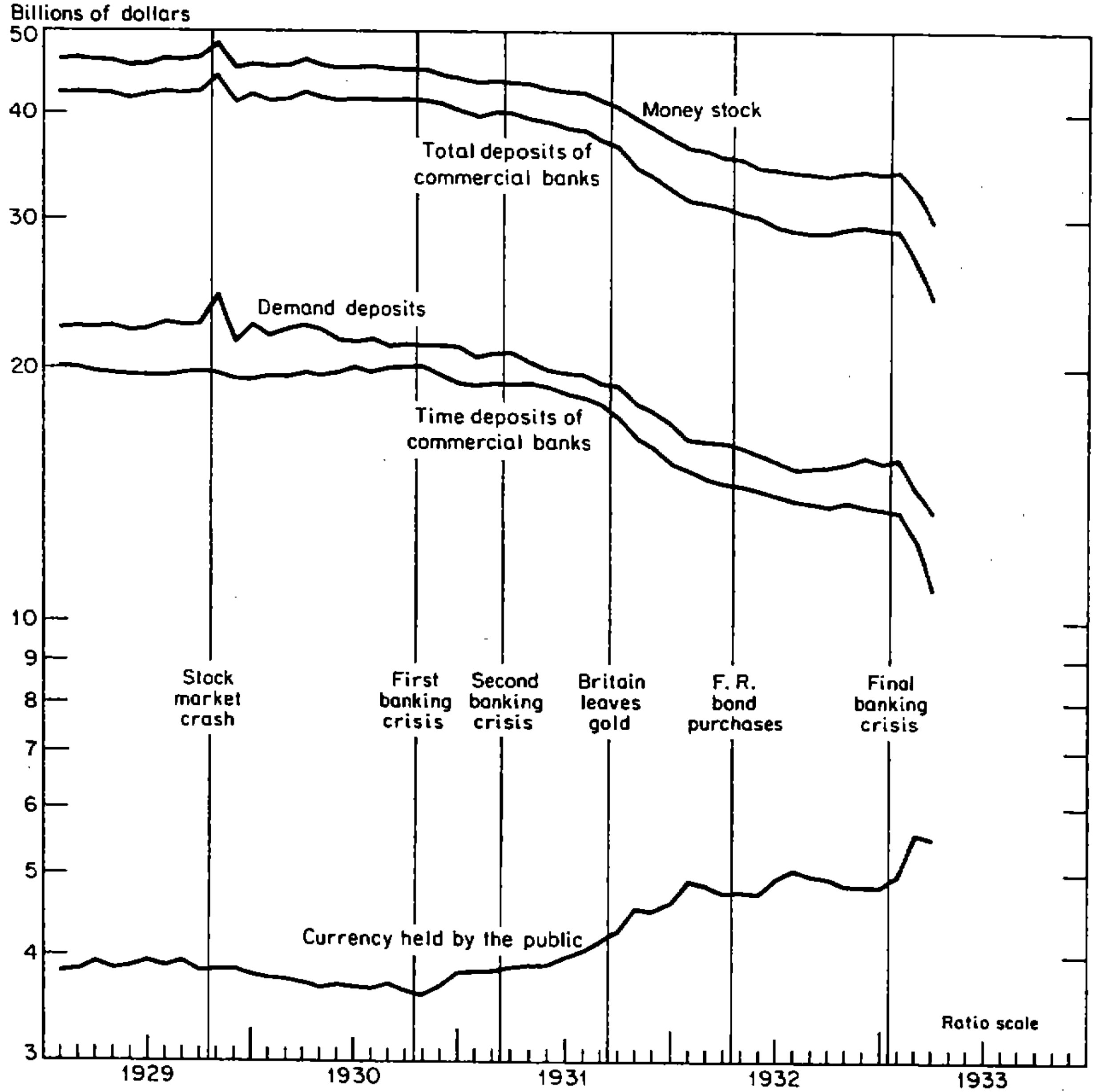
Figure 1

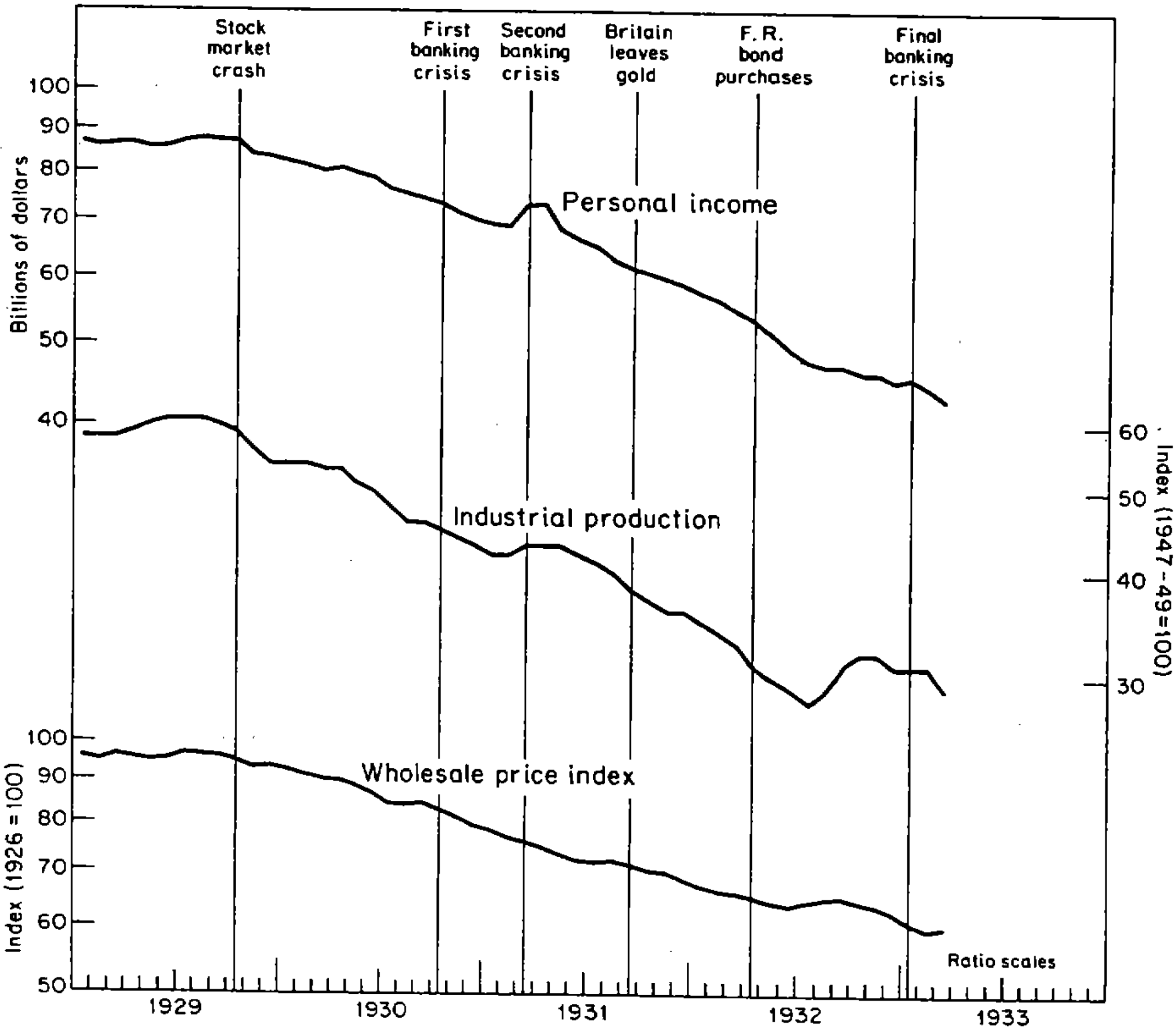
Money Stock, Currency, and Commercial Bank Deposits, Monthly, 1929-March 1933



Source: Friedman and Schwartz (1963), Chart 27, p. 302.

Figure 2

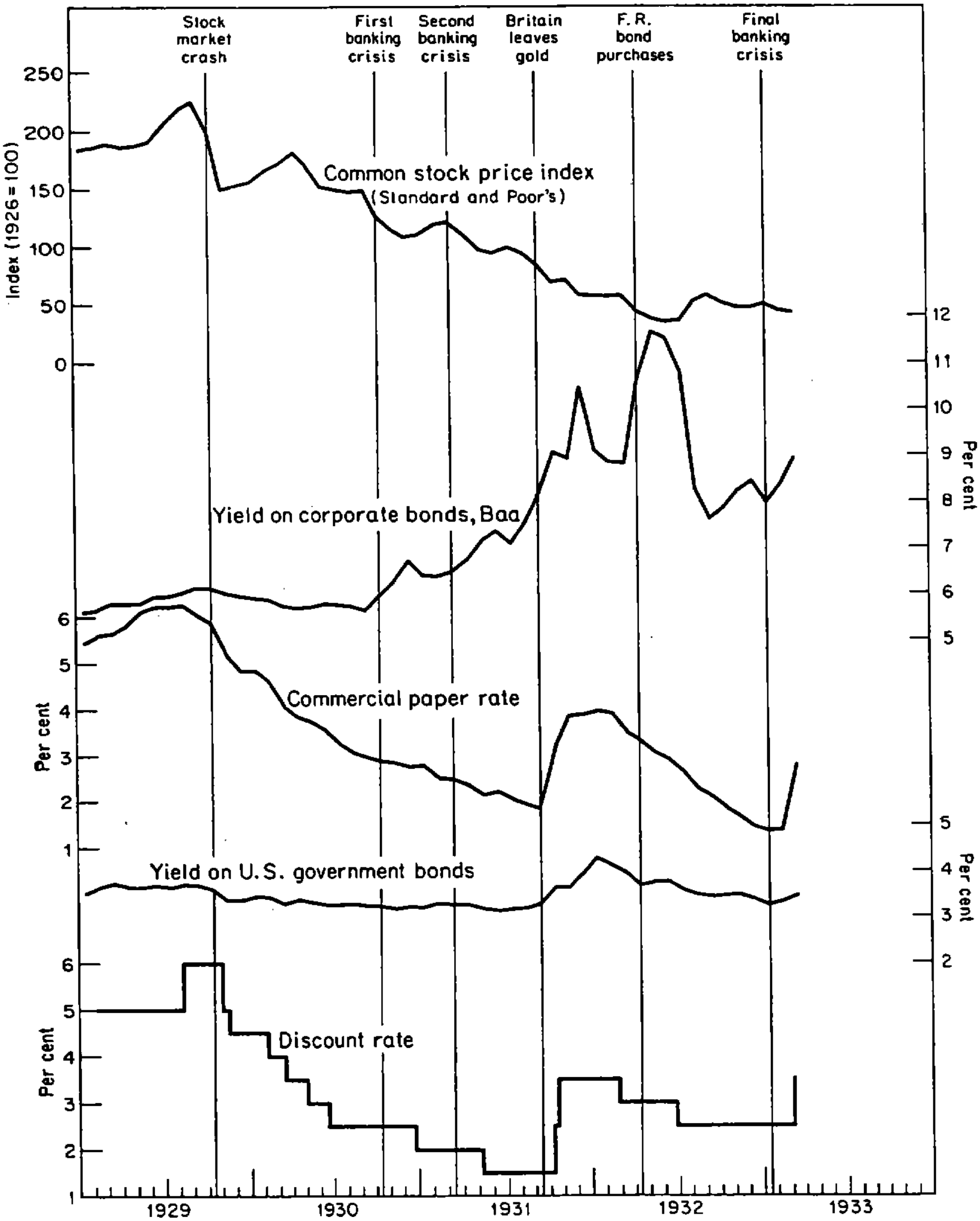
Prices, Personal Income, and Industrial Production, Monthly, 1929-March 1933



Source: Friedman and Schwartz (1963), Chart 28, p. 303.

Figure 3

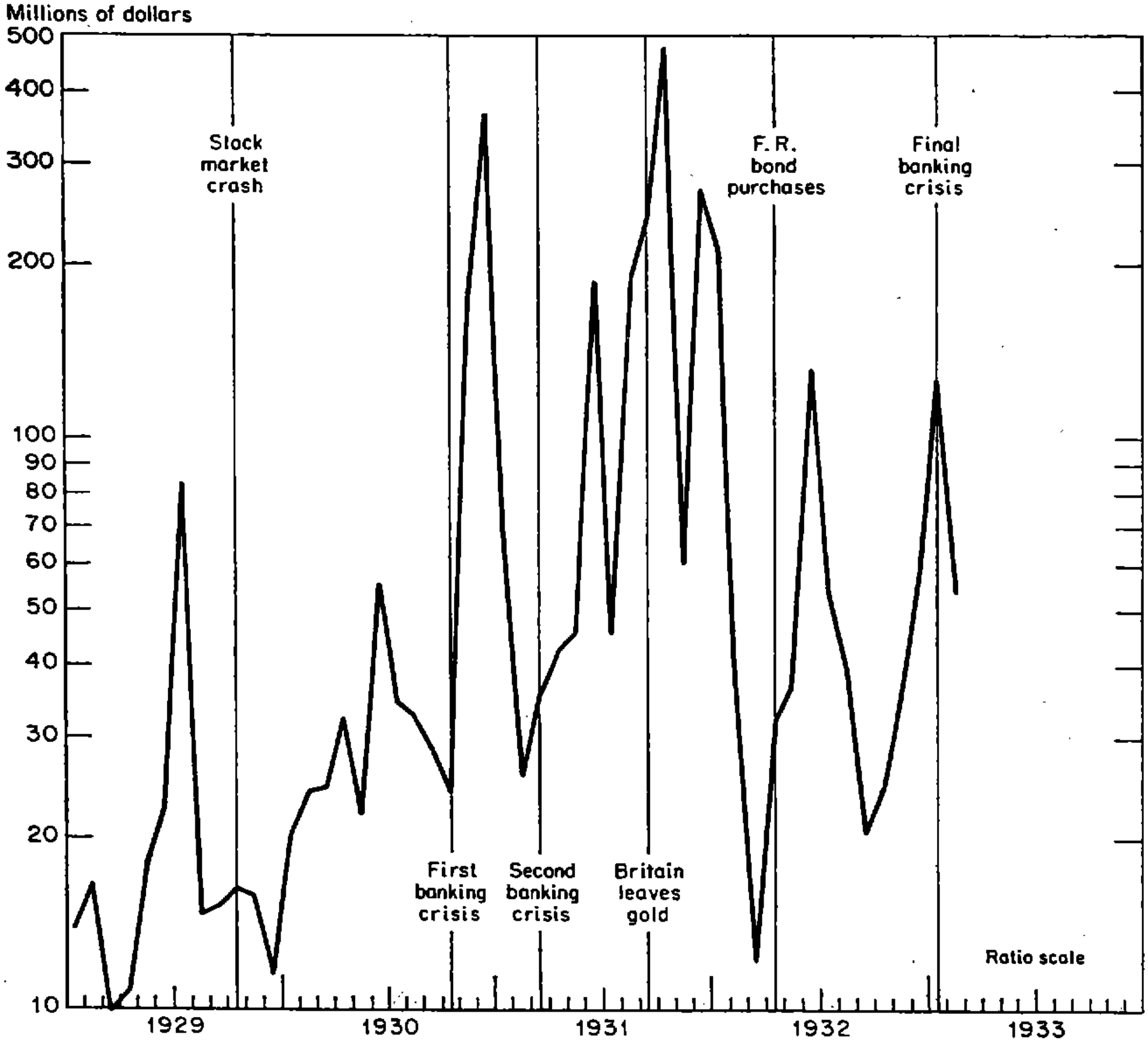
Common Stock Prices, Interest Yields, and New York Fed Discount Rates, Monthly, 1929-March 1933



Source: Friedman and Schwartz (1963), Chart 29, p. 304.

