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A Reinterpretation of the Banking Crisis of 1930

EUGENE NELSON WHITE

The banking crisis of 1930 is one of the central events of the Great Depression. The causes of this wave of bank failures are examined using individual bank balance sheet data. Both real and monetary factors are found to have forced the closure of banks, many of which were already weakened by regulatory constraints and regional economic difficulties. The bank failures in this crisis do not seem to have been different in character from failures in previous years, suggesting that the rise in the number of failures may have marked only the beginning of a recession rather than a depression.

IN all explanations of the causes of the Great Depression, the banking crisis of 1930 is regarded as a major turning point. Although this first wave of bank failures has received considerable attention, most research has focused on the effects of the crisis.¹ What has not been satisfactorily explained are the factors behind these unprecedented failures. The two books that have defined the debate on the depression, Milton Friedman and Anna J. Schwartz's *A Monetary History of the United States, 1867–1960* and Peter Temin's *Did Monetary Forces Cause the Great Depression?*, offer competing hypotheses about the causes of the banking crisis. Friedman and Schwartz argue that the surge of failures was prompted by a loss of confidence in the banking system, while Temin believes that the failures and depression grew out of a downturn in the real sector.

This paper analyzes the characteristics of the failed banks with previously unused information from the balance sheets of national banks. Econometric analysis shows that both real and monetary factors weakened banks and contributed to the crisis. One important but neglected factor affecting the ability of banks to withstand any real or

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¹ The effects of the 1930 and subsequent banking crises have been most recently studied by Elmus R. Wicker, "A Reconsideration of the Causes of the Banking Panic of 1930," this JOURNAL, 40 (Sept. 1980), pp. 571–83; Ben S. Bernanke, "Nonmonetary Effects of the Financial Crisis in the Propagation of the Great Depression," *American Economic Review*, 73 (June 1983), 257–76; and Karl Brunner, ed., *The Great Depression Revisted* (Boston, 1981).

policy-induced shock was the structure of the banking system which had been shaped by federal and state regulation. The pervasive restrictions on branching created thousands of small unit banks with relatively undiversified portfolios. The worsening agricultural conditions, the decline in the bond markets, and the relatively tight monetary policy of the Federal Reserve put exceptional pressure on these intermediaries.

The econometric evidence also indicates that the characteristics of banks failing during the 1930 crisis were more similar to those that failed in earlier years when there were no liquidity problems than to those that failed in subsequent years. This suggests that the banking crisis did not mark the change from a recession to a depression. These results corroborate other recent studies that examine the effects of the bank failures and find that the crisis was primarily regional in nature and had little impact on the national economy. The wave of bank failures in late 1930 thus appears to be a part of the economic downturn rather than a major turning point in the depression.

THE CAUSES OF THE BANK FAILURES

The debate over the origins of the banking crisis focuses on different interpretations of three events: (1) a decline in the quality of bank assets, (2) a loss of public confidence in the banking system, and (3) a fall in agricultural incomes. Friedman and Schwartz consider the possibility that a deterioration in the quality of loans and investments in the late 1920s prompted the bank failures. They suggest that, if the prosperity of the late 1920s led bankers to make overly optimistic evaluations of new creditors, there could have been a decline in the quality of credit.² They found, however, that there was no convincing evidence for a deterioration in the quality of domestic investments and loans.³ Friedman and Schwartz also feel that this was unlikely, as commercial banks did not substantially increase the volume of their loans in the late 1920s. They argue that banks were under steady reserve pressure and would have become more selective about giving loans, thus improving asset quality.

Poor loans had been a problem in the 1920s for many banks in rural areas and had led to many failures. Nevertheless, Friedman and Schwartz feel that these failures did not foreshadow the panic of 1930.

² There are a number of problems in determining whether this occurred because there was a substantial shift in the composition of banks' loan and investment portfolios. Commercial loans declined relative to loans on securities and real estate. This was the result of several important events, including the increase in the federal government's debt, the large-scale flotation of foreign securities, and the shift by firms from financing with bank loans to the issue of stock and bonds. Milton Friedman and Anna J. Schwartz, *A Monetary History of the United States, 1867–1960* (Princeton, 1963), pp. 244–45.

³ Friedman and Schwartz, *A Monetary History*, pp. 246–48.

These closings could be simply explained "by improvements in transportation, an increase in urbanization which benefited the large banks at the expense of the small, and by agricultural difficulties of the twenties."⁴ They contend that the public correctly perceived that these failures were due to local problems rather than a collapse of the banking system. But in 1930, this perception changed and Friedman and Schwartz give the failure of banks in agricultural areas an important role: "In November 1930 . . . a crop of bank failures, particularly in Missouri, Indiana, Illinois, Iowa, Arkansas, and North Carolina, led to widespread attempts to convert demand and time deposits into currency . . . a contagion of fear spread among depositors starting from agricultural areas, which had experienced the heaviest impact of bank failures in the twenties. But such contagion knows no geographical limits."⁵ Confidence in the banking system was weakened further by the failure on December 11, 1930 of the Bank of United States.

Temin's analysis of bank assets is very different. He believes there was a sharp, early decline in the value of banks' investments. As there is no readily available information on which bonds banks held, Temin constructed a proxy for bank investment portfolios consisting of a random sample of bonds traded on the New York Stock Exchange. He found that the price of bonds fell rapidly from December 1928 onwards, indicating a decline even before the stock market crash.⁶

Temin also feels that the failures of late 1930 differed from those of the 1920s, but argues that changes in economic conditions were more important than faltering confidence. He performed annual cross-section regressions for bank failures by state. For the pre-panic year of 1929, he found that only previous suspensions, his proxy for poor loans, were a significant factor; but that in 1930, only declines in farm income explained the higher levels of failures. He concluded that differences in bank failures across states were explained by changes in agricultural conditions, while the deterioration in asset quality increased failures in all states.⁷

The two pictures of the banking crisis of 1930 contrast sharply. In Friedman and Schwartz's view, bank insolvencies were the result of a loss in confidence spreading from agricultural areas and the Bank of

⁴ *Ibid.*, p. 249.

