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The Bank Crisis of the 1930s: New Evidence From Bank Examination Records

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1. Introduction

Much has been written about the causes of the Great Depression. Views vary from an autonomous downward shift in aggregate demand to a mistaken Federal Reserve policy that allowed a precipitous decline in the money supply. Yet, in most discussions of the Great Depression there is one general point of agreement: the collapse of the banking system is considered a key factor in turning what might only have been a sharp but short-term drop in real economic activity into a prolonged and major contraction.

What caused the banking collapse? One prominent view, which we label the "misled-public" hypothesis, is that the collapse was not necessarily caused by anything inherently unstable with banking; rather, it was due to the failure of the Federal Reserve to perform its lender-of-last-resort role in a timely and orderly fashion. The public, thus being misled into thinking bank deposits were safe, tried to withdraw their funds from all banks as quickly as possible.

Given the history of the Federal Reserve, this is a plausible explanation; but it is one that to our knowledge has never been tested directly. The absence of a direct test is partly due to data limitations, in particular the lack of good data on deposit rates. Now, however, based on recently uncovered examination records of New York city banks, we are able to consider this hypothesis more closely. The results are not strong enough to be conclusive, but they are definitely negative. The misled-public explanation cannot be supported, at least not by this evidence. Specifically, on average, deposit rates were well above the existing safe rate of return and appeared to vary as a function of the perceived riskiness of a bank's deposits. These results are

clearly inconsistent with the view that the public believed that bank deposits were safe.

The rest of this paper is organized as follows. In the next section the misled-public hypothesis is presented along with the implications of that hypothesis for rates paid on deposits. The third section then looks at the literature related to this issue and finds the results supportive but questionable mainly because of data limitations. In section 4 some recently uncovered data from bank examination records are described and the misled-public hypothesis is formally tested and rejected. The last section contains a summary and conclusions.

2. The "Misled-Public" Hypothesis Has Several Testable Implications

The misled-public explanation of the banking crisis of the 1930s stems from the history of the Federal Reserve and its failure to perform its expected role as lender of last resort during the banking collapse. Being established to prevent banking panics by supervising banks, imposing reserve requirements and becoming the banker's bank during times of need, the public expected the Fed to make bank deposits safe. When the Fed failed to live up to these expectations, the public then panicked and rushed to withdraw deposits which forced many solvent banks out of business. This explanation appears to be consistent with the problems that occurred during the panic as there developed a general lack of confidence in the banking system after numerous banks who were members of the Federal Reserve System failed.

2.1 The Hypothesis

The Federal Reserve System was established in 1913 to prevent the periodic banking panics that had occurred under the national banking system. In virtually every decade following the passage of the National Banking Act of 1863 there was a major banking crisis. Bank depositors periodically lost confidence in their bank's ability to redeem all of its deposit liabilities. When this happened, bank runs ensued--long lines of bank customers trying to withdraw their funds as soon as possible. When banks were run they were either forced to sell their assets at fire-sale prices or, as many did, suspend payment on deposits until the crisis passed.

After the panic of 1907 Congress decided there was a clear need to establish a Central Bank to provide liquidity to solvent banks during times of stress. The job of this Central Bank would be to know which were the good banks and when to come to their rescue. Obtaining this knowledge would, of course, require close and frequent monitoring. At the same time, this monitoring would help to discipline banks and encourage safe portfolios.

According to the misled-public hypothesis, establishing the Fed did not mean that all banks and their depositors would be safe but at least deposits of banks that were members of the Federal Reserve would be, especially during economic downturns when confidence would otherwise be low. Thus, the numerous small nonmember agricultural bank failures that occurred during the relatively prosperous 1920s should not have led to any loss of confidence in member banks. However, proponents of this view argue that a significant blow was struck to this confidence when the Fed allowed the Bank of United States to fail in December of 1930. At the time, the Bank of United States was one of the larger

banks in the country and was located in the financial heart of the country. Milton Friedman and Ann Schwartz (1963) have stressed the importance that the failure of this bank had on the public's confidence in the banking system. In particular, they suggest that the failure of the Bank of United States was the failure that most surprised the market causing the banking panics that soon followed.

> 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. Moreover, 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--measures of a kind the banking community had often taken in similar circumstances in the past--was a serious blow to the System's prestige. [pp. 309-311]

Friedman (1980) expresses the same view again when he compares what happened during banking panics under the national banking system--a suspension of payments on deposits--to the crisis in the 1930s.