Figure 4

Deposits of Suspended Commercial Banks, Monthly, 1929-March 1933



Source: Friedman and Schwartz (1963), Chart 30, p. 309.

Figure 5: Conditional Probability of Failure from Non-Parametric Survival Estimate

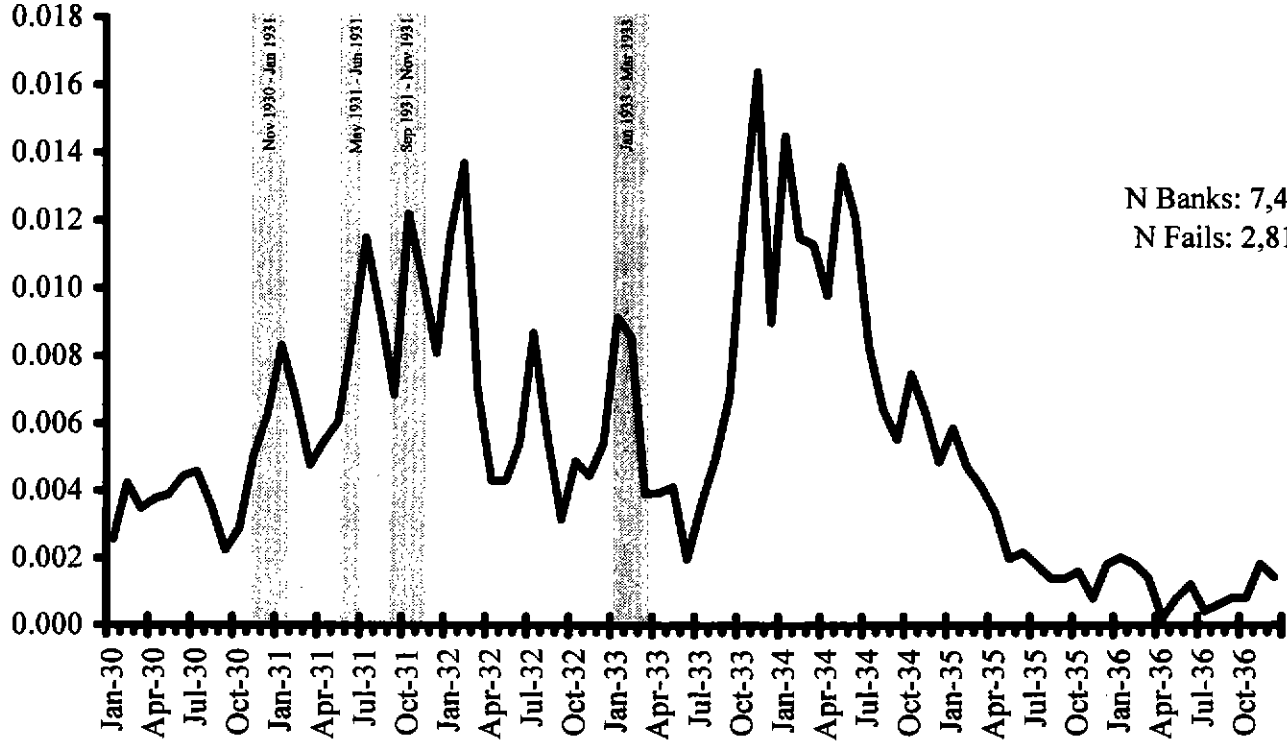


Figure 6: Liabilities of Failed Business and Failure Probability, January 1930 - December 1933

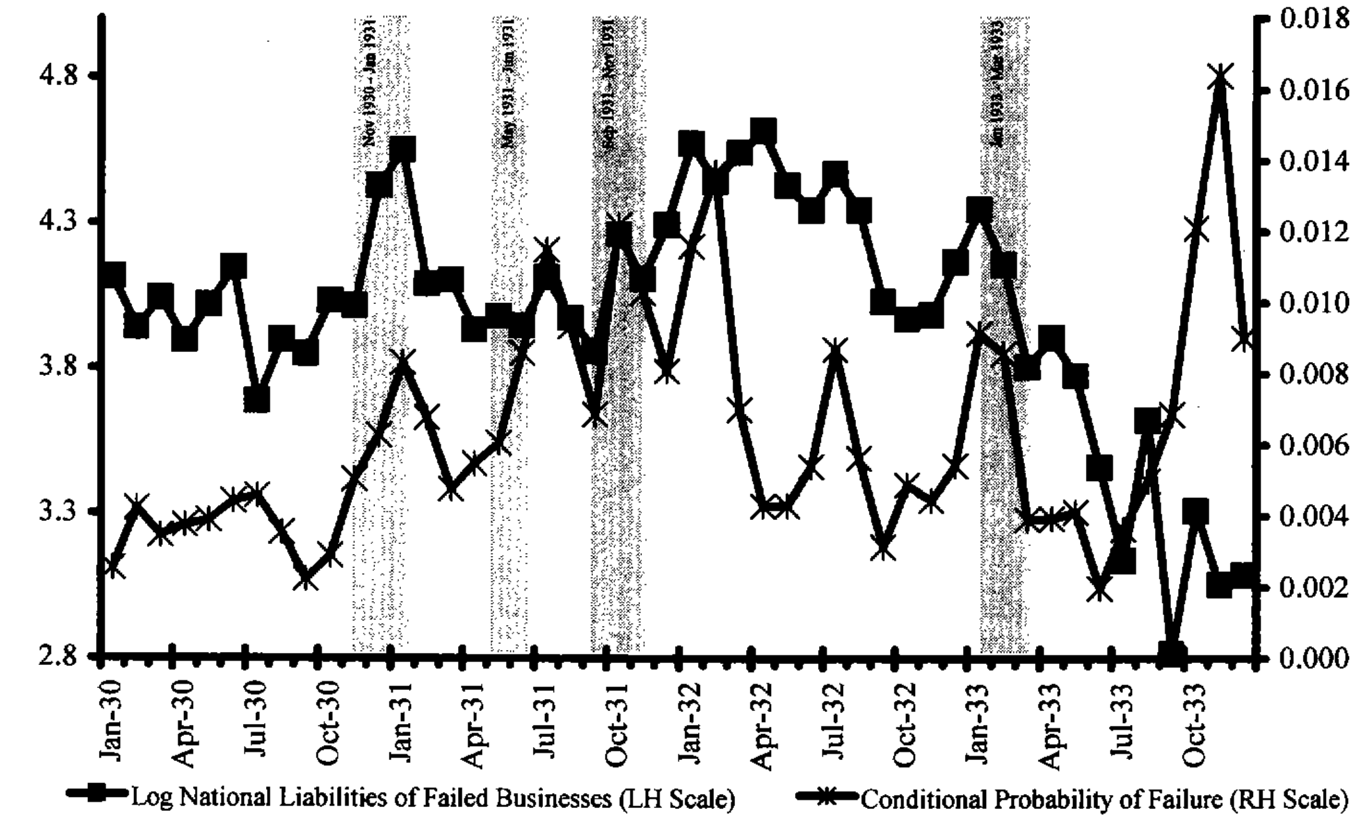


Figure 7: Agricultural Price Index and Failure Probability, January 1930 - December 1933