⁵ *Ibid.*, p. 308. Elmus Wicker has revealed that many failures were related to the collapse of Caldwell and Company of Nashville, Tennessee. This firm had recently created a fragile financial empire including many banks across the South. The failure of Caldwell and Company in November of 1930 caused a run on its banks. Wicker, "A Reconsideration," p. 572.

⁶ Peter Temin, *Did Monetary Forces Cause the Great Depression?* (New York, 1976), pp. 106–07. Temin's sample is apparently dominated by very low grade bonds, and this led Mayer to criticize Temin's results. Thomas Mayer, "Money and the Great Depression: A Critique of Professor Temin's Thesis," *Explorations in Economic History*, 15 (1978), 136–37. This criticism may be unjust, as many banks appear, as will be shown, to have held such bonds.

⁷ Temin, *Monetary Forces*, pp. 87–90.

United States. The real culprit was the Federal Reserve, which did not provide adequate high-powered money to stem the contraction of the money stock precipitated by the failures. The causes of the depression were thus monetary. Temin concedes that some reasons for the crisis were internal to the banking system, but he maintains that bank failures were primarily caused by a declining economy. Hence, the crisis and depression had origins in the real sector of the economy.

A MICROECONOMIC ANALYSIS OF THE BANK FAILURES

It is difficult to discriminate between these two stories because the evidence mustered to support both tends to be indirect and depends on aggregate data or on accounts of individual banks. As Mayer in his review of Temin's book pointed out, there is a large gap in our knowledge about the nature and causes of these important bank failures.⁸ To help fill that gap, this paper uses two neglected sources of information, the Comptroller of the Currency's *Annual Reports* and *Individual Statements of Condition of National Banks*, that provide data on the balance sheets of failing banks.⁹ This is the most detailed information available on national banks.

There is no similar information for state-chartered banks and trust companies as the reporting dates and practices of the state bank examiners varied widely, preventing the collection of comparable data for state banks. This is unfortunate because national banks accounted for only 12.4 percent of all suspensions, while state member and non-member banks experienced 2.4 percent and 85.2 percent of all suspensions.¹⁰ The higher proportion of state bank failures is attributable to the fact that state banks were more numerous than national banks, representing 64.5 percent of all commercial banks in 1929. They were also on average smaller and small banks failed more frequently in both the 1920s and 1930s.¹¹ Although one important difference will be discussed later, it seems that the causes of state and national bank failures were generally similar. Both competed strongly with one another in almost all parts of the country; and where state banks experienced high rates of failure, national banks did likewise. In 1930 the failure rates of national

⁸ Mayer, "A Critique," 144.

⁹ The Comptroller reported bank suspensions. A bank suspension occurs when a bank is temporarily or permanently closed by the supervisory authority or board of directors. A failure occurs when receivers are appointed to take control of the bank and dissolve it. Suspended banks that reopened were excluded. These represented only a small number of all suspended banks.

¹⁰ These rates were calculated with data from the *Federal Reserve Bulletin* (Sept. 1937), pp. 907-09. The small number of failing private and mutual savings banks were excluded here. Suspending national banks had 19.5 percent, state member banks of the Federal Reserve, 31.8 percent, and nonmember state banks, 48.7 percent of deposits in all suspended banks.

¹¹ See, Eugene Nelson White, *The Regulation and Reform of the American Banking System, 1900-1929* (Princeton, 1983), pp. 138-40.

banks and state-chartered banks and trust companies by state were highly correlated.¹² Thus, there are no strong a priori reasons for believing that the study of national bank failures will lead to erroneous generalizations.

In this analysis of the causes of the 1930 crisis, the failed banks are compared with a stratified random sample of non-failing banks with similar assets from the same cities or local areas.¹³ To compare these failures with previous ones, data on failures and non-failures during the corresponding months for the three preceding years were also collected. The statistical model employed was a logit regression. This qualitative-response model is appropriate, as the dependent variable is equal to 1 if a bank failed and 0 if it did not. The explanatory variables are financial ratios derived from balance sheet data one year prior to failure. For example, the financial ratios of banks that failed during the 1930 crisis are drawn from their December 31, 1929 balance sheet, giving a picture of the proximate causes of the closings.

This approach is novel to the issues raised here but the use of financial ratios is familiar to the analysis of contemporary bank failures. It has been observed that although financial ratios are useful in determining the characteristics of failing banks, they tend to point to symptoms rather than specific causes.¹⁴ Thus, the interpretations of the financial ratios employed in this analysis must be carefully examined.

The lack of adequate capital is generally regarded as a sign of weakness in a bank. Two alternative measures of capital adequacy are used: total capital (equity capital, surplus and undivided profits) to total assets and surplus and undivided profits to loans and discounts. If there is a significant difference in one of these ratios between failing and non-failing banks, it indicates that closure occurred in part because the banks had either suffered from defaults on their earning assets or invested insufficiently in capital given the risks embodied in their loan portfolio.

The danger of slow payment and default made loans the most risky assets that banks held. Banks with a greater exposure to this risk, measured here as the ratio of loans and discounts to total assets, should

¹² The coefficient of correlation is 0.885. Bank failure rates were measured as the number of failures in the year divided by the number of banks on June 30, 1930. The data were taken from the Comptroller of the Currency's *Annual Report* (Washington, D.C., 1931), pp. 707–20.

¹³ There were 192 observations for 1930, half being failures. In 1929, 1928 and 1927, 18, 21, and 17 banks failed out of a total of 70, 87 and 60 observations. This sampling of non-failing banks was used rather than an unstratified nationwide random sample. The size and portfolio composition of a rural bank in Iowa or Kansas was usually quite different from that of a New York or a Chicago bank. The Comptroller's data give broad categories of assets and liabilities. Without more detailed balance sheet information, comparison of a failing rural bank with a surviving city bank could be very misleading. The approach used here is similar to that employed by Joseph F. Sinkey Jr., *Problem and Failed Institutions in the Commercial Banking Industry* (Greenwich, Connecticut, 1979), p. 93.