> The existence of the Reserve System prevented this drastic therapeutic measure (a restriction of payments): directly by reducing the concern of the stronger banks, who, mistakenly, as it turned out, were confident that borrowing from the System offered them a reliable escape mechanism in case of difficulty; indirectly, by lulling the community as a whole, and the banking system in particular, into the belief that such drastic measures were no longer necessary now that the System was there to take care of such matters. [p. 82]

Friedman and Schwartz are not alone in advocating the misled-public hypothesis to explain the banking panic that developed in the 1930s. John Kareken and Neil Wallace (1978) put forth the same view in their analysis of deposit insurance.

> In the years to 1934 (prior to FDIC insurance) there were several banking panics. But the last of those panics, that of 1930-33, causes us no difficulty. For the Federal Reserve was intended to be the lender of last resort--in effect, the insurer of bank liabilities. ...With the Federal Reserve having been created, bank creditors thought--as it happens, mistakenly--that bank liabilities had been made safe. [p. 414]

This explanation, of course, is designed to fit the observations of the early 1930s. Over this period the worst banking problems in U.S. history occurred. Beginning with the failure of the Bank of United States, in December 1930, to the Banking Holiday declared in March 1933, three distinct banking panics developed. In 1929 over 24,000 banks in the U.S. were in business. By 1934 that number had fallen close to 15,000 banks. Accordingly, given the intent of Congress in establishing the Federal Reserve; given the failure of the Federal Reserve to act as a lender of last resort in a timely fashion; and given this unprecedented collapse of the banking system, the misled-public hypothesis seems quite plausible.

2.2 The Implications

The true test of any hypothesis, though, is to be able to confront data outside the period it was intended to explain. This hypothesis has such testable implications. If the public was misled into believing banks were safe, this misperception should be reflected in rates banks paid on bank deposits well before the crisis began.

Consider comparing a rate on a deposit in a member bank to the Treasury bill rate. If the deposit at this bank is perceived to be as safe as investing in a Treasury bill because both are backed by the government, then

the deposit rate should be no higher than the Treasury bill rate. In fact, since passbook accounts come in much more convenient denominations the rate on such accounts could easily be much lower.

A further implication of the misled-public hypothesis relates to the pattern of passbook rates across banks. Under this hypothesis rates should not vary across banks and if they did, the variability should not be a function of the riskiness of a bank's portfolio. To find otherwise would suggest the public was not convinced the Fed would be willing or able to respond as Congress hoped.

3. Studies Supporting the Misled-Public Hypothesis Are Questionable

Until recently, explicit data on rates commercial banks paid on their deposits in the decade prior to the collapse of the 1930s was not available. Research that required such data had to rely on proxies that were built upon data appearing in income and earnings reports and balance sheet accounts.

Although past research was not directed explicitly at the misled-public hypothesis, it also had implications for correlations between deposit rates and bank risk. Underlying this research was the premise, generally known as the destructive-rate hypothesis, that banks which were competitively forced to pay high rates were also led to take on more risk. This hypothesis has the causality running in the opposite direction as the misled-public hypothesis; that is, it has high rates causing risky portfolios instead of risky portfolios causing high rates. A lack of significant correlation between risk and rates, however, would be evidence against both hypotheses. And this lack of correlation is exactly what was found by the two leading studies. Albert Cox

[1966] using national banking data covering the years 1924 to 1933 finds no relationship between the rates paid on bank deposits and asset quality. In a similar study, George Benston [1964] also finds little correlation between deposit rates and various measures of bank risk. His results were partly based on data available for New York state banks in the 1920s, but mostly on the same national banking data base that Cox used.

Although both studies employ slightly different statistical techniques and examine different years, they are not independent. To a great extent both relied on the same data and used simple correlations to draw their conclusions. Hence, it is not surprising that their results are similar, but suffer from the same limitations. Rates on deposits were not reported rates; they are estimates derived from income and earnings reports and balance sheet accounts. Such estimates have several flaws that could easily obscure any correlation that in fact exists between deposit rates and bank risk.