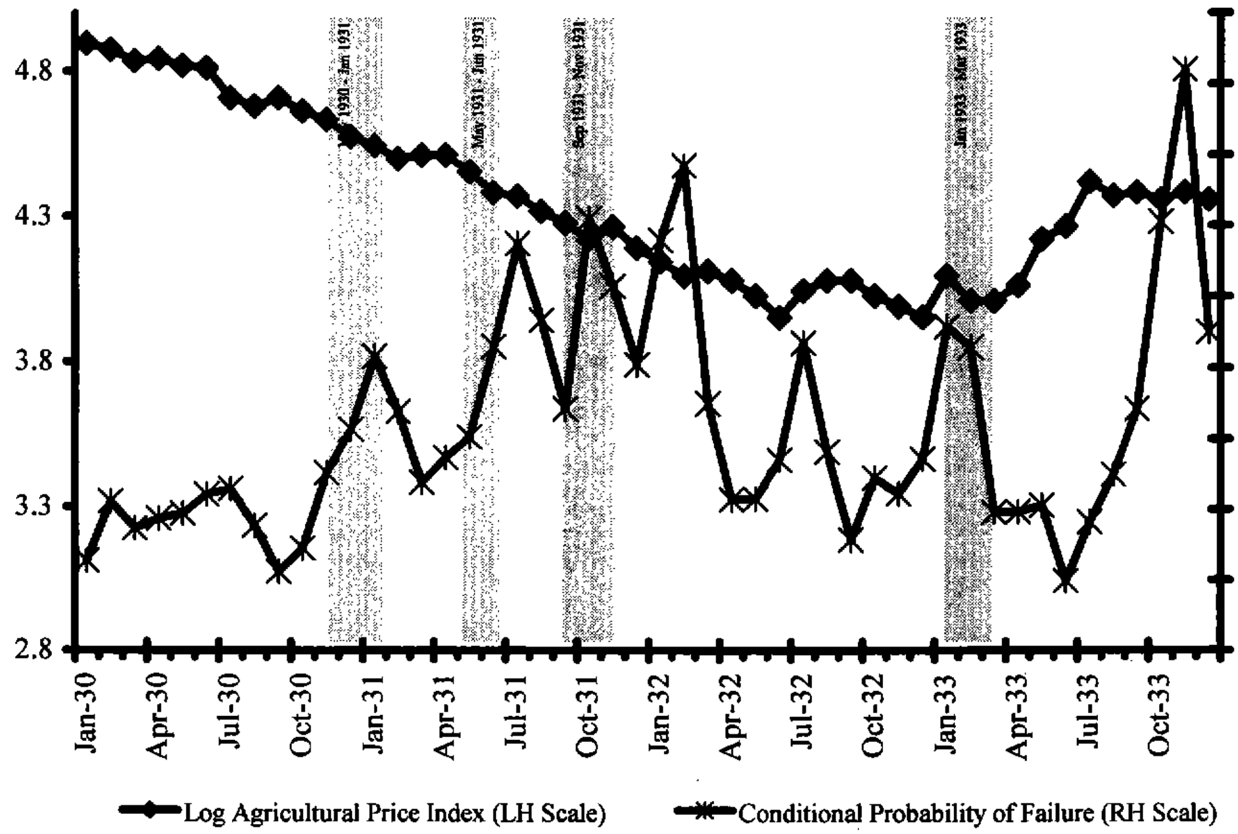


Figure 8: Building Permits and Failure Probability, January 1930 - December 1933

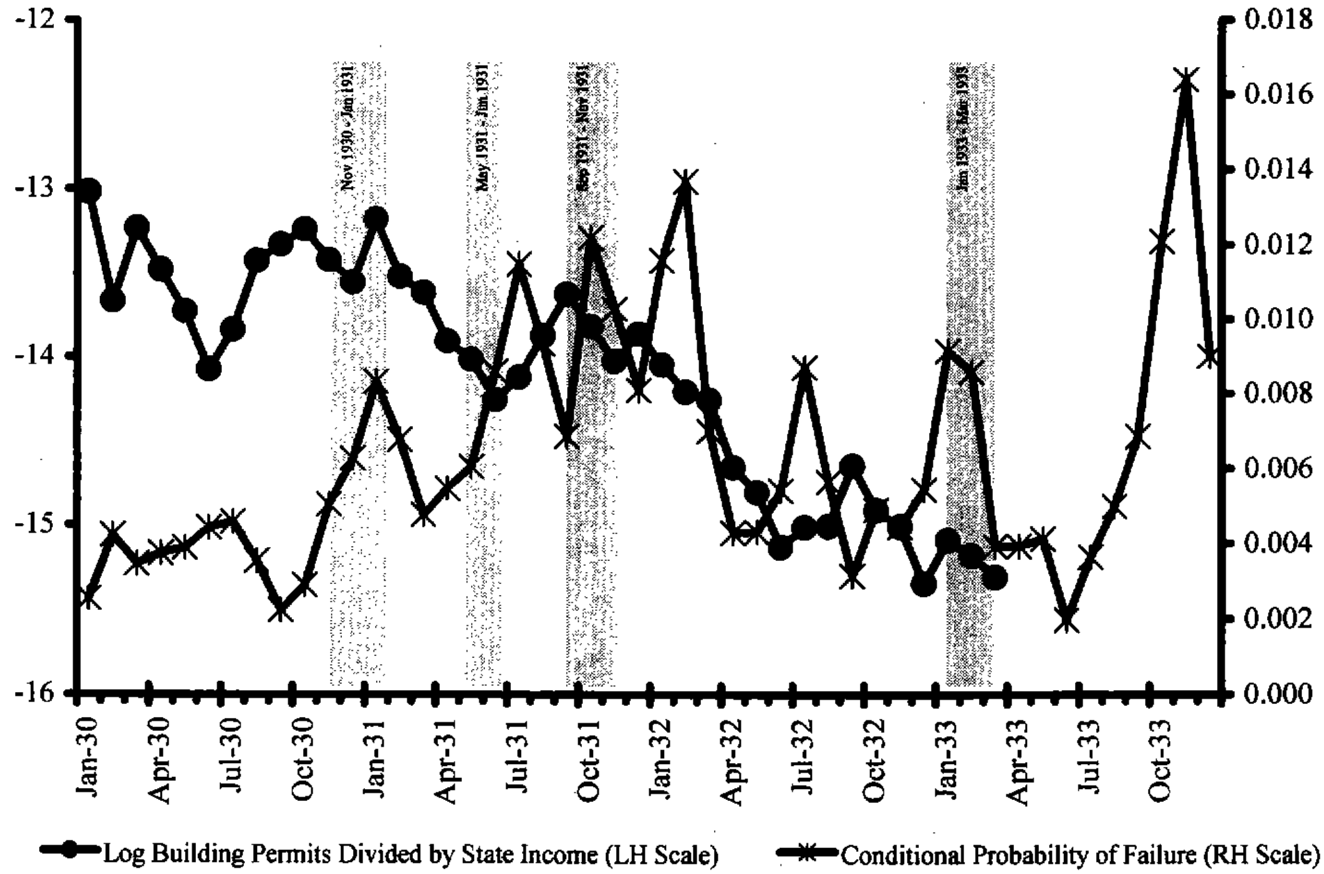


Figure 9: Predicted Survival During Friedman and Schwarz "Panic" Episodes

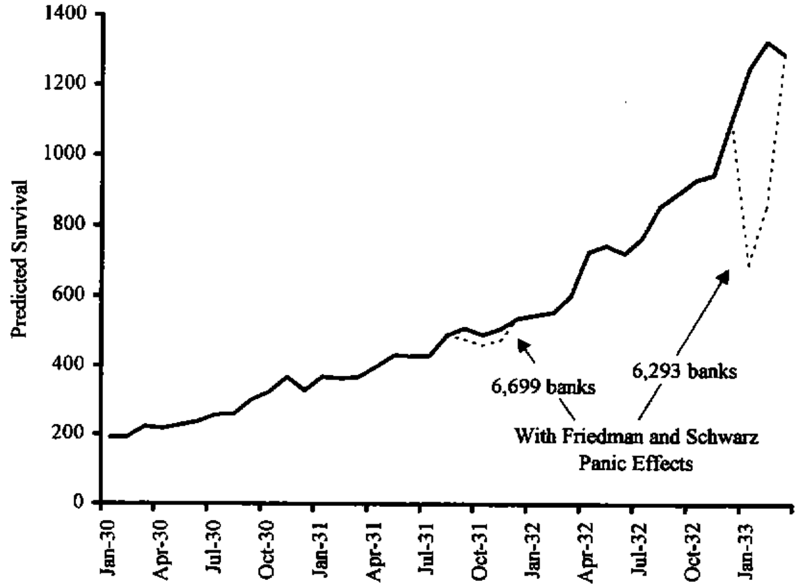


Figure 10: Predicted Survival During Wicker "Panic" Episodes

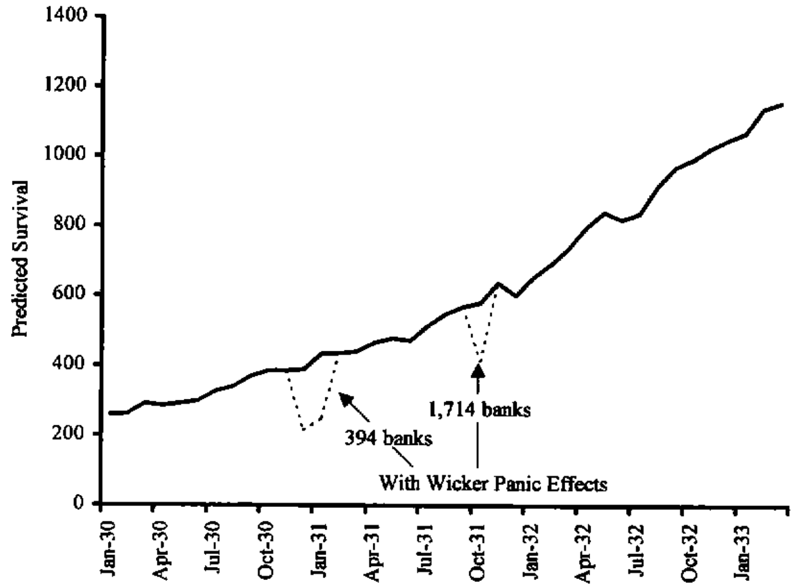


Figure 11: Predicted Survival During Chicago "Panic" Episode

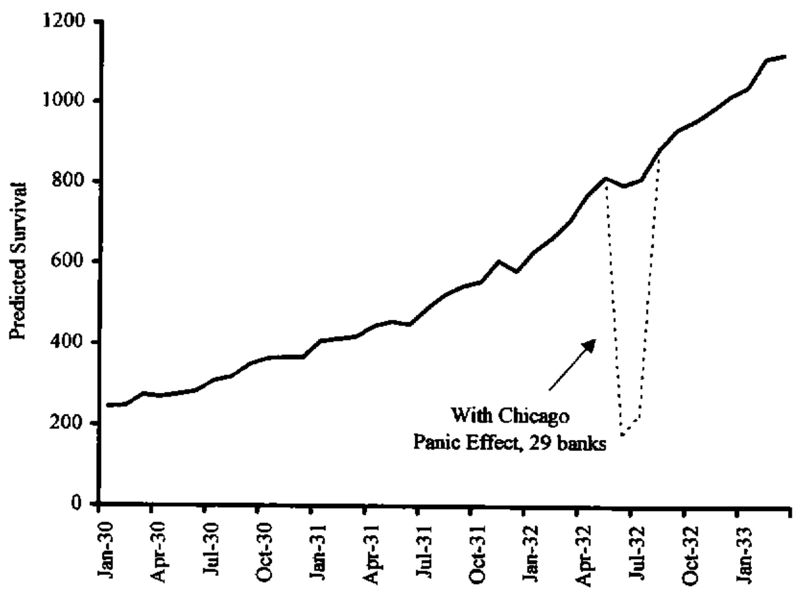
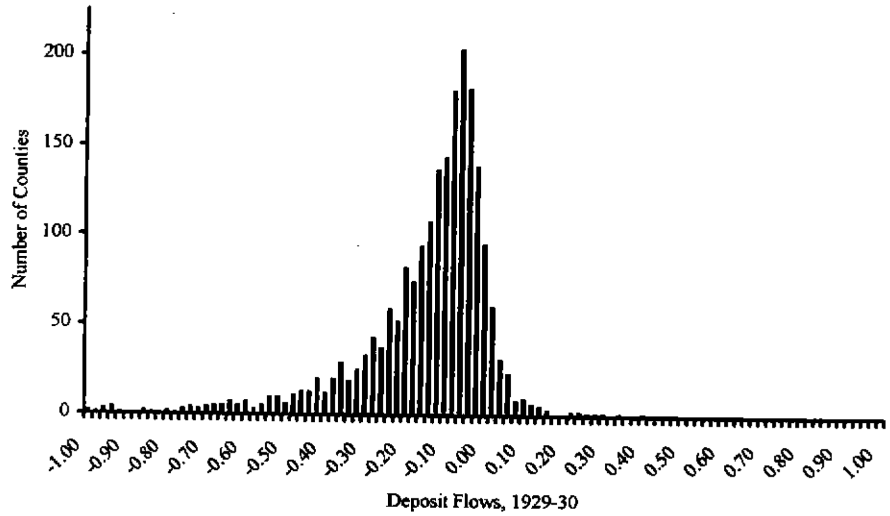
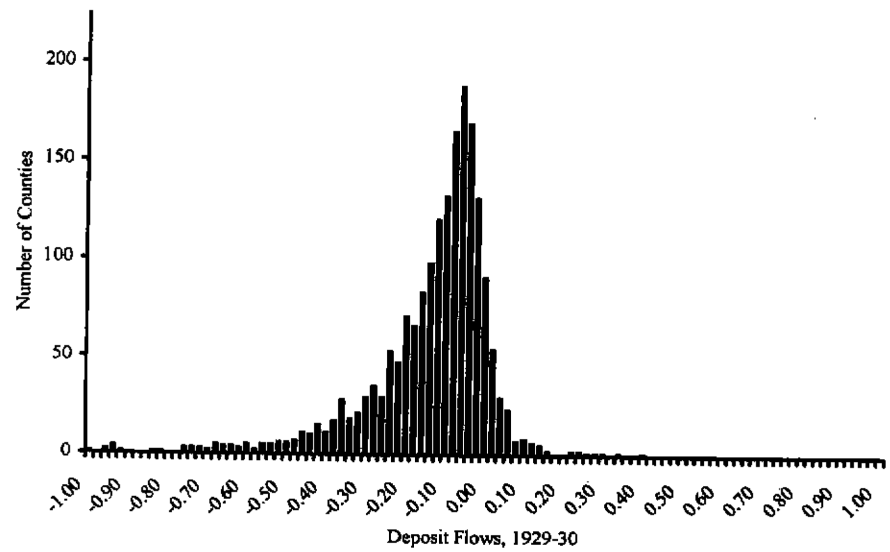


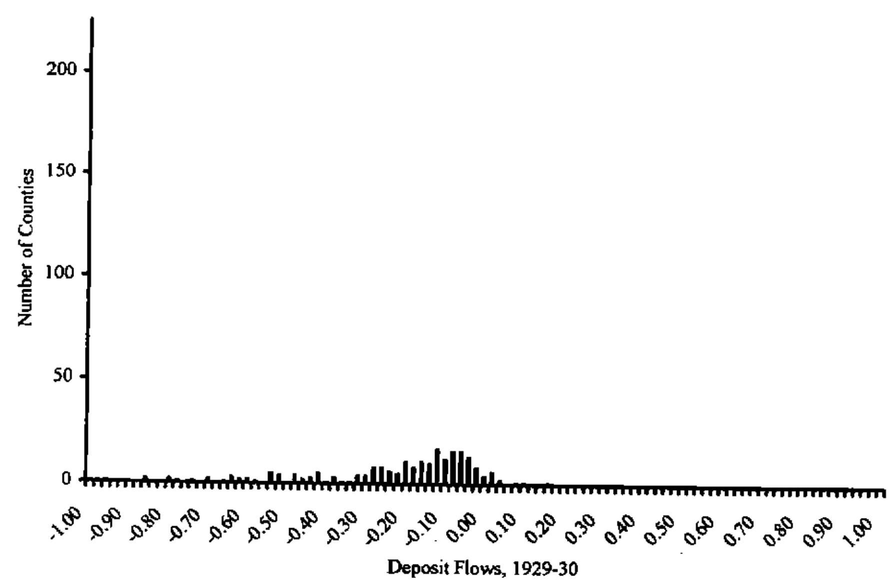
Figure 12: Deposit Flows, 1929-30-All Counties



Deposit Flows, 1929-30-Counties Outside 1930 Wicker Panic

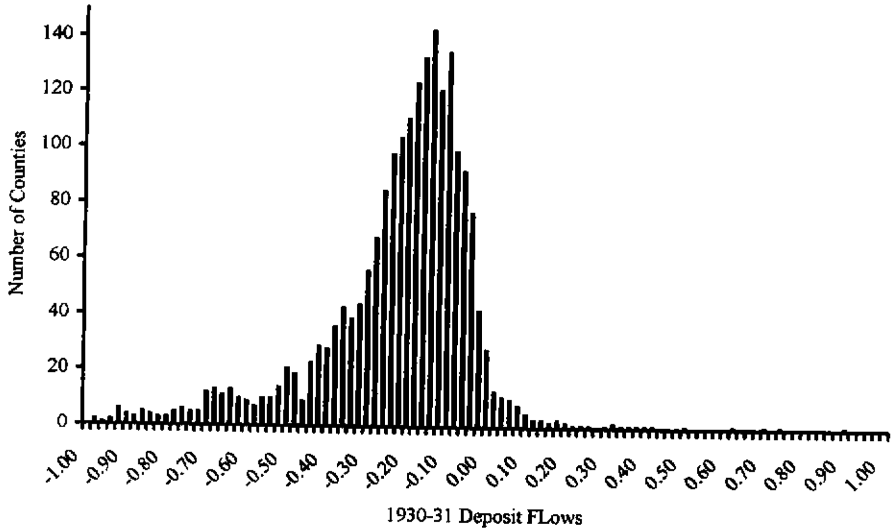


Deposit Flows, 1929-30-Counties Inside 1930 Wicker Panic

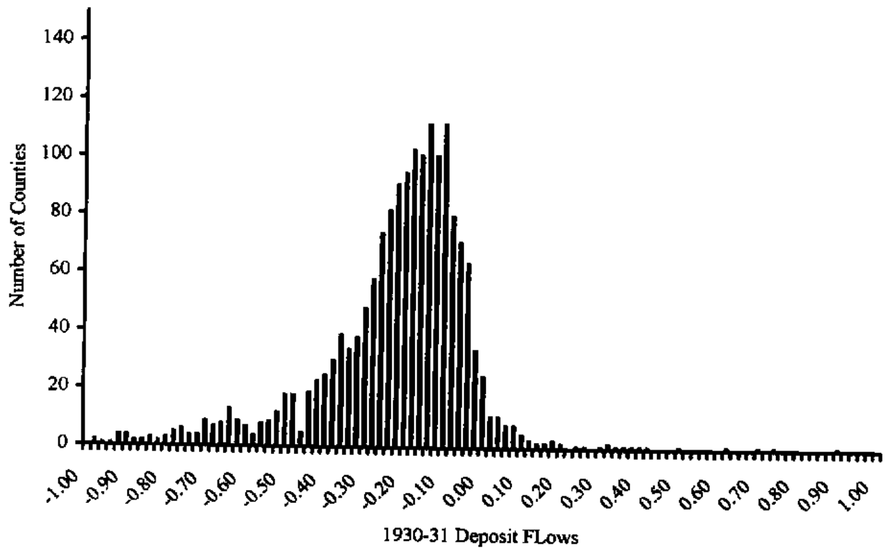


Variable	N	Mean	Std Dev	Minimum	Maximum
All Banks	2075	-0.145	0.165	-0.994	0.397
Outside Panic	1854	-0.135	0.155	-0.990	0.397
Inside Panic	221	-0.226	0.219	-0.994	0.162

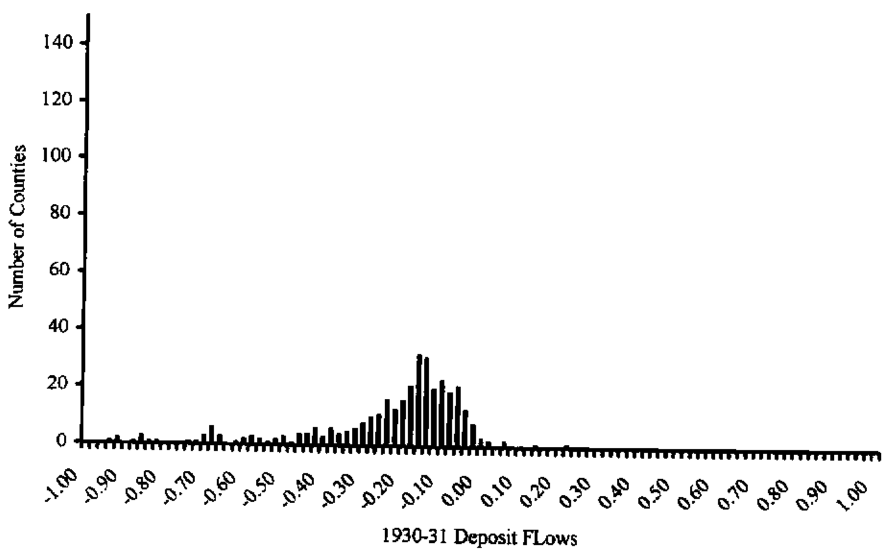
Figure 13: Deposit Flows, 1930-31-All Counties



Deposit Flows, 1930-31-Counties Outside 1931 Wicker Panic



Deposit Flows, 1930-31-Counties Inside 1931 Wicker Panic



Variable	N	Mean	Std Dev	Minimum	Maximum
All Banks	2046	-0.220	0.192	-0.986	0.908
Outside Panic	1699	-0.218	0.191	-0.986	0.908
Inside Panic	347	-0.229	0.195	-0.930	0.215