¹⁴ *Ibid.*, p. 93.

have had a greater probability of failure. U.S. government securities provided both liquidity and income to a bank. If banks were faced with large unexpected withdrawals, then those with large holdings of these securities relative to total assets would have survived. Other securities also yielded earnings but they may not have provided as much liquidity. The variable, other bonds to total assets, should indicate whether these assets strengthened or weakened banks.

The Comptroller's reporting category of cash, exchange, and reserves with the Federal Reserve banks includes funds to meet immediate withdrawals, items in the process of collection, and required reserves. The ratio of these cash items to total deposits is a measure of the resources available to meet withdrawals. Deposits were the least expensive non-equity source of funds available to a bank. The ratio of total deposits to total assets gives the proportion of deposits supporting a bank's assets. The larger the deposit base, the lower the cost of funds and the stronger the bank should have been. Bills payable, acceptances, and rediscounts are more costly sources of funds available from other banks and the Federal Reserve banks. These were sought with some reluctance, as they were often regarded as a sign of weakness. The ratio of these items to total assets indicates a bank's dependence on these sources of funds.

The maximum likelihood estimates for two alternative specifications are reported in Table 1 for all four years. Because the independent variables were constrained to values between zero and one, there was a sufficient degree of multicollinearity in some samples to prevent the iterative nonlinear procedure used to solve for the estimated logit coefficients from converging.¹⁵ To resolve this problem, the principal component method was applied to the data, and those components where the eigenvalues exceeded 1 were retained and used in a logit regression. The maximum likelihood estimates of the principal component parameters were then transformed back into estimates for all the coefficients and standard errors.¹⁶

For all four years, the equations significantly explained the variation in bank failures at the 5 percent level as indicated by the likelihood ratio tests.¹⁷ A positive and significant sign on a coefficient indicated that the higher the value of the variable for a bank, the greater the probability of

¹⁵ The SAS logit program was used. The maximum likelihood estimates were computed by the Newton-Raphson method.

¹⁶ The estimated coefficients, \hat{B} , were calculated from $P\hat{\theta} = \hat{B}$, where $\hat{\theta}$ are the logit MLEs for the principal components and P is the matrix of eigenvectors. The estimated standard errors were obtained from the variance-covariance matrix $V(\hat{B}) = PV(\hat{\theta})P'$, where $V(\hat{\theta})$ is the corresponding matrix for the principal component estimates.

¹⁷ This test is equal to $-2\{L(\hat{B}) - L(B_0)\}$, where $L(\hat{B})$ is the log of the likelihood function where all the explanatory variables are included and $L(B_0)$ is the log of the likelihood function with only the intercept. This is asymptotically distributed as chi-square. George G. Judge, et al., *The Theory and Practice of Econometrics* (New York, 1978), pp. 600-01.

TABLE I
DETERMINANTS OF BANK FAILURES: LOGIT ESTIMATES

Independent Variables	1930		1929		1928		1927	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Intercept	1.394 (0.922 [†])	0.883 (0.858)	1.428 (2.389)	1.185 (2.211)	-0.314 (1.341)	-0.615 (1.155)	2.764 (1.544*)	2.057 (1.403 [†])
Surplus and Undivided Profits to Loans and Discounts	-2.556 (0.237*)	—	-2.116 (3.954)	—	-0.400 (0.927)	—	0.220 (1.904)	—
Total Capital to Assets	—	0.775 (1.258)	—	0.460 (3.574)	—	-2.601 (2.680)	—	1.847 (1.957)
U.S. Government Bonds to Assets	-1.202 (0.942)	-2.830 (2.041 [†])	-6.859 (4.863 [†])	-7.672 (5.002 [†])	-0.843 (1.611)	2.259 (3.315)	1.159 (1.606)	1.101 (1.625)
Other Bonds to Assets	-0.883 (1.026)	-0.493 (1.039)	4.476 (3.051 [†])	4.543 (3.062 [†])	0.191 (1.363)	0.171 (1.615)	3.395 (2.809)	4.218 (2.606 [†])
Loans and Discounts to Assets	3.444 (0.799*)	3.741 (0.921*)	9.397 (2.640*)	9.619 (2.652*)	2.550 (1.194*)	2.159 (1.238*)	2.863 (1.479*)	2.556 (1.531*)
Cash Items to Total Deposits	-4.138 (1.185*)	-3.470 (1.478*)	-17.337 (6.334*)	-16.985 (5.862*)	-2.889 (1.625*)	-4.564 (2.034*)	-7.060 (2.745*)	-7.384 (2.850*)
Total Deposits to Assets	-2.961 (1.134*)	-2.923 (1.138*)	-7.848 (3.618*)	-8.122 (3.172*)	-2.258 (1.749*)	-1.099 (1.628)	-6.792 (2.329*)	-6.002 (2.145*)
Bills Payable and Other Liabilities to Assets	4.658 (1.279*)	4.870 (1.353*)	15.715 (4.409*)	15.848 (4.692*)	2.984 (1.408*)	3.850 (1.672*)	6.204 (1.744*)	5.552 (1.649*)
Likelihood Ratio Test Statistic	34.57*	31.24*	37.92*	42.47*	8.63*	9.37*	19.98*	18.82*

Note: The numbers in parentheses are estimated standard errors.

* Significant at the 5 percent level.

† Significant at the 10 percent level.

Source: See text.

failure, while a negative sign indicated that the greater the value, the smaller the probability.