Cox [1966] set out to determine whether the ceilings Congress imposed in 1933 on rates banks could pay on deposits were justified and found they were not. After a brief discussion of the historical background that led to the Congressional regulation of interest on deposits, his objective was to see if there was any empirical evidence to support the claim that interest rate competition led banks to lower the quality of their assets in order to generate income to pay their depositors. In other words, he attempted to test the hypothesis that before 1933 there was a significant negative correlation between deposit rates and bank safety.

To address this issue, Cox utilized data available on a sample of national banks. Cox began with a random sample of 300 national banks in four states (Michigan, Missouri, Oregon and Vermont) and the District of Columbia from a

total population of roughly 8,000 national banks that existed in 1929. The year 1929 was chosen because it wasn't until this year that detailed financial records of individual banks were available nationally.

Cox then constructed for this sample a dozen different measures of asset quality and proxies for deposit rates. In particular, he calculated the ratio of interest paid on total deposits to total deposits which he used as the proxy for the bank deposit rate. He found that this rate ranged from under .49% up to 5% with 75% of the banks, however, falling in the 1% to 3% range. He also constructed the ratio of total interest on time deposits to total time deposits and found that most of his banks fell in the 2.5% to 4.5% range; only 6% of these banks had rates 4.5% or over.

After calculating this proxy for the deposit rate, Cox tested to see if it was correlated with the quality of a bank's assets. That is, he posed the question, did those banks with high rates of interest on total deposits show signs of correspondingly low asset quality, where Cox used the following four ratios to measure asset quality:

(1) gross losses on earning assets to earning assets;

(2) real estate loans to earning assets;

(3) other securities to earning assets;

(4) interest received to earning assets.

Cox classified banks into four time deposit classes because his dependent variable, total interest to total deposits, was clearly a function of total time deposits to total assets. Given these four classifications and four risk variables he calculated 16 bank correlation coefficients for a subsample of 82 national banks for the year 1929. He found that only two of these coefficients were significant. The coefficients for his group in which 40% to

60% of their total deposits were time deposits had significant coefficients between interest paid and real estate loans and interest paid and gross losses. All other coefficients were insignificant.

Cox's study, while ambitious for the time, has several limitations. For our purposes the most serious is the ability of this proxy to pick up any correlation between actual deposit rates and risk. His proxy represents an average of all deposit rates; in particular he averages the demand deposit rate, the passbook rate and all other time deposit rates. Such averaging could easily obscure any correlation that might exist between bank rates and bank asset quality. Consider, for example, a very risky bank that is only able to market short-term time certificates while a very safe bank is able to offer much longer term certificates. With an upward sloping yield curve, Cox statistics could easily show a negative correlation between deposit rate and safety, even though the actual correlation is positive.

Benston, addressing the same issue and examining an additional body of data, is also unable to find very much correlation between bank rates and asset quality. Like Cox, therefore, he concludes that the laws prohibiting interest payment on bank deposits were not supported by the available evidence. Benston's analysis, however, suffers the same limitation as Cox's. He does not have explicit rate paid but is only able to construct deposit rate proxies from earnings and expense data. In addition, Benston fails to exploit the data that is available.

Benston first examines data on 412 individual New York State banks (95% of all New York State banks outside New York City) covering the period 1923-34. The data (collected by the New York State banking department) included

earning, expense and loss data as well as standard asset and liability accounts. Comparing the percentage of gross earnings paid out as interest (his proxy for the deposit rate) to gross interest and other receipts received per $100 of loans and securities (his proxy for asset quality or risk) for the years 1923, 1926 and 1929 he claims to find little correlation. Thus, he concludes that this evidence is not consistent with the view that before deposit ceilings were imposed, banks that paid high rates on deposits were forced to invest in riskier portfolios.

Why Benston did not point out that he had some evidence to support the destructive-rate hypothesis is somewhat questionable. Those banks paying out the least interest appear to have a significantly lower level of gross earnings in all three years. However, since Benston doesn't calculate any statistical difference tests, it is difficult to draw any defensible conclusions for or against the destructive-rate hypothesis. Further, like Cox, Benston was forced to use interest paid on all deposits for the deposit rate proxy which we argued above can easily obscure any actual correlation. Benston's second analysis, which uses national banking data for the years 1928-32, is more convincing because he was able to separate out rates paid on demand deposits from other deposit rates.