Figure 14: Deposit Flows, 1931-32-All Counties

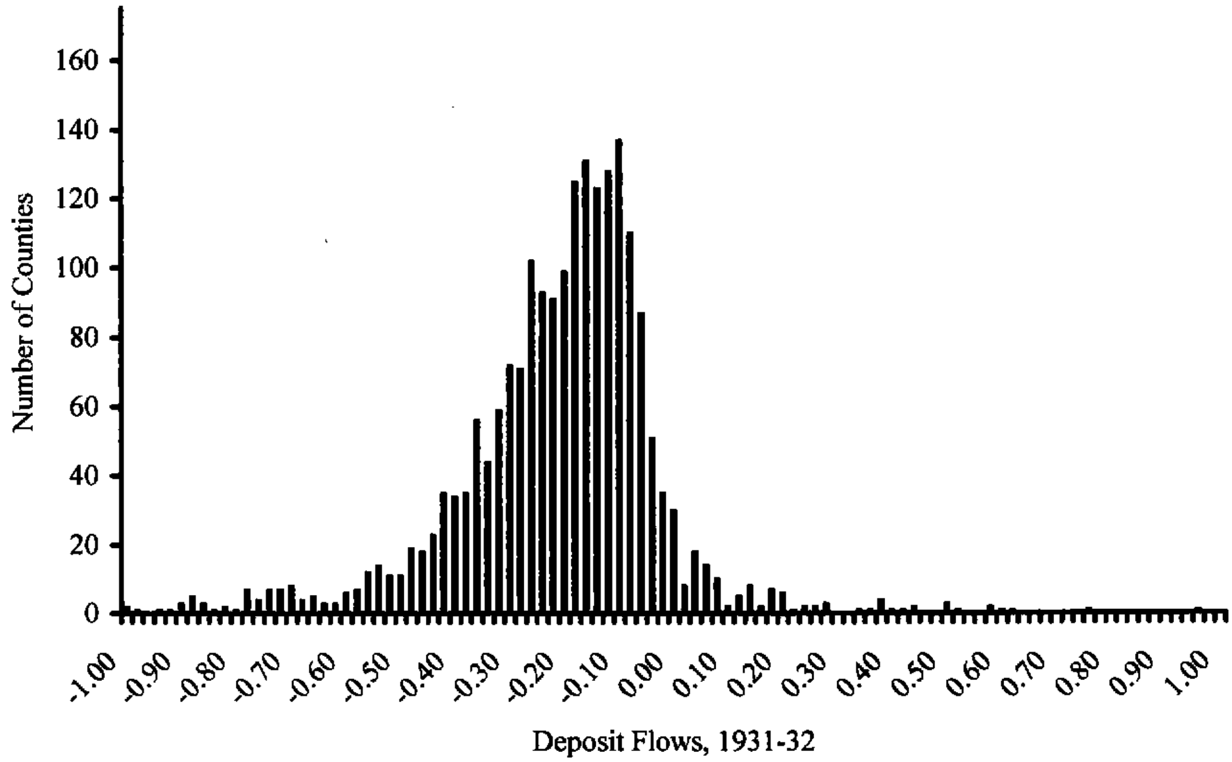
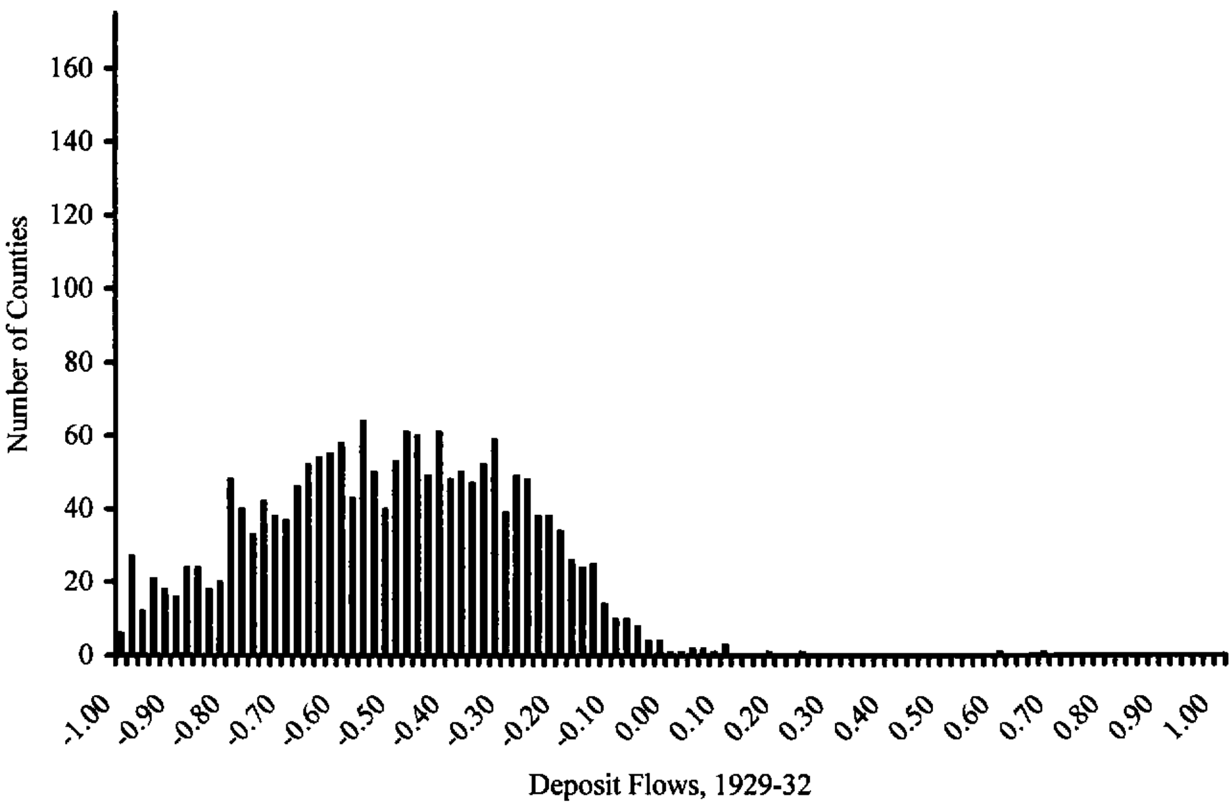


Figure 15: Deposit Flows, 1929-32-All Counties



Variable	N	Mean	Std Dev	Minimum	Maximum
1931-32	1956	-0.213	0.181	-1.000	0.964
1929-32	1811	-0.509	0.232	-0.999	0.673

Table 1

Variable Definitions

<u>BANK CHARACTERISTICS, Measured Bi-Annually (December 1929, December 1931)</u>

Basic bank characteristics:

LTA = log (Total Assets)

STBANK = State-Chartered Indicator (equal to 1 for State-Chartered Bank)

LNBRANCH = log [max (number of branches, 0.0010)]

MKTPWR = Total Deposits / Deposits of All Banks in the County

Bank Asset Composition:

NCA_TA = "Non-Cash" Assets / Total Assets

"Non-Cash" Assets = Total Assets - (U.S. Govt. Securities + Reserves + Cash Due from Banks + Outside Checks and Other Cash Items)

LD_OtherNCA = Loans and Discounts / (NCA – Loans and Discounts)

LIQLOANS = Loans Eligible for Rediscount / Loans and Discounts

DFB_LA = Cash due from Banks / (U.S. Govt. Securities + Reserves + Cash Due from Banks + Outside Checks and Other Cash Items)

Asset quality measures:

LOSSX = Losses on Assets and Trading / Total Expenses (Including Losses)

REO_NCA = Real Estate Owned / Non-Cash Assets

(BONDYLD)x(SEC) = (Change in U.S. Govt. Bond Yield) x(Bonds and Other Securities)

Change in U.S. Govt. Bond Yield = (This Month's Bond Yield – Bond Yield of Same Month in Previous Year)

Liability mix and cost:

TD = Total Deposits = Due to Banks + Demand Deposits + Time Deposits + U.S. Government Deposits + Bills Payable and Rediscounts

NW_TA = (Capital + Surplus + Undivided Profits + Contingency Reserve) / TA

(DD+DTB)_TD = Demand Deposits + Due to Banks / TD

DTB_TD = Due to Banks / TD

BPR_TD = Bills Payable and Rediscounts / TD

Oth_BPR = Private Bills Payable and Rediscounts / BPR

INTCOST = Interest and Discount Expenses on TD / TD

(Table 1, cont'd)

COUNTY CHARACTERISTICS, Measured in 1930, Unless Otherwise Noted

PCT_CROPINC30 = Crop Value / Crop Value + Manufacturing Value Added)

PCT_ACRES_PAST30 = Acreage in Pasture / Total Acreage in Farms

VALGR_INC_CROP30 = Value of Cereals, Oats, Grains, Seeds / Total Crop Value

UNEMP30 = (Persons Out of Work + Persons Laid Off) / Number of Gainful Workers

SMLFM30 = Farms of Less Than 100 Acres / Total Number of Farms

(DAGLBE)x(PCT_CROPINC30) = (PCT_CROPINC30)x(Growth in Value of Farm Land, Buldings, and Equipment from 1920 to 1930)

PCT_STBANK (annual data) = Number of State-Chartered Banks, Including Non-Member Banks / Total Number of Banks

STATE ECONOMIC ENVIRONMENT

STBUILDPERM (monthly) = Value of Buildings with New Permits in Cities within the State / State Income in 1929

STBUSFAIL (quarterly) = Value of Liabilities of Failed Businesses / State Income in 1929

NATIONAL ECONOMIC ENVIRONMENT

NATDAGP (monthly) = Log Difference, Agricultural Price Index, Seasonally Adjusted

NATDBUSFAIL (monthly) = Log Difference (Current Log Value Less Log Value for Same Month in Previous Year), Value of Liabilities of Failed Businesses

DISTRESS INDICATOR VARIABLES

FSPANIC-30 = 1 for November and December 1930 and January 1931, and 0 Otherwise

FSPANIC-31a = 1 for May-June 1931, and 0 Otherwise

FSPANIC-31b = 1 for September-November 1931, and 0 Otherwise

DUM_JAN-33 = 1 for January 1933, and 0 Otherwise

DUM_FEB-33 = 1 for February 1933, and 0 Otherwise

DUM_MAR-33 = 1 for March 1933, and 0 Otherwise

WICKER-30 = 1 for November 1930-January 1931 for Banks in Tennessee, Kentucky, Arkansas, North Carolina, and Mississippi, and 0 Otherwise

WICKER-31a = 1 for April-July 1931 for Banks in Illinois and Ohio, and 0 Otherwise

WICKER-31b = 1 for September-October 1931 for Banks in West Virginia, Ohio, Missouri, Illinois, and Pennsylvania, and 0 Otherwise

Chicago-6-32 = 1 for Banks in Chicago for June 1932, and 0 Otherwise

NEARFAILS = Log (Deposits in Other Banks That Failed in that Month in the Same County)

Sources: See Calomiris and Mason (2000), Data Appendix.

Table 2a: Number of Bank Failures from Sample, by Quarter, 1930Q1-1933Q1

	1930Q1	1930Q2	1930Q3	1930Q4	1931Q1	1931Q2	1931Q3	1931Q4	1932Q1	1932Q2	1932Q3	1932Q4	1933Q1	1933Q2-1933Q4	Grand Total
AL	4	2	3	-	3	1	3	2	2	1	3	3	-	6	33
AR	3	3	1	5	3	7	1	1	1	1	2	-	-	2	30
AZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA	2	-	2	1	1	3	3	2	7	4	1	4	3	8	41
CO	-	-	2	-	2	-	3	4	2	1	1	1	3	7	26
CT	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4
DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DE	1	-	-	-	-	-	-	-	-	-	-	-	-	-	1
FL	-	3	1	1	2	1	2	-	1	-	-	2	-	1	14
GA	-	1	-	-	6	-	2	-	2	-	1	3	-	-	15
IA	1	5	6	6	6	7	17	4	7	6	14	3	6	35	123
ID	1	1	-	-	1	-	3	3	2	2	2	2	2	2	21
IL	5	2	2	12	5	9	15	8	17	18	7	5	11	31	147
IN	1	2	1	3	4	1	9	1	10	1	4	1	6	20	64
KS	-	2	1	-	3	2	3	2	8	1	1	1	4	11	39
KY	2	1	2	3	2	1	2	-	4	3	3	-	2	5	30
LA	-	1	1	-	-	3	-	-	-	-	-	-	-	3	8
MA	-	-	1	-	1	2	-	3	2	4	-	-	-	7	20
MD	1	2	2	1	-	-	3	-	1	1	-	-	1	8	20
ME	-	-	-	-	-	-	5	1	-	-	-	-	-	6	12
MI	1	1	-	1	2	8	14	3	2	2	4	1	3	22	64
MN	2	2	-	2	4	6	4	1	-	-	5	3	4	12	45
MO	-	2	1	3	3	1	6	3	5	2	2	1	13	7	49
MS	-	-	-	1	3	1	-	1	-	-	-	-	2	1	9
MT	1	2	2	2	-	-	2	1	2	-	1	-	-	2	15
NC	-	2	-	6	-	3	2	5	7	-	-	-	2	2	29
ND	4	3	2	3	2	6	7	2	2	-	3	2	1	5	42
NE	1	2	-	3	-	1	4	4	1	4	1	-	6	6	33
NH	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1
NJ	-	2	2	-	-	1	7	5	4	1	1	1	5	14	43
NM	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1
NV	-	-	-	-	-	-	-	-	-	-	1	1	-	-	2
NY	1	4	3	-	2	4	18	2	12	2	3	-	4	16	71
OH	2	1	4	4	9	5	12	7	1	1	1	-	-	20	67
OK	2	1	4	4	-	1	4	6	3	1	2	7	1	6	42
OR	-	-	-	-	2	2	1	-	4	2	6	1	5	3	26
PA	-	-	8	1	6	15	11	8	12	2	10	1	1	18	93
RI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SC	1	6	2	1	1	3	5	1	2	1	-	-	1	2	26
SD	-	1	-	3	-	1	9	2	1	-	5	2	1	3	28
TN	-	-	-	4	-	1	3	3	2	2	2	-	3	3	23
TX	7	2	5	2	8	15	11	5	9	6	2	8	3	13	96
UT	-	3	1	-	-	2	-	-	-	-	-	-	-	1	7
VA	1	1	1	-	2	-	7	-	2	1	1	-	-	5	21
VT	-	1	-	-	-	-	-	-	-	-	-	-	-	5	6
WA	-	1	-	-	-	2	1	3	6	-	1	1	-	2	17
WI	-	-	2	-	-	2	3	3	5	2	-	2	6	11	36
WV	-	2	-	1	1	2	7	2	1	1	1	1	-	4	23
WY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	44	64	62	73	85	119	209	98	149	73	91	57	99	340	1,563