For the failures occurring during the banking crisis of 1930, the logit estimates provide a good picture of their causes. Only the variables measuring capital adequacy produced a somewhat ambiguous result. The ratio of surplus and undivided profits to loans and discounts focuses on the capital covering the loan portfolio. By this measure, more capital lowered the probability of a bank's failure. When adequacy is measured, however, by the total capital account to total assets, the cover for all assets, it is not possible to reject the hypothesis that the coefficient was different from zero. The difference in these results probably indicates that losses on a bank's loan portfolio rather than its other assets reduced capital and increased the probability of failure.

One of the principal problems of banks failing during the crisis appears to have been swollen loan portfolios. A greater percentage of loans and discounts in total assets significantly increased the probability of a bank's failure. Banks that had booked a relatively large volume of loans were clearly in trouble at least one year before failure. This is not surprising, as many of the failures were in agricultural areas where overly optimistic financial commitments made during the post-World War I boom in real estate had forced difficult adjustments in the 1920s on farmers and their bankers.¹⁸ Foreclosure rates and bank failures rose and remained well above the pre-war levels in spite of reasonable farm prices. Agriculture's plight is revealed by the farm real estate values that fell every year after a peak in 1921, with the cotton and corn belts being the most severely depressed areas.¹⁹

The persistent problems of agriculture left rural banks with many poorly performing loans. Banks did make adjustments to the postwar conditions; but, as one contemporary observed in 1929, they were not ". . . strong or ready to enter another depression. They were still licking old wounds. Many were loaded with submarginal paper dating in some instances from the 'teens. They were dependent for future solvency on conditions which improve only gradually."²⁰ Conditions did not improve; instead, they worsened. The passage of the Smoot-Hawley tariff in June 1930 led to a sharp decrease in the demand for agricultural exports.²¹ Agricultural prices fell sharply, farmers' and

¹⁸ H. Thomas Johnson, "Postwar Optimism and the Rural Financial Crisis of the 1920s," *Explorations in Economic History*, 11 (Winter 1973/74), 173-74.

¹⁹ E. H. Wiecking, *The Farm Real Estate Situation, 1929-1930*, Department of Agriculture, Circular No. 150 (Washington D.C., Nov. 1930), pp. 1-13.

²⁰ Charles Sterling Popple, *Development of Two Bank Groups in the Central Northwest* (Cambridge, Massachusetts, 1944), p. 105.

²¹ Allan H. Meltzer, "Monetary and Other Explanations of the Start of the Great Depression," *Journal of Monetary Economics*, 2 (1976), 455-71.

local merchants' ability to repay their loans was seriously impaired, and the number of rural bank failures rose in the South and the Midwest.²²

Friedman and Schwartz's dismissal of a deterioration in the quality of bank loans cannot be sustained. On the other hand, Temin separates two linked phenomena when he argues that it was a decline in farm incomes rather than poor loans that caused some states to have higher failure rates than others. Falling incomes led to increases in slow repayments and defaults on loans, thereby increasing the number of suspensions.²³

National banks' bond holdings do not appear to have been a source of trouble. All the signs on the coefficients for U.S. government and other bonds for 1930 are negative, indicating a lower probability of failure; but except in the case of U.S. government securities in Model 2, the coefficients are not strongly significant. These results do not support Temin's hypothesis that the falling prices of bonds were an important factor in bringing about bank failures.

Although national banks' solvency does not appear to have been strongly affected by their bond holdings, the level of their primary reserves was important. The coefficient on the ratio of cash, exchange, and reserves to total deposits was negative and significant, implying that the lack of sufficient cash to meet the deposit withdrawals increased the probability of failure. Cash in the vault or reserves at a Federal Reserve bank were clearly superior to investments in marginal loans or bonds.

Friedman and Schwartz charge that the Federal Reserve failed to maintain a healthy growth of the money supply causing financial markets to tighten. The stock of high-powered money was kept virtually level from late 1927 to 1929, preventing an expansion of bank deposits. Recently, Paul Trescott examined the policies pursued by the Federal Reserve System and found that beginning in December 1929, it abandoned its practice (of the five previous years) of offsetting changes in member bank borrowing, the gold stock, and currency in circulation.²⁴ He found that if this policy had been maintained, there would not have been as severe a decline in the money stock. The effects of this altered policy were quickly felt in agricultural areas. Surveying the worsening

²² The price index of farm goods which had fluctuated little in the late 1920s fell from 58 in 1929 to 49 in 1930 (1967 = 100). Farm incomes fell from \$6,152 million to \$4,259 million. U.S. Bureau of Census, *Historical Statistics of the United States, Colonial Times to 1970* (Washington, D.C., 1975), Vol. 1, p. 483, Series K259, and p. 489, Series K344.

²³ Although information does not exist for individual banks, the increase in defaults and slow payments can be seen in the data for all national banks. For the six-month period ending December 31, 1929, losses on loans and discounts totalled \$54 million. Between July 1 and December 30, 1930, this rose to \$85 million, while gross earnings on loans and discounts fell from \$475 million to \$401 million. Comptroller of the Currency, *Annual Report* (1930), pp. 695–96, 946–47.

²⁴ Paul B. Trescott, "Federal Reserve Policy in the Great Contraction: A Counterfactual Assessment," *Explorations in Economic History*, 19 (July 1982), 211–20.

agricultural conditions in late 1930, economists at the Department of Agriculture noted that farm credit was becoming tighter. Interest rates on mortgages rose, service charges increased, and loan limits were reduced.²⁵

Tighter money markets also meant that banks' sources of funds were becoming more costly, and banks with cheaper sources of funds were stronger. The larger a bank's deposit base, as indicated by the negative coefficient on the deposit to asset ratio, the less likely it was for the bank to fail. If deposits shrank too far, banks were forced to seek more costly sources of funds by obtaining bills payable, acceptances or rediscounts. Acquisition of these liabilities was usually regarded as a sign of distress, and this is reflected by the positive coefficient on the ratio of these liabilities to total assets.