Benston was aware of the problems that using total interest paid on deposits raised. Consequently, he turned to a data base that did not go back as many years as the New York State banking data but contained interest paid on demand deposits separate from interest on other deposits. This was data published by the Comptroller of the Currency in their annual reports. These reports are available for all national banks and beginning in 1927 contain earning and expense reports that have interest paid on demand deposits

separate from other interest payments. Before 1927 only the total interest paid was reported.

With this data Benston estimates the rate paid on demand deposit along with a dozen different measures of asset quality for the years 1928, 1931 and 1932. The interest rate proxy is total interest paid on deposit to total demand deposits. The asset quality variables include four different measures of gross earnings, two different measures of investments as percentages of total assets, and six different measures of losses and loans and securities. Benston computes the totals of these variables for all banks in a reserve city or a nonreserve city depending on a bank's classification. These groupings, rather than banks, become the observations and the question is, do cities that on average offer the higher rates on deposits have lower quality portfolios.

Computing simple correlation coefficients between interest paid on deposits with asset quality variable, Benston finds either no correlation or a correlation opposite to what the destructive-rate hypothesis would predict. For example, in all three years and for all different earnings variables, he found that the higher the earnings, the lower the rate paid on demand deposits (although, not all coefficients were significant).

Benston's analysis, while improving on the deposit rate proxy, still suffers from several limitations. As noted, the deposit rate was not the rate offered on demand deposits but a derived rate based on interest income paid and deposit levels as reported on call reports. Benston thus had to assume that the deposit level over the six months between call report periods did not vary too much. For example, if demand deposits were fairly stable just before the call report and then declined precipitously just prior, the ratio of total

interest paid on demand deposits to total demand deposits would overstate the actual rate of interest paid on deposits. This is an inherent limitation of the data, and one Benston could do little to correct.

Benston, however, chose to analyze the data in some ways that are questionable and could have been avoided. He chose to group banks by reserve city and nonreserve city classification, thus making cities rather than banks the observation and tossing out much of the data. This sort of averaging, moreover, could easily hide the correlation he was trying to estimate. If, for example, the asset quality variation among banks is more variable within a city than between cities, testing for a lack of correlation between cities is not the best way to test the null hypothesis. In fact, a priori, one would expect the destructive-rate competition hypothesis to apply more directly to intra-city competition than to inter-city competition.

Lastly, Benston, like Cox, chose to rely on simple correlation coefficients when multiple regression analysis was more appropriate. Although some of his independent variables are proxies for the same variable, he could have estimated a regression of the demand deposit rate against his best proxies for different aspects of asset quality and then experimented with other proxies to test how sensitive the results were.

In summary, neither Cox nor Benston have presented convincing results about the nature of the correlation between deposit rates and the safety of banks. Both of their studies suffer from data limitations and neither attempted a multiple regression approach. Further, Benston, by grouping his banks by reserve city classification, may have hid the correlation he claims to have shown did not exist.

4. Newly Available Evidence Suggests Support for Misled-Public Hypothesis Is Not Warranted

To test the proposition that the public believed member bank deposits were safe, we have argued that a comparison of deposit rates to government rates would be revealing. Previous research related to this issue did not have access to explicit rates banks paid on their deposits. Researchers had to rely on a proxy that was constructed from earnings and income data. While acknowledging the problems with these proxies, they defended their approach on grounds that they had the best available data.

That claim is no longer true, though, as some recently uncovered bank examination records from the 1920s and 1930s contain more explicit deposit rate information. In particular, these records contain the rates banks paid on their deposits and the dollar amount on which those rates were paid. These records also include both balance sheet and earnings and income reports.

When tested with these data, the misled-public hypothesis does not hold up very well. Deposit rates were significantly higher than rates paid on comparable government securities; and deposit rates varied to some degree with measures of bank risk, results which are inconsistent with the misled-public hypothesis.

Since the establishment of the Federal Reserve System in 1913 the Fed has been responsible for examining all state member banks (national banks, which are required to be members of the Fed, are examined by the Comptroller of the Currency). Fortunately, these examination records still exist and were found

to be in reasonably good condition for New York City, state member banks over the years just prior to the banking collapse that began in the 1930s.

We chose to limit the sample of banks to state chartered banks located in New York City for two reasons. First, to our knowledge the interest rate data was only available on the New York Fed's examination records. The examination reports were not uniform across Federal Reserve Banks in the 1920s and we do not know of another examination report that contained this information.[1/] Second, confining the sample to a single market where all sample banks are assumed to be competing for the same deposits reduces the possibility of deposit rate variation being caused by extraneous economic conditions; that is, the ceteris paribus assumption is more defensible.