Table 2b: Deposits of Failed Sample Banks, by Quarter, 1930Q1-1933Q1

	1930Q1	1930Q2	1930Q3	1930Q4	1931Q1	1931Q2	1931Q3	1931Q4	1932Q1	1932Q2	1932Q3	1932Q4	1933Q1	1933Q2-1933Q4	Grand Total
AL	$ 1,916,143	$ 941,893	$ 6,956,996	$ -	$ 1,462,666	$ 822,185	$ 838,812	$ 2,287,533	$ 1,071,203	$ 743,228	$ 2,237,816	$ 1,882,645	$ -	$ 6,443,415	$ 27,604,535
AR	6,216,420	1,370,178	2,733,053	1,811,752	4,132,021	4,959,612	403.749	951,277	196,574	129,617	1,285,040	-	-	424,616	24,613,910
AZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA	610,999	-	5,173,905	347,426	1,835,086	648,045	2,023,805	857,111	6,335,890	9,483,961	756,850	8,189,997	24,702,836	37,260,561	98,226,473
CO	-	-	355,061	-	470,158	-	367,508	1,403,941	640,330	183,772	101,241	665,293	1.149,566	3,354,886	8,691,757
CT	-	-	-	-	-	-	-	-	-	-	-	-	-	3,687,510	3,687,510
DC	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DE	1,807,667	-	-	-	-	-	-	-	-	-	-	-	-	-	1,807,667
FL	-	7,874,682	578,495	6,965,177	1,122,867	3,643,291	1,431,053	-	679,606	-	-	2,555,479	-	673,361	25,524,011
GA	-	2,952,608	-	-	4,448,678	-	611,259	-	317,811	-	201,178	1,483,982	-	-	10,015,516
IA	387,053	1,980,150	1,812,218	14,269,157	5,867,779	7,615,134	8,347,216	1,674,913	17,848,838	2,190,287	20,099,628	1,946,815	3,953,560	14,930,382	102,923,130
ID	915,186	355,103	-	-	474,993	-	1,600,338	2,411,862	411,114	892,345	4,279,077	1,151,619	1,026,441	6,740,373	20,258,452
IL	6,403,122	318,655	1,744,995	11,853,513	2,338,884	32,147,226	189,076,865	5,612,577	33,054,543	57,497,606	163,213,256	24,305,081	27,125,044	38,222,228	592,913,594
IN	260,347	259,709	122,281	2,885,668	8,471,929	503,830	36,348,293	3,265,788	18,733,785	1,374,573	4,536,549	251,079	2,495,071	25.484,583	104,993,487
KS	-	6,290,979	230,646	-	1,889,782	719,988	464,773	721,202	5,572,683	241,788	331,566	410,114	1.590,891	4,653,135	23,117,545
KY	2,399,955	892,845	852,041	41,137,818	1,154,525	979,705	4,596,633	-	2,706,453	2.730,585	5,827,426	-	1,371,461	2,960,086	67,609,532
LA	-	1,002,380	2,437,460	-	-	3,063,684	-	-	-	-	-	-	-	898,356	7,401,881
MA	-	-	1,686,092	-	1.667,398	6,388,140	-	40,734,756	4,002,638	133,533,668	-	-	-	21,194,395	209,207.087
MD	18,517,959	2,979,301	27,762,158	850,023	-	-	4,291,429	-	951,920	475,802	-	-	1,046,880	82,835,680	139,711,151
ME	-	-	-	-	-	-	8,341,323	203,464	-	-	-	-	-	25,502,392	34,047,179
MI	4,895,450	1,122,949	-	496,210	4,810,677	28,210,217	13,433,916	4,310,925	1,958,899	1,316,633	18,560,809	281,669	1,913,165	321,343,655	402,655,174
MN	233,326	500,728	-	2,033,839	1,399,213	2,488,379	1,775,299	536,514	-	-	1,830,216	1,863,954	1,900,793	5,006,402	19,568,663
MO	-	18,044,507	78,255	913,796	936,093	893,325	3,766,540	3,122,777	3,762,994	2,222.349	1,425,932	924,210	29,918,284	37,393,829	103,402,891
MS	-	-	-	2,577,825	10,091.648	841,878	-	1,308,254	-	-	-	-	2,608,018	2,865,121	20,292,743
MT	70,475	814,336	595,844	621,248	-	-	516,682	231,581	626,817	-	855,232	-	-	1,549,343	5,881,557
NC	-	1,811,626	-	7,570,777	-	3,966,311	965,894	10,759,047	19,271,188	-	-	-	2,304,857	523,578	47,173,277
ND	691,066	457,942	296,535	456,745	290,603	1,579,038	1,740,127	359,217	196,038	-	548,304	355,682	462,267	8,098,271	15,531,836
NE	271,405	779,923	-	454,779	-	252,091	2,922,314	5,898,747	169,032	1,101,226	613,025	-	4,091,627	2,163,155	18,717,324
NH	-	-	-	-	1,486,458	-	-	-	-	-	-	-	-	-	1,486,458
NJ	-	15,454,442	7,006,217	-	-	339,886	15,939,396	7,890,710	5,591,281	21,401,809	103,314	1,951,104	18,342,189	20.117,003	114,137,350
NM	-	-	-	-	-	-	-	-	-	-	-	-	-	889,864	889,864
NV	-	-	-	-	-	-	-	-	-	-	396,519	5,270,433	-	-	5,666,952
NY	3,471,355	38,589,125	15,917,992	-	1,976.215	7,897,086	78.178,581	1.355,853	263,221,299	2,981,549	3,784,595	-	7,022,341	63,919,203	488,315,193
OH	17.089,840	237,104	22,449.616	26,669,814	7,466.491	5,521,070	40,136,115	7,163,247	1,015.555	123,092	1,558,053	-	-	455,159,921	584,589,917
OK	1,167,550	373,629	1.188,720	978,244	-	120,500	1,454,655	1,191,311	1,298,332	401,674	1,534,361	6,297,088	249,478	1,611,830	17,867.372
OR	-	-	-	-	690,331	1,400.799	166,508	-	2,996,688	1,681,452	2,301,321	268,183	3,794,554	3,861,411	17,161,248
PA	-	-	11,151.869	529,431	5,375,199	86,159,098	34,055,619	8,920,190	15,747,790	1,606,640	10,569,549	222,038	1,833,734	24.338,706	200,509,862
RI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SC	1,691,417	3,076,695	7,155,820	122,880	434,609	1,530,969	2,913,260	324,223	1,824,753	3,674,980	-	-	952,801	9.624,309	33,326,716
SD	-	188,085	-	1,218,788	-	109,322	3,691,302	1,082,696	105,499	-	1.303,114	920,547	534,802	1,336,100	10,490,255
TN	-	-	-	15,312,467	-	85,711	2,251,423	1,515,599	13,660,908	1,436,830	30,631,498	-	2,981,590	1,010,346	68,886,372
TX	9,630,251	228,392	824,748	587,782	8.798.965	24,353,784	19,997.511	3,136,465	9,389,567	4,099,651	511,809	11,329,463	733,808	4,152,820	97,775,016
UT	-	3,810,052	336.068	-	-	893,984	-	-	-	-	-	-	-	1,764,076	6,804,181
VA	599,860	295,718	455,233	-	574,745	-	10,688,631	-	610,831	447,513	160,069	-	-	21.216,548	35,049.149
VT	-	912.747	-	-	-	-	-	-	-	-	-	-	-	5,843.439	6,756,186
WA	-	406,854	-	-	-	492,806	372,709	4,897,496	8,697,455	-	1,809,734	360,010	-	604,477	17,641,541
WI	-	-	437,992	-	-	3,339,111	3,799,851	1.743,885	2,330,988	823.005	-	4,286,589	14,433,831	12,026,827	43,222,079
WV	-	576,070	-	3,389,338	238,819	574,343	3,272.561	3,596,778	1,144,069	156.318	769,925	643,300	-	8,230,747	22,592,268
WY	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grand Total	$ 79,246,847	$ 114,899,407	$ 120,340,307	$ 144,054,498	$ 79,906,833	$ 232,540,548	$ 500,781,950	$ 129,469,937	$ 446,143,372	$ 252,951,953	$ 282,137,006	$ 77,816.373	$ 158,539,890	$ 1,289,916,941	$ 3,908,745,861

Table 3a: Ratio of Failed Sample Banks, by Quarter, 1930Q1-1933Q1, to Total Number of Banks, 1929

	1930Q1	1930Q2	1930Q3	1930Q4	1931Q1	1931Q2	1931Q3	1931Q4	1932Q1	1932Q2	1932Q3	1932Q4	1933Q1	1933Q2-1933Q4	Average
AL	0.011	0.006	0.009	-	0.009	0.003	0.009	0.006	0.006	0.003	0.009	0.009	-	0.017	0.006
AR	0.007	0.007	0.002	0.012	0.007	0.017	0.002	0.002	0.002	0.002	0.005	-	-	0.005	0.005
AZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA	0.005	-	0.005	0.002	0.002	0.007	0.007	0.005	0.017	0.010	0.002	0.010	0.007	0.019	0.006
CO	-	-	0.007	-	0.007	-	0.011	0.015	0.007	0.004	0.004	0.004	0.011	0.026	0.006
CT	-	-	-	-	-	-	-	-	-	-	-	-	-	0.023	0.001
DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE	0.021	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
FL	-	0.013	0.004	0.004	0.009	0.004	0.009	-	0.004	-	-	0.009	-	0.004	0.004
GA	-	0.002	-	-	0.014	-	0.005	-	0.005	-	0.002	0.007	-	-	0.002
IA	0.001	0.004	0.004	0.004	0.004	0.005	0.012	0.003	0.005	0.004	0.010	0.002	0.004	0.026	0.006
ID	0.007	0.007	-	-	0.007	-	0.022	0.022	0.015	0.015	0.015	0.015	0.015	0.015	0.010
IL	0.003	0.001	0.001	0.007	0.003	0.005	0.009	0.005	0.010	0.010	0.004	0.003	0.006	0.018	0.005
IN	0.001	0.002	0.001	0.003	0.004	0.001	0.009	0.001	0.010	0.001	0.004	0.001	0.006	0.021	0.004
KS	-	0.002	0.001	-	0.003	0.002	0.003	0.002	0.008	0.001	0.001	0.001	0.004	0.010	0.002
KY	0.004	0.002	0.004	0.005	0.004	0.002	0.004	-	0.007	0.005	0.005	-	0.004	0.009	0.003
LA	-	0.004	0.004	-	-	0.013	-	-	-		-	-		0.013	0.002
MA	-	-	0.004	-	0.004	0.008	-	0.012	0.008	0.016	-	-	-	0.027	0.005
MD	0.005	0.009	0.009	0.005	-	-	0.014	-	0.005	0.005	-	-	0.005	0.036	0.006
ME	-	-	-	-	-	-	0.050	0.010	-	-	-	-	-	0.059	0.007
MI	0.001	0.001	-	0.001	0.002	0.010	0.017	0.004	0.002	0.002	0.005	0.001	0.004	0.026	0.005
MN	0.002	0.002	-	0.002	0.004	0.006	0.004	0.001	-	-	0.005	0.003	0.004	0.012	0.003
MO	-	0.002	0.001	0.002	0.002	0.001	0.005	0.002	0.004	0.002	0.002	0.001	0.010	0.006	0.002
MS	-	-	-	0.003	0.010	0.003	-	0.003	-	-	-	-	0.006	0.003	0.002
MT	0.005	0.010	0.010	0.010	-	-	0.010	0.005	0.010	-	0.005	-	-	0.010	0.005
NC	-	0.004	-	0.013	-	0.007	0.004	0.011	0.015	-	-	-	0.004	0.004	0.004
ND	0.010	0.007	0.005	0.007	0.005	0.015	0.017	0.005	0.005	-	0.007	0.005	0.002	0.012	0.006
NE	0.001	0.002	-	0.004	-	0.001	0.005	0.005	0.001	0.005	0.001	-	0.007	0.007	0.003
NH	-	-	-	-	0.014	-	-	-	-	-	-	-	-	-	0.001
NJ	-	0.004	0.004	-	-	0.002	0.013	0.009	0.007	0.002	0.002	0.002	0.009	0.026	0.005
NM	-	-	-	-	-	-	-	-	-	-	-	-	-	0.018	0.001
NV	-	-	-	-	-	-	-	-	-	-	0.029	0.029	-	-	0.004
NY	0.001	0.004	0.003	-	0.002	0.004	0.018	0.002	0.012	0.002	0.003	-	0.004	0.016	0.004
OH	0.002	0.001	0.004	0.004	0.009	0.005	0.012	0.007	0.001	0.001	0.001	-	-	0.020	0.004
OK	0.003	0.002	0.006	0.006	-	0.002	0.006	0.010	0.005	0.002	0.003	0.011	0.002	0.010	0.004
OR	-	-	-	-	0.009	0.009	0.004	-	0.017	0.009	0.026	0.004	0.022	0.013	0.007
PA	-	-	0.005	0.001	0.004	0.010	0.007	0.005	0.008	0.001	0.007	0.001	0.001	0.012	0.004
RI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SC	0.005	0.030	0.010	0.005	0.005	0.015	0.025	0.005	0.010	0.005	-	-	0.005	0.010	0.008
SD	-	0.003	-	0.008	-	0.003	0.023	0.005	0.003	-	0.013	0.005	0.003	0.008	0.005
TN	-	-	-	0.008	-	0.002	0.006	0.006	0.004	0.004	0.004	-	0.006	0.006	0.003
TX	0.005	0.001	0.004	0.001	0.006	0.011	0.008	0.004	0.006	0.004	0.001	0.006	0.002	0.009	0.004
UT	-	0.029	0.010	-	-	0.019	-	-	-	-	-	-	-	0.010	0.004
VA	0.002	0.002	0.002	-	0.004	-	0.015	-	0.004	0.002	0.002	-	-	0.011	0.003
VT	-	0.012	-	-	-	-	-	-	-	-	-	-	-	0.061	0.005
WA	-	0.003	-	-	-	0.006	0.003	0.009	0.018	-	0.003	0.003	-	0.006	0.003
WI	-	-	0.002	-	-	0.002	0.003	0.003	0.005	0.002	-	0.002	0.006	0.012	0.002
WV	-	0.007	-	0.003	0.003	0.007	0.024	0.007	0.003	0.003	0.003	0.003	-	0.014	0.005
WY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average	0.002	0.004	0.003	0.003	0.003	0.004	0.008	0.004	0.005	0.003	0.004	0.003	0.003	0.014	0.004

Table 3b: Ratio of Deposits of Failed Sample Banks, by Quarter, 1930Q1-1933Q1, to Total Deposits in Banks, 1929