The analysis of the characteristics of failing banks provides considerable support for Temin's hypothesis that poorly performing assets were an important contributing factor. Agricultural distress in the Midwest and the South increased the number of slow payments and defaults for banks in those regions, while a fall in bond prices created problems for many state banks and trust companies. At the same time, the restrictive monetary policy mentioned by Friedman and Schwartz also seems to have affected banks by increasing their costs and putting more pressure on their customers. It is not surprising that banks were susceptible in 1930 to both real contraction and monetary tightness, for many rural banks were already relatively weak.

THE ROLE OF FALLING BOND PRICES

The econometric estimates indicate that national banks' holdings of non-U.S. government bonds did not increase the likelihood that they would fail; however, this should not be treated as conclusive evidence that holdings of these "other bonds" were unimportant. More than most categories reported by the Comptroller of the Currency, other bonds represented an extremely heterogeneous collection of assets. The variable, other bonds to total assets, is probably not a good measure of the effects that poorly performing bonds had on banks. Furthermore, looking solely at the effects holding other bonds had on national banks ignores any different effects they may have had on state-chartered banks; and as seen in Table 2, the composition of state banks' bond portfolios differed substantially from national banks' portfolios.

Unfortunately, there is virtually no information on which bonds were held by either national or state banks. Only the reports of Vermont's bank commissioner provide sufficient information to analyze the problem. These reports list the names and book and market values of bonds

²⁵ Wiecking, *Farm Real Estate*, pp. 62-64.

TABLE 2
BOND HOLDINGS OF BANKS

Category of Bonds	Vermont State Banks and Trust Companies: Percentage Change from Book Value of Bonds Continuously Held from June 30, 1928 to June 30, 1930		Share of Total Bonds Held by Vermont State Banks and Trust Companies June 30, 1929	Share of Total Bonds Held by All State Banks and Trust Companies June 30, 1929	Share of Total Bonds Held by All National Banks, June 30, 1929
	1928	1929			
U.S. Government Securities	+2.1	-8.7	+2.4	11.4	14.7
State and Local Government Bonds	-0.7	-4.6	-2.7	8.5	7.4
Railroad Bonds	+3.7	-2.8	+2.0	1.6	9.7
Telephone Bonds	-1.9	-0.1	+1.6	3.3	
Public Utility Bonds	-0.9	-6.5	-9.8	54.6	67.1
Real Estate Mortgage and Construction Bonds	-1.9	-4.1	-12.6	5.7	
Foreign Bonds	-2.2	-0.2	+1.7	14.7	1.1
Total	-0.3	-5.1	-7.0	100.0	100.0

Source: The figures for Vermont's state banks and trust companies were calculated from data in the *Annual Report of the Bank Commissioner of the State of Vermont* (Montpelier, 1928-1930). The information on national banks, state banks and trust companies was obtained from the Comptroller of the Currency, *Annual Report* (Washington, D.C., 1929), pp. 43, 669, 676.

held by each state-chartered bank and trust company. Even with these data, inference about what happened to the value of bond portfolios is hampered by banks' purchases and sales of bonds between reporting dates. To circumvent this problem, information was collected on three reporting dates for those bonds that Vermont banks held continuously from June 30, 1928 to June 30, 1930. This procedure obviously omits those bonds that were sold for a gain or loss within the period.²⁶ It seems, however, that potential losses may be understated, as the most important type of bonds omitted were those of Latin American governments.²⁷

Table 2 shows the percentage deviations from book values of the bonds and the portion of each category represented in the total holdings of Vermont banks and trust companies and all national banks. In these three reporting years, bonds made up a substantial portion, about 30 percent, of Vermont's total bank assets. Nationwide, national banks held 20 percent of their assets in bonds and state banks and trust companies 21 percent. There were important differences in the composition of these bond portfolios. For national banks, U.S. government securities constituted 42.7 percent of their bond holdings, whereas for Vermont banks, they represented only 11.4 percent of investments, and for all state banks and trust companies, 14.7 percent.²⁸ National banks were, thus, on the whole, less susceptible to declines in the value of non-U.S. government bonds. Depending on their bond holdings, state-chartered banks could have been hit hard. Many country bankers expanded their holdings of bonds in the late twenties in an effort to improve their earnings. Poorly performing loans may have made some bankers eager purchasers of high yield bonds and led them to ignore the higher risks implied by the higher returns. One analyst noted, "Unfortunately many country bankers expert in local finance were hopelessly incompetent in selecting bonds. With few exceptions, the quality of bonds they purchased was low."²⁹

The decline in the value of bond portfolios of Vermont banks was not an isolated event. A study of the Michigan banks that failed between 1930 and 1933 found that on December 31, 1928, over one-half of their bond portfolios consisted of utilities, real estate, or construction bonds that experienced the severest declines in value.³⁰ This decline in bond

²⁶ It may be a fairly accurate measure if banks tended to sell only those bonds that would pay close to their book value, minimizing any losses and held depreciated bonds in the hope that they would receive their book value in the future.

²⁷ Friedman and Schwartz, *A Monetary History*, p. 246. Latin American bonds were all purchased after 1928 and apparently suffered a large decline in value.

²⁸ There is no simple explanation for why this difference existed; however, national banks had been accustomed to holding U.S. bonds as backing for national banknotes and may have preferred to hold them to use for discounting at the Federal Reserve banks.

²⁹ Popple, *Development of Two Bank Groups*, pp. 102-03.

³⁰ Robert G. Rodkey, *State Bank Failures in Michigan*, Michigan Business Studies, Vol 7, No. 2 (Ann Arbor, 1935), p. 132.

prices undoubtedly reflects the slump in the construction industry beginning in 1928. Banks may even have become locked into holding low quality bonds. As prices fell, they tended to sell the high quality bonds that were close to book value. This minimized the need to write down capital and would have given them substantial capital gains on the remaining bonds if the economy had rebounded. Although there is no econometric support for Temin's contention that falling bond prices hurt national banks, the limited evidence for state banks does support his hypothesis.