	1930Q1	1930Q2	1930Q3	1930Q4	1931Q1	1931Q2	1931Q3	1931Q4	1932Q1	1932Q2	1932Q3	1932Q4	1933Q1	1933Q2-1933Q4	Average
AL	0.007	0.003	0.024	-	0.005	0.003	0.003	0.008	0.004	0.003	0.008	0.007	-	0.023	0.006
AR	0.026	0.006	0.011	0.008	0.017	0.021	0.002	0.004	0.001	0.001	0.005	-	-	0.002	0.006
AZ	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CA	0.000	-	0.001	0.000	0.000	0.000	0.001	0.000	0.002	0.003	0.000	0.002	0.007	0.010	0.002
CO	-	-	0.001	-	0.002	-	0.001	0.004	0.002	0.001	0.000	0.002	0.004	0.011	0.002
CT	-	-	-	-	-	-	-	-	-	-	-	-	-	0.006	0.000
DC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DE	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	0.001
FL	-	0.028	0.002	0.024	0.004	0.013	0.005	-	0.002	-	-	0.009	-	0.002	0.006
GA	-	0.008	-	-	0.012	-	0.002	-	0.001	-	0.001	0.004	-	-	0.002
IA	0.000	0.002	0.002	0.016	0.007	0.009	0.009	0.002	0.020	0.002	0.023	0.002	0.004	0.017	0.007
ID	0.010	0.004	-	-	0.005	-	0.017	0.026	0.004	0.009	0.045	0.012	0.011	0.072	0.013
IL	0.002	0.000	0.000	0.003	0.001	0.008	0.048	0.001	0.008	0.015	0.041	0.006	0.007	0.010	0.009
IN	0.000	0.000	0.000	0.003	0.010	0.001	0.043	0.004	0.022	0.002	0.005	0.000	0.003	0.030	0.008
KS	-	0.014	0.001	-	0.004	0.002	0.001	0.002	0.012	0.001	0.001	0.001	0.004	0.010	0.003
KY	0.005	0.002	0.002	0.087	0.002	0.002	0.010	-	0.006	0.006	0.012	-	0.003	0.006	0.009
LA	-	0.002	0.005	-	-	0.007	-	-	-	-	-	-	-	0.002	0.001
MA	-	-	0.001	-	0.001	0.003	-	0.020	0.002	0.064	-	-	-	0.010	0.006
MD	0.029	0.005	0.044	0.001	-	-	0.007	-	0.001	0.001	-	-	0.002	0.130	0.014
ME	-	-	-	-	-	-	0.028	0.001	-	-	-	-	-	0.087	0.007
MI	0.002	0.001	-	0.000	0.002	0.014	0.007	0.002	0.001	0.001	0.009	0.000	0.001	0.162	0.013
MN	0.000	0.001	-	0.002	0.002	0.003	0.002	0.001	-	-	0.002	0.002	0.002	0.005	0.001
MO	-	0.014	0.000	0.001	0.001	0.001	0.003	0.002	0.003	0.002	0.001	0.001	0.023	0.029	0.005
MS	-	-	-	0.011	0.041	0.003	-	0.005	-	-	-	-	0.011	0.012	0.005
MT	0.000	0.005	0.004	0.004	-	-	0.003	0.001	0.004	-	0.005	-	-	0.009	0.002
NC	-	0.004	-	0.018	-	0.010	0.002	0.026	0.047	-	-	-	0.006	0.001	0.007
ND	0.005	0.003	0.002	0.003	0.002	0.010	0.011	0.002	0.001	-	0.004	0.002	0.003	0.053	0.006
NE	0.001	0.002	-	0.001	-	0.001	0.007	0.014	0.000	0.003	0.001	-	0.010	0.005	0.003
NH	-	-	-	-	0.017	-	-	-	-	-	-	-	-	-	0.001
NJ	-	0.008	0.003	-	-	0.000	0.008	0.004	0.003	0.010	0.000	0.001	0.009	0.010	0.003
NM	-	-	-	-	-	-	-	-	-	-	-	-	-	0.019	0.001
NV	-	-	-	-	-	-	-	-	-	-	0.009	0.118	-	-	0.008
NY	0.000	0.003	0.001	-	0.000	0.001	0.006	0.000	0.019	0.000	0.000	-	0.001	0.005	0.002
OH	0.006	0.000	0.009	0.010	0.003	0.002	0.015	0.003	0.000	0.000	0.001	-	-	0.173	0.014
OK	0.003	0.001	0.003	0.002	-	0.000	0.003	0.003	0.003	0.001	0.003	0.014	0.001	0.004	0.002
OR	-	-	-	-	0.002	0.005	0.001	-	0.010	0.006	0.008	0.001	0.013	0.013	0.004
PA	-	-	0.002	0.000	0.001	0.018	0.007	0.002	0.003	0.000	0.002	0.000	0.000	0.005	0.003
RI	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SC	0.009	0.016	0.038	0.001	0.002	0.008	0.015	0.002	0.010	0.019	-	-	0.005	0.051	0.011
SD	-	0.001	-	0.008	-	0.001	0.023	0.007	0.001	-	0.008	0.006	0.003	0.008	0.004
TN	-	-	-	0.034	-	0.000	0.005	0.003	0.030	0.003	0.068	-	0.007	0.002	0.010
TX	0.008	0.000	0.001	0.000	0.007	0.021	0.017	0.003	0.008	0.003	0.000	0.010	0.001	0.004	0.005
UT	-	0.024	0.002	-	-	0.006	-	-	-	-	-	-	-	0.011	0.003
VA	0.001	0.001	0.001	-	0.001	-	0.021	-	0.001	0.001	0.000	-	-	0.042	0.004
VT	-	0.006	-	-	-	-	-	-	-	-	-	-	-	0.041	0.003
WA	-	0.001	-	-	-	0.001	0.001	0.011	0.019	-	0.004	0.001	-	0.001	0.002
WI	-	-	0.000	-	-	0.004	0.004	0.002	0.002	0.001	-	0.005	0.015	0.013	0.003
WV	-	0.002	-	0.010	0.001	0.002	0.010	0.011	0.003	0.000	0.002	0.002	-	0.025	0.004
WY	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Average	0.003	0.004	0.003	0.005	0.003	0.004	0.007	0.004	0.005	0.003	0.006	0.004	0.003	0.024	0.005

Table 4a: FDIC Number of Suspended Banks as a Ratio of Total Number of Banks in 1929

	FDIC Number of Suspensions, 1930	FDIC Number of Suspensions, 1931	FDIC Number of Suspensions, 1932
AL	0.103	0.051	0.108
AR	0.115	0.032	0.194
AZ	0.109	0.152	0.087
CA	0.043	0.079	0.117
CO	0.077	0.088	0.217
CT	0.058	0.035	0.029
DE	0.000	0.021	0.063
FL	0.074	0.048	0.127
GA	0.080	0.057	0.041
IA	0.153	0.109	0.304
ID	0.073	0.175	0.117
IL	0.135	0.118	0.139
IN	0.099	0.071	0.214
KS	0.036	0.065	0.072
KY	0.045	0.068	0.070
LA	0.031	0.062	0.261
MA	0.074	0.012	0.074
MD	0.090	0.018	0.315
ME	0.020	0.000	0.327
MI	0.135	0.102	0.377
MN	0.097	0.059	0.117
MO	0.097	0.063	0.202
MS	0.179	0.039	0.104
MT	0.057	0.041	0.109
NC	0.129	0.066	0.149
ND	0.161	0.034	0.108
NE	0.135	0.063	0.239
NH	0.028	0.000	0.085
NJ	0.071	0.013	0.130
NM	0.018	0.018	0.125
NV	0.057	0.457	0.057
NY	0.056	0.010	0.108
OH	0.114	0.026	0.195
OK	0.039	0.051	0.128
OR	0.057	0.113	0.165
PA	0.087	0.027	0.144
RI	0.000	0.000	0.043
SC	0.167	0.084	0.153
SD	0.189	0.060	0.070
TN	0.064	0.056	0.089
TX	0.061	0.025	0.052
UT	0.087	0.136	0.058
VA	0.077	0.019	0.092
VT	0.000	0.000	0.220
WA	0.066	0.084	0.187
WI	0.051	0.071	0.386
WV	0.195	0.020	0.167

Table 4b: FDIC Deposits in Suspended Banks as a Ratio of Total Deposits in 1929

	FDIC Deposits in Suspended Banks, 1930	FDIC Deposits in Suspended Banks, 1931	FDIC Deposits in Suspended Banks, 1932
AL	0.032	0.026	0.042
AR	0.055	0.008	0.125
AZ	0.052	0.089	0.010
CA	0.006	0.007	0.023
CO	0.015	0.015	0.046
CT	0.031	0.079	0.016
DE	0.000	0.007	0.006
FL	0.038	0.020	0.033
GA	0.029	0.016	0.022
IA	0.125	0.127	0.147
ID	0.031	0.185	0.044
IL	0.067	0.047	0.047
IN	0.079	0.051	0.165
KS	0.019	0.030	0.041
KY	0.047	0.027	0.041
LA	0.012	0.015	0.368
MA	0.053	0.014	0.029
MD	0.046	0.010	0.282
ME	0.008	0.000	0.386
MI	0.069	0.023	0.465
MN	0.035	0.018	0.028
MO	0.022	0.013	0.110
MS	0.131	0.012	0.068
MT	0.010	0.012	0.036
NC	0.086	0.043	0.111
ND	0.079	0.010	0.068
NE	0.094	0.027	0.074
NH	0.014	0.000	0.083
NJ	0.044	0.009	0.063
NM	0.021	0.004	0.180
NV	0.006	0.510	0.021
NY	0.008	0.001	0.013
OH	0.127	0.004	0.192
OK	0.011	0.024	0.036
OR	0.042	0.037	0.049
PA	0.074	0.014	0.076
RI	0.000	0.000	0.007
SC	0.085	0.176	0.194
SD	0.111	0.044	0.029
TN	0.015	0.014	0.079
TX	0.057	0.009	0.017
UT	0.069	0.073	0.014
VA	0.040	0.002	0.075
VT	0.000	0.000	0.174
WA	0.035	0.069	0.073
WI	0.030	0.030	0.154
WV	0.139	0.004	0.107

Table 5: Summary Statistics

Variable	N	Mean	Std Dev	Minimum	Maximum
Survival Model (Full Sample)					
Dependent Variable					
Log(DAYS UNTIL FAILURE)	269683	5.913	1.320	0.000	7.078
MONTHLY BANK FAILURE RATE	269683	0.005	0.068	0.000	1.000
Bank Data, December 31, 1929					
LTA	7553	13.974	1.265	10.960	21.312
STBANK	7553	0.112	0.316	0.000	1.000
LNBRANCH	7553	-8.858	1.861	-9.210	4.934
MKTPWR	7553	0.993	0.067	0.038	1.000
NCA_TA	7553	0.766	0.107	0.064	0.965
LD_Other/NCA	7553	0.744	0.186	0.030	0.997
LIQLOANS	7553	0.284	0.216	0.000	0.999
LOSSX	7553	0.165	0.145	0.000	0.911
REO_NCA	7553	0.013	0.025	0.000	0.340
(BONDYLD)x(SEC)	7553	-0.007	0.004	-0.023	0.000
(DD+DTB)_TD	7553	0.520	0.229	0.000	1.000
DTB_TD	7553	0.033	0.061	0.000	0.748
DFB_LA	7553	0.281	0.172	0.000	1.000
BPR_TD	7553	0.028	0.049	0.000	0.504
OTH_BPR	7553	0.052	0.165	0.000	0.993
NW_TA	7553	0.149	0.061	0.031	0.601
INTCOST	7553	0.011	0.010	0.000	0.598
Bank Data, December 31, 1931					
LTA	6857	13.887	1.325	10.752	21.197
STBANK	6857	0.126	0.332	0.000	1.000
LNBRANCH	6857	-8.856	1.872	-9.210	4.934
MKTPWR	6857	0.990	0.082	0.026	1.000
NCA_TA	6857	0.760	0.109	0.130	0.978
LD_Other/NCA	6857	0.701	0.192	0.015	0.997
LIQLOANS	6857	0.253	0.198	0.000	0.999
LOSSX	6857	0.298	0.203	0.000	0.926
REO_NCA	6857	0.014	0.024	0.000	0.385
(BONDYLD)x(SEC)	6857	0.080	0.043	0.001	0.258
(DD+DTB)_TD	6857	0.467	0.233	0.000	1.000
DTB_TD	6857	0.028	0.055	0.000	0.683
DFB_LA	6857	0.244	0.171	0.000	1.000
BPR_TD	6857	0.048	0.072	0.000	0.588
OTH_BPR	6857	0.069	0.180	0.000	1.000
NW_TA	6857	0.166	0.069	0.010	0.635
INTCOST	6857	0.012	0.019	0.000	0.995
Distress Variables					
FSPANIC-30	269683	0.081	0.272	0.000	1.000
FSPANIC-31a	269683	0.052	0.222	0.000	1.000
FSPANIC-31b	269683	0.075	0.263	0.000	1.000
DUM_JAN-33	269683	0.023	0.151	0.000	1.000
DUM_FEB-33	269683	0.023	0.151	0.000	1.000
DUM_MAR-33	269683	0.023	0.150	0.000	1.000
(FSPANIC-30)x(DFB_LA)	269683	0.023	0.091	0.000	1.000
(FSPANIC-31a)x(DFB_LA)	269683	0.015	0.074	0.000	1.000
(FSPANIC-31b)x(DFB_LA)	269683	0.021	0.088	0.000	1.000
WICKER-30	269683	0.003	0.054	0.000	1.000
WICKER-31a	269683	0.008	0.090	0.000	1.000
WICKER-31b	269683	0.006	0.079	0.000	1.000
(WICKER-30)x(DFB_LA)	269683	0.001	0.021	0.000	1.000
(WICKER-31a)x(DFB_LA)	269683	0.002	0.025	0.000	1.000
(WICKER-31b)x(DFB_LA)	269683	0.001	0.021	0.000	1.000
Chicago-6-32	269683	0.000	0.015	0.000	1.000
NEARFAILS	269683	0.972	15.235	-16.118	20.026

Table 5 (cont'd): Summary Statistics

Variable	N	Mean	Std Dev	Minimum	Maximum
Survival Model (215 City Sample)					
Log(DAYS UNTIL FAILURE)	53032	5.922	1.317	0.000	7.078
MONTHLY BANK FAILURE RATE	53032	0.004	0.065	0.000	1.000
Bank Data, December 31, 1929					
LTA	1470	15.057	1.506	11.645	20.862
STBANK	1470	0.196	0.397	0.000	1.000
LNBRANCH	1470	-7.970	3.342	-9.210	4.934
MKTPWR	1470	0.974	0.124	0.044	1.000
NCA_TA	1470	0.786	0.097	0.245	0.965
LD_Other/NCA	1470	0.727	0.175	0.030	0.996
LIQLOANS	1470	0.189	0.172	0.000	0.980
LOSSX	1470	0.143	0.123	0.000	0.799
REO_NCA	1470	0.007	0.014	0.000	0.121
(BONDYLD)x(SEC)	1470	-0.007	0.004	-0.022	0.000
(DD+DTB)_TD	1470	0.511	0.215	0.000	1.000
DTB_TD	1470	0.058	0.082	0.000	0.559
DFB_LA	1470	0.256	0.162	0.000	1.000
BPR_TD	1470	0.029	0.045	0.000	0.294
OTH_BPR	1470	0.058	0.170	0.000	0.993
NW_TA	1470	0.148	0.065	0.045	0.601
INTCOST	1470	0.012	0.006	0.000	0.151
Bank Data, December 31, 1931					
LTA	1383	15.004	1.570	11.462	20.720
STBANK	1383	0.205	0.404	0.000	1.000
LNBRANCH	1383	-7.976	3.352	-9.210	4.934
MKTPWR	1383	0.961	0.159	0.037	1.000
NCA_TA	1383	0.764	0.110	0.237	0.962
LD_Other/NCA	1383	0.678	0.177	0.015	0.993
LIQLOANS	1383	0.161	0.143	0.000	0.998
LOSSX	1383	0.306	0.200	0.000	0.926
REO_NCA	1383	0.010	0.016	0.000	0.144
(BONDYLD)x(SEC)	1383	0.080	0.042	0.001	0.239
(DD+DTB)_TD	1383	0.454	0.223	0.000	1.000
DTB_TD	1383	0.053	0.077	0.000	0.589
DFB_LA	1383	0.219	0.162	0.000	0.877
BPR_TD	1383	0.044	0.063	0.000	0.376
OTH_BPR	1383	0.088	0.207	0.000	0.956
NW_TA	1383	0.159	0.070	0.010	0.635
INTCOST	1383	0.013	0.035	0.000	0.995
Distress Variables					
FSPANIC-30	53032	0.079	0.271	0.000	1.000
FSPANIC-31a	53032	0.051	0.221	0.000	1.000
FSPANIC-31b	53032	0.074	0.262	0.000	1.000
DUM_JAN-33	53032	0.024	0.152	0.000	1.000
DUM_FEB-33	53032	0.024	0.152	0.000	1.000
DUM_MAR-33	53032	0.023	0.151	0.000	1.000
(FSPANIC-30)x(DFB_LA)	53032	0.020	0.083	0.000	1.000
(FSPANIC-31a)x(DFB_LA)	53032	0.013	0.067	0.000	1.000
(FSPANIC-31b)x(DFB_LA)	53032	0.019	0.080	0.000	1.000
WICKER-30	53032	0.001	0.036	0.000	1.000
WICKER-31a	53032	0.008	0.088	0.000	1.000
WICKER-31b	53032	0.007	0.081	0.000	1.000
(WICKER-30)x(DFB_LA)	53032	0.000	0.013	0.000	0.649
(WICKER-31a)x(DFB_LA)	53032	0.002	0.027	0.000	1.000
(WICKER-31b)x(DFB_LA)	53032	0.001	0.020	0.000	1.000
Chicago-6-32	53032	0.001	0.033	0.000	1.000
NEARFAILS	53032	0.729	15.422	-16.118	20.026