THE ROLE OF REGULATION

It is also possible to view some of the banks' problems as a consequence of the regulatory constraints placed on them. Although this factor is generally overlooked in most explanations of the origins of the banking crisis, regulation reduced the efficiency of the banking industry and increased its susceptibility to any real or policy-generated shocks. The most important of these regulations were the severe state and federal restrictions placed on branch banking. These regulations had created an industry largely composed of single-office banks. The smallest and perhaps weakest banks were in rural regions where low population density and very strict anti-branching laws prevented the growth of large, diversified intermediaries. Although these unit banks had become linked in the late nineteenth and early twentieth century to national money and capital markets, many remained relatively undiversified. They were heavily dependent on their local loan business, prospering or failing with the farmers that they financed.

A system of nationwide branching probably could have reduced or eliminated bank failures by establishing intermediaries with loan portfolios that were sufficiently diversified to manage regional risks. Testing this hypothesis for 1930 when there was very limited branching is difficult; an instructive comparison, however, can be made with Canada.³¹ The Canadian economy was closely tied to the American economy and shared many of its characteristics. One significant difference was that Canada had permitted a system of branching banks to develop.³²

While anti-branch-banking laws gave the United States 30,291 commercial banks in 1920, there were only 18 chartered banks in Canada. These Canadian banks operated 4,676 branch offices, whereas the

³¹ Carl Gambs found that branching did not significantly reduce failures across states, but his test was a weak one owing to the fact that branching, even on a limited basis, was established in few states. Where it did exist there were other factors that also reduced failures. Carl M. Gambs, "Bank Failures—An Historical Perspective," Federal Reserve Bank of Kansas City, *Monthly Review* (June 1977), 16–19.

³² Friedman and Schwartz, *A Monetary History*, p. 354. Friedman and Schwartz discuss the factors affecting the depression in Canada, but they do not draw the comparison between the two banking systems.

American banks had only 1,281 additional offices.³³ These dissimilar configurations of the banking industry led to different responses to the problems of the 1920s. The agricultural regions of Canada felt the same postwar shock as those south of the border, making retrenchment in banking necessary in both countries.³⁴ In the United States, this took place through a wave of failures and mergers. Between 1920 and 1929, there were 6,008 suspensions and voluntary liquidations and 3,963 absorptions and mergers.³⁵ In Canada, only one bank failed, and the contraction of the banking industry was carried out by the remaining banks reducing the number of their offices by 13.2 percent.³⁶ This is very near the 9.8 percent decline in bank offices that occurred in the United States.³⁷

As the Canadian banks managed the problems of the 1920s adequately, they also weathered the Great Depression without disaster. In Canada, the downturn began with falling prices for its leading exports—wheat, wood pulp, and newsprint. The most severely affected provinces were located in the Midwest and West.³⁸ In spite of the many similarities with the United States, there were no bank failures in Canada during the dark years of 1929–1933. The number of bank offices fell by another 10.4 percent, reflecting the shocked state of the economy; yet this was far fewer than the 34.5 percent of all bank offices permanently closed in the United States. Nationwide branching in Canada permitted the quick mobilization of funds to meet any localized run while allowing banks to hold negligible excess reserves.³⁹ Canada suffered from other problems but there was no collapse of the banking system. Canadian banks incurred heavy losses; but, as they were larger and had diversified to handle regional loan risks, they were in a better position to survive the crisis.

³³ M. C. Urquhart and K. A. H. Buckley, *Historical Statistics of Canada* (Cambridge, 1965), p. 246, Series H289–H294, and U.S. Bureau of Census, *Historical Statistics*, p. 1037, Series X733. This does not imply that Canadians had access to fewer banking services. One, albeit imperfect measure of services, the number of persons per banking office, was approximately 1800 for Canada and 3500 for the United States in 1920. Benjamin H. Beckhart, "The Banking System of Canada," in B. H. Beckhart and H. Parker Willis, *Foreign Banking Systems* (New York, 1929), p. 364.

³⁴ A. B. Jamieson, *Chartered Banking in Canada* (Toronto, 1953), p. 54.

³⁵ Board of Governors of the Federal Reserve System, *Banking and Monetary Statistics, 1914–1941*, (Washington, D.C., 1943), pp. 52–53.

³⁶ Calculated from Urquhart and Buckley, *Historical Statistics*, p. 246. In addition, seven weak banks were absorbed by stronger firms. This was an orderly process that had evolved in Canada whereby the relatively small number of banks recognized the importance of maintaining public confidence in the banking system and often took over troubled institutions rather than panic the public. The functioning of this informal system of mutual insurance is described in White, *Regulation and Reform*, Ch. 4.

³⁷ Calculated from U.S. Bureau of Census, *Historical Statistics*, Vol I, p. 1035, Series X717.

³⁸ Edward Marcus, *Canada and the International Business Cycle, 1927–1933* (New York, 1954), pp. 11–17, and A. E. Safarian, *The Canadian Economy in the Great Depression* (Toronto, 1959), pp. 44–54.

³⁹ George R. Morrison, *Liquidity Preferences of Commercial Banks* (Chicago, 1966), pp. 74–75.

WAS THE CRISIS A TURNING POINT?

Although most studies are not in agreement about the causes of the bank failures, the crisis of 1930 is generally treated as a turning point in the depression. According to Friedman and Schwartz, the movement from a recession into a depression began when the public lost confidence in the banking system, causing the currency-deposit ratio to rise and the money stock to decline. The bank failures that started this economic deceleration occurred because of a sudden illiquidity, not because of problems of insolvency that had forced earlier closures. If this interpretation is correct, it implies that the characteristics of banks that failed before and during the crisis should be different. The regression results do not favor this view and show no sharp break with the experience of previous years. The strong similarity in the sign and significance of the coefficients from year to year suggests that the causes of bank failures did not change substantially as the nation entered the depression.