Table 5 (cont'd): Summary Statistics

Variable	N	Mean	Std Dev	Minimum	Maximum
County Data					
PCT_CROPINC30	2187	0.991	0.059	0.000	1.000
PCT_ACRES_PAST30	2249	0.386	0.205	0.000	1.000
VALGR_INC_CROP30	2259	0.416	0.281	0.000	0.982
UNEMP30	2252	0.044	0.031	0.000	0.271
SMLFM30	2254	0.534	0.292	0.000	1.000
(DAGLBE)x(PCT_CROPINC30)	2187	-0.223	1.009	-1.534	25.805
PCT_STBANK	2259	0.583	0.251	0.000	1.000
Quarterly State Data					
STBUSFAIL	565	-7.006	2.551	-24.488	-3.640
Monthly State Data					
STBUILDPERM5	1693	-14.423	1.188	-19.290	-11.716
STBUILDPERM3	1693	-13.781	1.083	-15.056	26.185
Monthly National Data					
NATDAGP	39	0.003	0.036	-0.070	0.078
NATDBUSFAIL	39	-0.003	0.172	-0.349	0.432
County-Level OLS Variables					
Dependent Variables					
Sus.Dep.30-31	1976	0.093	0.146	0.000	1.416
Sus.Dep.30-32	1811	0.176	0.199	0.000	2.981
dDEP.29-30	2075	-0.145	0.165	-0.994	0.397
dDEP.30-31	2046	-0.220	0.192	-0.986	0.908
dDEP.31-32	2045	-0.208	0.187	-1.000	0.964
dDEP.29-31	1976	-0.343	0.222	-0.997	0.824
dDEP.30-32	1957	-0.409	0.225	-0.994	0.732
dDEP.29-32	1811	-0.509	0.232	-0.999	0.673
County Aggregate Bank Data, December 31, 1929					
LTA	2243	13.670	0.868	11.503	18.045
STBANK	2259	0.105	0.230	0.000	1.000
LNBRANCH	2259	-9.016	1.019	-9.210	1.609
MKTPWR	2223	0.999	0.019	0.500	1.000
NCA_TA	2242	0.743	0.097	0.064	0.951
LD_Other/NCA	2244	0.783	0.153	0.080	0.997
LIQLOANS	2241	0.339	0.187	0.000	2.108
LOSSX	2213	0.173	0.119	0.000	1.000
REO_NCA	2242	0.017	0.022	0.000	0.196
(BONDYLD)x(SEC)	2243	0.838	0.420	0.011	2.702
(DD+DTB)_TD	2243	0.560	0.208	0.012	1.000
DTB_TD	2259	0.030	0.043	0.000	0.612
DFB_LA	2259	0.314	0.149	0.000	1.000
BPR_TD	2243	0.025	0.041	0.000	0.504
OTH_BPR	2259	0.039	0.102	0.000	0.833
NW_TA	2242	0.146	0.049	0.031	0.572
INTCOST	2209	0.011	0.009	0.000	0.309
PCT_CROPINC30	2187	0.991	0.059	0.000	1.000
PCT_ACRES_PAST30	2249	0.386	0.205	0.000	1.000
VALGR_INC_CROP30	2259	0.416	0.281	0.000	0.982
UNEMP30	2252	0.044	0.031	0.000	0.271
SMLFM30	2254	0.534	0.292	0.000	1.000
(DAGLBE)x(PCT_CROPINC30)	2187	-0.223	1.009	-1.534	25.805
PCT_STBANK	2259	0.583	0.251	0.000	1.000

Table 5 (cont'd): Summary Statistics

Variable	N	Mean	Std Dev	Minimum	Maximum
County Aggregate Bank Data, December 31, 1931					
LTA	2110	13.550	0.944	10.869	18.019
STBANK	2141	0.098	0.233	0.000	1.000
LNBRANCH	2141	-9.017	1.052	-9.210	1.792
MKTPWR	2099	0.999	0.016	0.595	1.000
NCA_TA	2110	0.744	0.098	0.174	0.970
LD_Other/NCA	2110	0.736	0.165	0.105	0.996
LIQLOANS	2110	0.307	0.179	0.000	1.605
LOSSX	2119	0.279	0.160	0.000	0.851
REO_NCA	2110	0.017	0.023	0.000	0.385
(BONDYLD)x(SEC)	2110	0.976	0.450	0.021	2.709
(DD+DTB)_TD	2110	0.515	0.203	0.084	1.000
DTB_TD	2141	0.025	0.039	0.000	0.503
DFB_LA	2141	0.273	0.140	0.000	1.000
BPR_TD	2110	0.049	0.067	0.000	0.486
OTH_BPR	2141	0.054	0.120	0.000	1.000
NW_TA	2110	0.167	0.058	0.034	0.513
INTCOST	2096	0.014	0.094	0.000	4.312
PCT_CROPINC30	2075	0.991	0.060	0.000	1.000
PCT_ACRES_PAST30	2132	0.388	0.204	0.000	1.000
VALGR_INC_CROP30	2141	0.420	0.283	0.000	0.982
UNEMP30	2135	0.044	0.031	0.000	0.271
SMLFM30	2137	0.527	0.292	0.000	1.000
(DAGLBE)x(PCT_CROPINC30)	2075	-0.202	1.188	-1.534	26.536
PCT_STBANK	2141	0.575	0.252	0.000	1.000
State-Level Variables					
STBUILDPERM	2214	0.018	0.010	0.002	0.054
STBUSFAIL	2255	0.007	0.003	0.002	0.019

Table 6

Survival Regressions for Individual Fed Member Banks, Dependent Variable: Log Probability of Survival (Daily)
Full Sample of Fed Member Banks
(Standard Errors in Parentheses)

	(1)	(2)	(3)	(4)
Constant	6.044	5.956	6.017	5.965
	(0.283)	(0.263)	(0.287)	(0.251)
LTA	0.105	0.099	0.107	0.090
	(0.011)	(0.011)	(0.012)	(0.010)
STBANK	0.136	0.123	0.133	0.118
	(0.031)	(0.029)	(0.031)	(0.028)
LNBRANCH	-0.012	-0.012	-0.013	-0.009
	(0.006)	(0.005)	(0.006)	(0.005)
MKTPWR	0.259	0.250	0.261	0.227
	(0.099)	(0.092)	(0.100)	(0.086)
NCA_TA	-0.845	-0.779	-0.855	-0.769
	(0.124)	(0.115)	(0.126)	(0.109)
LD_OtherNCA	-0.229	-0.216	-0.220	-0.200
	(0.058)	(0.054)	(0.059)	(0.052)
LIQLOANS	0.115	0.107	0.111	0.092
	(0.054)	(0.050)	(0.055)	(0.048)
LOSSX	0.027	0.011	0.021	0.009
	(0.049)	(0.046)	(0.050)	(0.044)
REO_NCA	-3.415	-3.100	-3.501	-2.908
	(0.331)	(0.310)	(0.337)	(0.291)
(BONDYLD)x(SEC)	-0.247	-1.334	-0.168	-1.072
	(0.239)	(0.280)	(0.244)	(0.265)
NW_TA	1.700	1.531	1.730	1.428
	(0.184)	(0.171)	(0.187)	(0.161)
(DD+DTB)_TD	-0.164	-0.146	-0.168	-0.149
	(0.059)	(0.054)	(0.059)	(0.052)
DTB_TD	-0.478	-0.439	-0.483	-0.425
	(0.203)	(0.190)	(0.206)	(0.182)
DFB_LA	0.059	0.062	0.066	0.062
	(0.060)	(0.056)	(0.061)	(0.053)
BPR_TD	-1.490	-1.427	-1.518	-1.349
	(0.146)	(0.138)	(0.148)	(0.130)
OTH_BPR	-0.126	-0.116	-0.125	-0.109
	(0.050)	(0.047)	(0.051)	(0.044)
INTCOST	-0.671	-0.666	-0.587	-0.771
	(0.428)	(0.400)	(0.510)	(0.453)
PCT_INC_CROP30	0.317	0.304	0.330	0.290
	(0.093)	(0.086)	(0.094)	(0.082)
PCT_ACRES_PAST30	0.063	0.054	0.067	0.050
	(0.063)	(0.059)	(0.064)	(0.056)
VALGR_INC_CROP30	-0.016	-0.008	-0.012	-0.005
	(0.058)	(0.054)	(0.059)	(0.052)
UNEMP30	-1.204	-1.129	-1.257	-1.127
	(0.315)	(0.295)	(0.321)	(0.282)
SMFARM30	-0.075	-0.073	-0.055	-0.049
	(0.052)	(0.048)	(0.053)	(0.046)

(Table 6 cont'd)

(DAGLBE)x (PCT_CROPINC30)	0.139 (0.036)	0.131 (0.033)	0.135 (0.036)	0.111 (0.032)
PCT_STBANK	-0.288 (0.047)	-0.270 (0.044)	-0.289 (0.048)	-0.254 (0.042)
STBUILDPERM_Lag5M	0.054 (0.010)	0.057 (0.009)	0.054 (0.010)	0.048 (0.009)
STBUSFAIL_Lag3Q	-0.005 (0.004)	-0.001 (0.004)	-0.004 (0.004)	0.000 (0.003)
NATDAGP_Lag5M	-0.086 (0.264)	0.930 (0.295)	-0.181 (0.270)	0.806 (0.282)
NATDBUSFAIL_Lag5M	-0.057 (0.054)	-0.059 (0.054)	-0.083 (0.055)	-0.070 (0.052)
TIME	0.044 (0.001)	0.053 (0.001)	0.043 (0.001)	0.052 (0.001)
FSPANIC-30		0.073 (0.035)		0.122 (0.035)
FSPANIC-31a		0.046 (0.037)		0.050 (0.036)
FSPANIC-31b		-0.086 (0.029)		-0.043 (0.028)
DUM_JAN33		-0.619 (0.063)		-0.570 (0.060)
DUM_FEB33		-0.452 (0.070)		-0.412 (0.066)
DUM_MAR33		-0.060 (0.088)		-0.042 (0.084)
(FSPANIC-30)x(DFB_LA)				
(FSPANIC-31a)x(DFB_LA)				
(FSPANIC-31b)x(DFB_LA)				
WICKER-30			-0.464 (0.085)	-0.439 (0.078)
WICKER-31a			0.055 (0.084)	0.047 (0.074)
WICKER-31b			-0.307 (0.073)	-0.190 (0.065)
(WICKER-30)x(DFB_LA)				
(WICKER-31a)x(DFB_LA)				
(WICKER-31b)x(DFB_LA)				
Chicago-6-32				
NEARFAILS				
No. Observations (Bank-months)	269,683	269,683	269,683	269,683
Log Likelihood	-11,704	-11,644	-11,681	-11,628

Sources and Definitions: Definitions of variables are provided in Table 1 and sources are described in the Data Appendix to Calomiris and Mason 2000. Indicator Variables for individual months appear as DUM, followed by the month and year of the indicator variable. Lags are indicated by appending _Lag, followed by an indication of the lag length (3M=three months, 3Q=three quarters). Time is a monthly time trend.

Table 6 (cont'd)

Survival Regressions for Individual Fed Member Banks, Dependent Variable: Log Probability of Survival (Daily)
Full Sample of Fed Member Banks
(Standard Errors in Parentheses)

	(5)	(6)	(7)	(8)	(9)
Constant	5.737	5.982	5.812	6.002	7.783
	(0.192)	(0.278)	(0.209)	(0.278)	(0.953)
LTA	0.070	0.107	0.081	0.109	0.056
	(0.008)	(0.011)	(0.008)	(0.011)	(0.032)
STBANK	0.079	0.133	0.083	0.127	0.171
	(0.021)	(0.031)	(0.023)	(0.031)	(0.084)
LNBRANCH	-0.009	-0.013	-0.013	-0.015	-0.011
	(0.004)	(0.006)	(0.004)	(0.006)	(0.010)
MKTPWR	0.182	0.162	0.109	0.130	0.262
	(0.066)	(0.104)	(0.076)	(0.103)	(0.174)
NCA_TA	-0.554	-0.838	-0.595	-0.793	-1.147
	(0.083)	(0.122)	(0.090)	(0.121)	(0.443)
LD_OtherNCA	-0.129	-0.233	-0.153	-0.229	-0.355
	(0.039)	(0.058)	(0.043)	(0.058)	(0.216)
LIQLOANS	0.078	0.110	0.071	0.094	0.224
	(0.037)	(0.053)	(0.040)	(0.053)	(0.236)
LOSSX	-0.004	0.037	0.011	0.041	-0.236
	(0.034)	(0.049)	(0.037)	(0.049)	(0.165)
REO_NCA	-2.123	-3.345	-2.317	-3.282	-3.733
	(0.216)	(0.324)	(0.235)	(0.328)	(1.792)
(BONDYLD)x(SEC)	-0.720	-0.115	-0.338	-1.220	-2.139
	(0.202)	(0.234)	(0.218)	(0.290)	(0.979)
NW_TA	1.048	1.729	1.169	1.749	1.006
	(0.122)	(0.182)	(0.134)	(0.182)	(0.506)
(DD+DTB)_TD	-0.105	-0.161	-0.105	-0.157	-0.250
	(0.040)	(0.058)	(0.043)	(0.058)	(0.205)
DTB_TD	-0.265	-0.476	-0.310	-0.473	-0.094
	(0.139)	(0.199)	(0.151)	(0.202)	(0.585)
DFB_LA	0.103	0.066	0.100	0.066	-0.162
	(0.047)	(0.059)	(0.051)	(0.059)	(0.200)
BPR_TD	-1.023	-1.459	-1.075	-1.555	-1.721
	(0.096)	(0.144)	(0.106)	(0.145)	(0.565)
OTH_BPR	-0.087	-0.117	-0.082	-0.101	-0.252
	(0.034)	(0.049)	(0.037)	(0.049)	(0.153)
INTCOST	-0.281	-0.675	-0.200	-0.611	3.175
	(0.317)	(0.420)	(0.349)	(0.501)	(10.027)
PCT_INC_CROP30	0.209	0.306	0.212	0.327	-0.005
	(0.063)	(0.091)	(0.068)	(0.091)	(0.208)
PCT_ACRES_PAST30	0.042	0.057	0.023	0.025	-0.022
	(0.043)	(0.062)	(0.047)	(0.063)	(0.233)
VALGR_INC_CROP30	-0.007	-0.008	0.032	0.062	0.162
	(0.040)	(0.057)	(0.043)	(0.057)	(0.301)
UNEMP30	-0.715	-1.140	-0.529	-0.891	-0.259
	(0.215)	(0.309)	(0.233)	(0.313)	(1.348)
SMFARM30	-0.040	-0.070	-0.035	-0.044	0.230
	(0.035)	(0.051)	(0.038)	(0.051)	(0.237)

(Table 6 cont'd)

(DAGLBE)x (PCT_CROPINC30)	0.091 (0.024)	0.142 (0.035)	0.104 (0.026)	0.135 (0.035)	-0.197 (0.136)
PCT_STBANK	-0.194 (0.032)	-0.269 (0.046)	-0.213 (0.035)	-0.280 (0.047)	-1.057 (0.221)
STBUILDPERM_Lag5M	0.045 (0.007)	0.047 (0.010)	0.051 (0.008)	0.060 (0.010)	0.048 (0.031)
STBUSFAIL_Lag3Q	0.000 (0.003)	-0.004 (0.004)	0.001 (0.003)	0.001 (0.004)	-0.024 (0.021)
NATDAGP_Lag5M	0.794 (0.216)	-0.058 (0.259)	0.924 (0.234)	0.696 (0.304)	1.005 (0.999)
NATDBUSFAIL_Lag5M	-0.070 (0.040)	-0.082 (0.053)	-0.102 (0.044)	-0.052 (0.055)	0.276 (0.173)
TIME	0.057 (0.001)	0.044 (0.001)	0.056 (0.001)	0.051 (0.002)	0.042 (0.005)
FSPANIC-30	0.140 (0.047)		0.101 (0.051)		
FSPANIC-31a	0.106 (0.048)		0.135 (0.052)		
FSPANIC-31b	0.066 (0.040)		0.053 (0.043)		
DUM_JAN33	-0.510 (0.045)		-0.478 (0.049)	-0.568 (0.067)	-0.369 (0.268)
DUM_FEB33	-0.415 (0.051)		-0.401 (0.055)	-0.411 (0.074)	-0.588 (0.226)
DUM_MAR33	-0.173 (0.064)		-0.135 (0.070)	0.112 (0.093)	0.511 (0.497)
(FSPANIC-30)x(DFB_LA)	-0.028 (0.151)		0.140 (0.163)		
(FSPANIC-31a)x(DFB_LA)	-0.049 (0.140)		-0.087 (0.153)		
(FSPANIC-31b)x(DFB_LA)	-0.277 (0.113)		-0.245 (0.123)		
WICKER-30	-0.419 (0.117)		-0.150 (0.121)	-0.327 (0.082)	-0.625 (0.326)
WICKER-31a	0.215 (0.123)		0.193 (0.133)		
WICKER-31b	-0.136 (0.121)		-0.093 (0.132)	-0.230 (0.070)	-0.034 (0.255)
(WICKER-30)x(DFB_LA)	0.298 (0.301)		-0.429 (0.326)		
(WICKER-31a)x(DFB_LA)	-0.677 (0.451)		-0.514 (0.487)		
(WICKER-31b)x(DFB_LA)	-0.126 (0.433)		-0.236 (0.474)		
Chicago-6-32		-1.378 (0.727)	-1.078 (0.504)	-1.259 (0.601)	-0.430 (0.353)
NEARFAILS			-0.004 (0.001)	-0.006 (0.001)	-0.009 (0.002)
No. Observations (Bank-months)	269,683	269,683	269,683	269,683	53,032
Log Likelihood	-11,643	-11,679	-11,569	-11,568	-2,076

Sources and Definitions: Definitions of variables are provided in Table 1 and sources are described in the Data Appendix to Calomiris and Mason 2000. Indicator Variables for individual months appear as DUM, followed by the month and year of the indicator variable. Lags are indicated by appending _Lag, followed by an indication of the lag length (3M=three months, 3Q=three quarters). Time is a monthly time trend.

Table 7
OLS Regressions, Dependent Variable: County-Level Suspension Rate (Sus.Dep.)
(Deposits of Suspended Banks for All Banks During Period / Deposits of All Banks at End of 1929)
(Standard Errors in Parentheses)

	1930-1931	1930-1932
Constant	-0.187	-0.059
	(0.218)	(0.290)
LTA	0.000	-0.011
	(0.006)	(0.008)
STBANK	0.026	0.060
	(0.017)	(0.023)
LNBRANCH	-0.006	0.000
	(0.004)	(0.005)
MKTPWR	0.288	0.167
	(0.170)	(0.224)
NCA_TA	0.021	0.266
	(0.055)	(0.074)
LD_OtherNCA	-0.149	-0.152
	(0.070)	(0.094)
LIQLOANS	0.006	-0.001
	(0.022)	(0.030)
LOSSX	-0.041	-0.004
	(0.030)	(0.042)
REO_NCA	1.128	1.152
	(0.173)	(0.253)
(BONDYLD)x(SEC)	-0.055	-0.012
	(0.027)	(0.037)
NW_TA	-0.132	-0.311
	(0.078)	(0.109)
(DD+DTB)_TD	0.039	-0.130
	(0.025)	(0.034)
DTB_TD	-0.049	0.162
	(0.087)	(0.124)
DFB_LA	-0.064	-0.031
	(0.036)	(0.049)
BPR_TD	0.229	0.136
	(0.106)	(0.151)
OTH_BPR	0.031	0.060
	(0.037)	(0.053)
INTCOST	0.198	-0.421
	(0.355)	(0.503)
PCT_INC_CROP30	0.039	0.098
	(0.063)	(0.083)
PCT_ACRES_PAST30	-0.036	0.020
	(0.021)	(0.029)
VALGR_INC_CROP30	0.041	0.093
	(0.018)	(0.025)
UNEMP30	0.205	0.534
	(0.128)	(0.173)
SMFARM30	-0.007	0.067
	(0.018)	(0.024)
(DAGLBE)x(PCT_CROPINC30)	0.001	0.000
	(0.003)	(0.004)
PCT_STBANK	0.065	0.113
	(0.016)	(0.022)
STBUILDPERM	-0.674	-0.322
	(0.365)	(0.493)
STBUSFAIL	0.848	-2.330
	(1.162)	(1.565)
No. Observations	1,976	1,811
Adjusted R-Sq.	0.066	0.139

Sources and Definitions: See Table 1 and Data Appendix to Calomiris and Mason 2000. Building permits and business failures are defined for the year 1930 as a whole, and (as with the quarterly and monthly series used in Table 6) are normalized by state income in 1929.

Table 8

OLS Regressions, Dependent Variables: County-Level Deposit Growth (dDep)
Deposit Growth Includes All Banks, Growth is Measured as Log Difference of End of Year Deposits
(Standard Errors in Parentheses)

	1929-30	1929-30	1930-31	1930-31	1931-32
Constant	-0.660	-0.702	-0.181	-0.209	-0.467
	(0.223)	(0.222)	(0.282)	(0.282)	(0.268)
LTA	0.040	0.040	0.007	0.006	0.033
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)
STBANK	0.011	-0.003	-0.088	-0.089	-0.023
	(0.017)	(0.017)	(0.021)	(0.021)	(0.020)
LNBRANCH	-0.001	-0.001	0.000	0.000	-0.004
	(0.004)	(0.004)	(0.005)	(0.005)	(0.004)
MKTPWR	-0.044	-0.043	-0.164	-0.155	-0.002
	(0.174)	(0.173)	(0.220)	(0.220)	(0.209)
NCA_TA	0.126	0.140	0.001	0.008	-0.037
	(0.056)	(0.056)	(0.071)	(0.071)	(0.067)
LD_OtherNCA	-0.052	-0.035	-0.019	-0.014	-0.151
	(0.071)	(0.070)	(0.090)	(0.090)	(0.085)
LIQLOANS	-0.046	-0.048	-0.048	-0.058	-0.061
	(0.022)	(0.022)	(0.028)	(0.028)	(0.026)
LOSSX	-0.061	-0.065	-0.016	-0.016	-0.076
	(0.029)	(0.029)	(0.037)	(0.037)	(0.035)
REO_NCA	-0.615	-0.701	-1.131	-1.137	-0.437
	(0.168)	(0.168)	(0.215)	(0.215)	(0.200)
(BONDYLD)x(SEC)	0.037	0.038	0.022	0.024	-0.069
	(0.028)	(0.028)	(0.035)	(0.035)	(0.034)
NW_TA	0.399	0.370	0.183	0.216	0.150
	(0.079)	(0.079)	(0.099)	(0.100)	(0.096)
(DD+DTB)_TD	-0.119	-0.115	-0.064	-0.066	0.050
	(0.025)	(0.025)	(0.032)	(0.032)	(0.031)
DTB_TD	-0.078	-0.080	0.117	0.109	0.121
	(0.088)	(0.088)	(0.111)	(0.111)	(0.105)
DFB_LA	-0.043	-0.026	-0.056	-0.060	-0.049
	(0.036)	(0.036)	(0.046)	(0.046)	(0.044)
BPR_TD	-0.080	-0.088	-0.346	-0.361	0.035
	(0.101)	(0.100)	(0.127)	(0.127)	(0.123)
OTH_BPR	0.024	0.034	0.027	0.035	-0.003
	(0.037)	(0.037)	(0.047)	(0.047)	(0.046)
INTCOST	-0.193	0.039	0.023	0.002	-0.326
	(0.364)	(0.365)	(0.459)	(0.459)	(0.436)
PCT_INC_CROP30	-0.127	-0.114	0.068	0.067	0.024
	(0.065)	(0.065)	(0.082)	(0.082)	(0.078)
PCT_ACRES_PAST30	0.157	0.157	0.053	0.056	-0.005
	(0.021)	(0.021)	(0.027)	(0.027)	(0.026)
VALGR_INC_CROP30	0.107	0.107	-0.016	-0.001	-0.046
	(0.018)	(0.018)	(0.023)	(0.024)	(0.022)
UNEMP30	-0.079	-0.147	-0.443	-0.378	0.116
	(0.126)	(0.125)	(0.163)	(0.165)	(0.152)
SMFARM30	0.040	0.063	0.087	0.091	0.063
	(0.018)	(0.018)	(0.023)	(0.023)	(0.022)
(DAGLBE)x(PCT_CROPINC30)	0.004	0.004	0.000	-0.001	-0.004
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)
PCT_STBANK	-0.033	-0.027	-0.020	-0.019	-0.121
	(0.016)	(0.016)	(0.020)	(0.020)	(0.019)
STBUILDPERM	2.178	1.814	0.661	0.649	0.241
	(0.368)	(0.371)	(0.464)	(0.464)	(0.440)
STBUSFAIL	-4.938	-4.121	0.376	1.072	0.787
	(1.173)	(1.175)	(1.488)	(1.521)	(1.415)
WPANIC		-0.064		-0.027	
		(0.012)		(0.013)	
No. Observations	2,075	2,075	2,046	2,046	2,045
Adjusted R-Sq.	0.220	0.231	0.080	0.082	0.124
Mean of Dependent Variable	-0.145	-0.145	-0.220	-0.220	-0.208
St Dev of Dependent Variable	0.165	0.165	0.192	0.192	0.187

Sources and Definitions: See Table 1 and Data Appendix to Calomiris and Mason 2000. Building permits and business failures are defined for the year 1930 as a whole, and (as with the quarterly and monthly series used in Table 6) are normalized by state income in 1929.

Table 8 (cont'd)

OLS Regressions, Dependent Variables: County-Level Deposit Growth (dDep)
Deposit Growth Includes All Banks, Growth is Measured as Log Difference of End of Year Deposits
(Standard Errors in Parentheses)

	1929-31	1930-32	1929-32
Constant	-0.685	-0.488	-0.863
	(0.309)	(0.317)	(0.313)
LTA	0.036	0.029	0.052
	(0.008)	(0.008)	(0.008)
STBANK	-0.052	-0.072	-0.059
	(0.024)	(0.024)	(0.024)
LNBRANCH	0.000	-0.005	-0.006
	(0.005)	(0.005)	(0.005)
MKTPWR	-0.069	-0.107	-0.008
	(0.240)	(0.246)	(0.241)
NCA_TA	0.080	-0.050	0.074
	(0.078)	(0.079)	(0.080)
LD_OtherNCA	-0.122	-0.241	-0.303
	(0.099)	(0.101)	(0.101)
LIQLOANS	-0.075	-0.107	-0.161
	(0.031)	(0.032)	(0.032)
LOSSX	-0.095	-0.039	-0.087
	(0.042)	(0.043)	(0.045)
REO_NCA	-1.039	-1.529	-1.054
	(0.245)	(0.257)	(0.273)
(BONDYLD)x(SEC)	0.028	-0.058	-0.046
	(0.039)	(0.040)	(0.039)
NW_TA	0.533	0.477	0.657
	(0.111)	(0.115)	(0.118)
(DD+DTB)_TD	-0.176	0.003	-0.098
	(0.036)	(0.037)	(0.037)
DTB_TD	-0.009	0.257	0.207
	(0.123)	(0.125)	(0.133)
DFB_LA	-0.117	-0.145	-0.165
	(0.051)	(0.052)	(0.053)
BPR_TD	-0.257	-0.218	-0.148
	(0.150)	(0.156)	(0.163)
OTH_BPR	0.000	0.034	0.039
	(0.053)	(0.056)	(0.057)
INTCOST	0.033	0.701	0.499
	(0.503)	(0.552)	(0.541)
PCT_INC_CROP30	-0.038	0.059	-0.077
	(0.090)	(0.091)	(0.089)
PCT_ACRES_PAST30	0.166	0.031	0.112
	(0.030)	(0.030)	(0.031)
VALGR_INC_CROP30	0.045	-0.066	-0.007
	(0.026)	(0.026)	(0.027)
UNEMP30	-0.184	-0.456	-0.414
	(0.181)	(0.186)	(0.186)
SMFARM30	0.080	0.127	0.103
	(0.025)	(0.026)	(0.026)
(DAGLBE)x(PCT_CROPINC30)	0.003	-0.006	-0.005
	(0.004)	(0.005)	(0.004)
PCT_STBANK	-0.049	-0.100	-0.155
	(0.022)	(0.023)	(0.023)
STBUILDPERM	1.944	0.344	1.283
	(0.516)	(0.523)	(0.531)
STBUSFAIL	-4.335	0.355	-3.829
	(1.646)	(1.677)	(1.686)
No. Observations	1,976	1,957	1,811
Adjusted R-Sq.	0.189	0.179	0.264
Mean of Dependent Variable	-0.343	-0.409	-0.509
St Dev of Dependent Variable	0.222	0.225	0.232

Sources and Definitions: See Table 1 and Data Appendix to Calomiris and Mason 2000. Building permits and business failures are defined for the year 1930 as a whole, and (as with the quarterly and monthly series used in Table 6) are normalized by state income in 1929.