This conjecture may be tested in the form of a hypothesis that the coefficients on each variable were equal in all years against the alternative that they were significantly different. For Model 1, the likelihood ratio test statistic was 30.06 and for Model 2 it was 33.60.⁴⁰ At the 5 percent level, the value of chi-square with 21 degrees of freedom is 32.7. For Model 1 it is not possible to reject the null hypotheses that all the coefficients are equal, whereas it is possible for Model 2. Given this ambiguous result, likelihood ratio tests were performed for all pairs of years, and these results are reported in Table 3. At the 5 percent level of significance, chi-square with 7 degrees of freedom has a value of 14.1. Only two of the twelve possible pairwise comparisons suggest that the coefficients differed from year to year, and in these cases, the differences occur for earlier years, not with 1930. Although these tests are not conclusive, they do support the view that the characteristics of bank failures did not change dramatically between 1927 and 1930.

An alternative method of testing the hypothesis that bank failures in late 1930 were significantly different from previous years is to examine the predictive accuracy of the models estimated for 1927, 1928, and 1929. One test of forecast performance for binary choice models gives a 95 percent confidence interval for the proportion of correctly classified

⁴⁰ The likelihood ratio test used here is

$$-2 \left\{ L(\bar{B}) - \sum_{i=1}^4 L(B_i) \right\},$$

where $L(\bar{B})$ is the log of the likelihood function when the data for all years are combined and $\sum L(B_i)$ is the sum of the log of the likelihood functions for each year estimated individually. The degrees of freedom for this asymptotic chi-square test are equal to the number of constraints. See, Takeshi Amemiya, "Quantitative Response Models: A Survey," *Journal of Economic Literature*, 19 (Dec. 1981), pp. 1498, 1505.

TABLE 3
 LIKELIHOOD RATIO TESTS FOR EQUALITY OF ALL COEFFICIENTS ACROSS
 YEARS

Year	Model	Year		
		1927	1928	1929
1928	Model 1	9.78	—	—
	Model 2	21.22*	—	—
1929	Model 1	10.03	12.62	—
	Model 2	6.86	23.48*	—
1930	Model 1	11.67	13.10	11.64
	Model 2	13.68	10.75	13.88

* Significant at the 5 percent level.

Source: See text.

failing and non-failing banks.⁴¹ For the 1927 model, this confidence interval is 0.7746 ± 0.0972 ; for the 1928 model, it is 0.7011 ± 0.0962 ; and for the 1929 model, it is 0.6857 ± 0.1088 . When these models were applied to the data for 1930, the proportions of correctly classified banks were 0.6563, 0.6823, and 0.6615. Although the forecast for 1927 narrowly failed the test, the forecasts for the last two years easily passed it.

These models were also applied to sample data for failing and non-failing banks in 1931 and 1932.⁴² The proportions of correctly classified banks for 1931 were 0.4905, 0.4952, and 0.5000, and for 1932 were 0.4691, 0.4845, and 0.4691. All of these proportions fell well outside the confidence intervals. These failures in later years are not better identified by the model estimated for 1930. This model's confidence interval was 0.5729 ± 0.069 , and its correctly classified proportions for 1931 and 1932 were 0.4892 and 0.4897. The nature of these models' poor performance was that, although they almost invariably correctly identified failing banks, they could not distinguish surviving banks. By the

⁴¹ Richard B. Westin, "Prediction from Binary Choice Models," *Journal of Econometrics*, 2 (1974), 12–14. This test requires the selection of some arbitrary probability, z , so that a bank is classified as failing or non-failing depending on whether its predicted probability, p , is greater or less than this value. The proportion of correctly identified banks in $P(C)$ where $P(C) = \int_0^z (1-p)f(p) dp + \int_z^1 pf(p)dp$ and the 95 percent confidence interval is $P(C) \pm 1.96\sqrt{P(C)[1-P(C)]/n}$ where n is the number of observations. In selecting z , it seems appropriate here to use the approach of the Federal Deposit Insurance Corporation, which is willing to misclassify sound banks to ensure that most problem banks are correctly identified. This implies picking some arbitrarily low z . This differs from the usual choice of 0.5 which implies no prior information or preferences. The value 0.25 was chosen and performed well under the FDIC criterion for identifying banks.

⁴² There were 210 observations for 1931 and 194 observations for 1932, half of each being failures.

standards of 1927–1930, all banks' balance sheets had substantially deteriorated in these samples. The proximate causes of the bank failures in 1930 were thus much more like those of earlier years than those of later years.

Although some of these statistical results may not appear to be very strong, they are quite robust given the very limited information embodied in the balance sheet data. Additional information on the income and losses of individual banks would certainly have strengthened the results. What is striking is that bank failures in late 1930 can be predicted a year in advance with some accuracy, while those that occurred later cannot. The 1930 banking crisis, despite its higher rate of bank failures, did not mark a departure from previous experience.

This evidence weakens Friedman and Schwartz's case for a radical change in the character of the bank failures. In their account, one of the most important events shaking public confidence in the banking system was the failure of the Bank of United States. This largest failure was not included in the logit analysis because it was a state member of the Federal Reserve, not a national bank. Most of the 20 state member banks that failed during the 1930 crisis lack data comparable to the national bank data; such data, however, do exist for the Bank of United States and one New Jersey bank. When these were added to the sample, the results were not altered in sign or significance in spite of the fact that the Bank of United States failure was larger by an order of magnitude than other failures.

One means of judging whether the Bank of United States failure was different in nature from previous or contemporary national bank failures is to examine its predicted probability of failure given its 1929 balance sheet. Although all models do not identify it as a failing bank, the Bank of United States is correctly classified by the 1928 and 1930 models. The difficulty in identifying this bank is not surprising because the ratio of loans to assets does not fully capture the quality of a bank's loan portfolio. This is particularly important for the Bank of United States which had greatly expanded its operations in the late 1920s, including heavy investments in real estate.⁴³ The failure of the Bank of United States does not appear to have been unique or unexpected.

There is other evidence suggesting that the banking crisis of 1930 was not a turning point. Not only are bank failures in 1930 similar to those in previous years, but their effects on the rest of the economy appear to

⁴³ Temin, *Monetary Forces*, pp. 91–92. Other urban banks were also brought to grief by heavy investments in real estate. In Chicago, many banks outside the Loop were hurt not only by the financing of many questionable local real estate projects but also by the sale of mortgages and mortgage bonds to the public with repurchase provisions. When the value of these assets declined, banks were obliged to buy them back. This source of weakness would not have been evident from an examination of their balance sheets. Cyril F. James, *The Growth of Chicago Banks* (New York, 1938), p. 993.

have been much more limited than previously thought. Boughton and Wicker have studied the link between bank failures and the rise in the currency-deposit ratio. In their analysis of the determinants of this ratio, they found that for the period of November 1930 to March 1933, 32.6 percent of the change in the ratio can be explained by interest rate changes, 12.8 percent by falling expenditures, and 28.3 percent by bank failures.⁴⁴ Even though this finding is for the whole of the depression rather than just 1930, it does reduce bank failures from being *the* causal factor to being one of several. Furthermore, it appears that bank failures had limited influence on the other factors. In a recent article, Wicker looked at evidence on the impact of the bank failures during the crisis on interest rates and expenditures for goods and services. He found that neither local nor national interest rates were affected and that the decline in expenditure, witnessed by the drop in bank debits, was restricted to those areas that had the highest failure rates. Even the impact of the closing of the Bank of United States was negligible. Wicker concluded that the damage done to the economy by the banking crisis was local in character.⁴⁵ These findings help to complete the picture drawn in this paper. Bank failures in 1930 were not likely to have a national impact because their characteristics did not differ from those in previous years—years for which Friedman and Schwartz argue that bank failures had local origins and localized effects.

Even though the crisis was not a major macroeconomic event, it was a signal that certain parts of the economy were deeply in trouble. The Federal Reserve should have acted to halt the economic decline rather than abet it. Why it chose not to act has already been studied elsewhere in considerable detail.⁴⁶ For the purposes of this paper, however, it is still worthwhile to examine the Federal Reserve's attitude towards the bank failures.

During the 1920s, the consensus at the Federal Reserve was that bad management and problems carried over from the First World War were the primary cause of bank failures.⁴⁷ This opinion does not appear to have changed much when the number of bank closings began to increase in 1930. The Federal Reserve did not feel responsible for these failures, as most of them were nonmember banks.⁴⁸ Furthermore, the failing banks were (with very few exceptions) among the smallest banks in the country. Even if they were member banks, their influence in the Federal

⁴⁴ James M. Boughton and Elmus R. Wicker, "The Behavior of the Currency Deposit Ratio During the Great Depression," *Journal of Money, Credit, and Banking*, 11 (Nov. 1979), p. 415.

⁴⁵ Elmus R. Wicker, "Interest Rate and Expenditure Effects of the Banking Panic of 1930," *Explorations in Economic History*, 19 (Oct. 1982), 435–45.

⁴⁶ See Friedman and Schwartz, *A Monetary History*, Ch. 7, and Elmus R. Wicker, *Federal Reserve Monetary Policy, 1917–1933* (New York, 1966), Chs. 10 and 11.

⁴⁷ Friedman and Schwartz, *A Monetary History*, p. 270.

⁴⁸ *Ibid.*, p. 358.

Reserve System was minimal. The leading bankers who were influential had clashed with the country bankers over many issues, notably branching and holding companies; and they showed little concern for the failing banks. The officials at the Federal Reserve also had been frustrated by the opposition of the small unit banks that had successfully blocked their attempts to secure universal par clearance and increased branching.⁴⁹ It is not surprising then that the Federal Reserve and the most influential bankers probably regarded the rising number of failures as a just winnowing of the weakest firms in the industry. The structure of the banking system thus influenced both the susceptibility of banks to economic disruptions and the attitude and behavior of the central bank. A system of nationwide branching might have not only reduced the number of bank failures but also induced the Federal Reserve to follow different policies. Fewer larger banks with offices in all regions would have put much more pressure on the Federal Reserve to alter its policies if severe regional economic problems had threatened them. Instead, the Federal Reserve and the major metropolitan banks complacently watched the rising number of failures in rural areas.

CONCLUSION

The importance of the banking crisis of 1930 in the history of the Great Depression appears to be somewhat inflated. The increased number of bank failures did not represent a radical departure from the 1920s. The characteristics of the banks that failed in 1930 were very similar to those that failed in earlier years. There are strong elements of continuity, and the events of 1930 should be reinterpreted in this light.

After the post-World War I boom, many banks, especially those in rural areas, found themselves carrying assets whose expected future returns had fallen. This is reflected in the higher rate of bank failures in the 1920s compared with the prewar decade. Adjustments for banks, particularly small banks, were slow and painful. At times, many were barely solvent. For them, the worst possible situation was the coincidence of difficult times for their local clients with a relatively tight national monetary policy. This increased defaults and withdrawals of deposits at the same time that the cost of funds rose. The depictions of events by Temin and by Friedman and Schwartz are not really in conflict. The weakening of assets and the lack of easy credit put the squeeze on all banks, and many weak ones were doomed.

Although these structural economic problems troubling the American banking system would have been difficult to eliminate, bank failures were not a necessary consequence. The strict limitations on branching

⁴⁹ White, *Regulation and Reform*, pp. 152–65.

produced an industry of predominantly single-office banks which were particularly susceptible to economic fluctuations in contrast to the branching banks of Canada. The flexibility needed by the economy to resist any real or policy-generated shocks was reduced by the presence of this banking structure. Mistaken policies or dislocations in different sectors of the economy may be blamed for precipitating the banking crisis of 1930, but the inability of the banking system to absorb these shocks may be attributed to the debilitating regulations imposed on banking.