The New York examination records prior to 1933 are located in a sub-basement of the New York Fed. They have been stored in locked files since the mid-1930s. Recently, at the request of this author, the records were made available. A copy of part of one of these reports can be found in the Appendix. (At the request of the Federal Reserve Bank of New York, we have kept the bank examination ratings confidential so that the bank name does not appear on this report.)

The Examiner's Report of Condition contains several tables that are relevant for this study. The first pages of each report contain the standard balance sheet items for assets and liabilities, given at both book and allowed (or market) value. The balance sheets are followed by a table listing the collateral of secured loans and a table of doubtful investments in securities. The last formal page of the report reproduced in the Appendix consists of officers' names, positions and salaries, a table for earnings and charges since last examination, a table of dividends declared over the year

and lastly, a table listing the deposit rates and amount paid at the corresponding rate. It's this last table that has not previously been available to researchers. And we doubt anyone was even aware that the data existed.

Following the formal report which also contained a complete listing of the bank's security holdings (not included in the Appendix) are the two-page hand written notes of the examiner. The first page contains the initial estimates of assets and liabilities, a breakdown of capital and surplus, and a summary of criticized assets. The second and more interesting page contains the examiner's remarks on the well-being of the bank. This page contains information that is analogous to the more formal CAMEL rating the examiners construct today.[2/]

In Table 1 we report the banks for which examination reports were available and the dates these reports were made. We divided bank reports into subperiods because the observations can be viewed as coming from both a time series population and a cross-section population. Most banks had more than one examination between the years 1926 and 1930. Three subperiods were identified, although the dates chosen are somewhat arbitrary. The first covers the months February 1926 to April 1928, the second May 1928 to April 1929, and the third May 1929 to November 1930. For convenience, we label the subperiods 1927, 1929, and 1930 respectively. The total number of banks in this sample is 46 but since not all were examined in each period, the period totals are less--39 reports for 1927, 27 for 1929, and 27 for 1930.

By construction, the banks in this sample are from the same market, all located in the City of New York. Yet they are quite diverse on several measures that define a bank. Bank size, for example, as measured by total

assets, varies from as small as $1.6 million to as large as $1.5 billion. The size distribution was quite skewed though with half the banks being smaller than $40 million. Capital assets ratios varied considerably also. The smallest ratio was 5.7%, while the largest was over 50%. Here again the distribution was skewed to the small end with half the banks having capital asset ratios less than 14%. Loan to deposit ratios ranged from close to zero to a few that were over 200%, although most ratios fell between 30% and 90%. Given the variability in loan to deposit ratios it is not surprising that the liquid asset to deposit ratios were also variable. (Liquid assets are defined as the sum of the first four items under assets in the Report of Conditions: cash on hand, due from Federal Reserve Bank, exchange and demand cash items, and other items in cash.) They ranged from a low of 4.5% to a high of 80%.

The key variable of interest for the misled-public hypothesis is the deposit rate. But which deposit rate should and can be gleaned from these reports? We would like a rate identified with a reasonably well defined deposit; that is, we don't want to average across deposits of different maturities or different liquidity characteristics. The table of rates paid, however, does not identify the type of deposit, only the amount paid. Nevertheless, for one type of deposit, the passbook account, we can identify the rate with a high degree of confidence.

Consider again the Examiner's Report of Condition that is reproduced in the Appendix. On line 14 of page two of the report appears the item "deposits withdrawable only on presentation of pass-books". The amount on this line matches the amount that corresponds to the 4% deposit rate appearing in the interest rate table on page four. In this way, for those banks which offered passbook accounts we were able to identify the rate paid.[3/] We thus have a

rate associated with a well defined bank deposit and which should be a close substitute for a short-term Treasury security.

As would be expected, the interest rate variation across banks was much less than the variation for other variables. Nevertheless, the passbook rate did vary. Rates ranged from a low of 2.5% to a high of 5%. The coefficient of dispersion (the standard deviation of the passbook rate divided by its mean) for the entire sample period was 13%, and virtually the same for each subperiod. The questions we now address are: Do these rates reflect a risk premium and is the variability related to the perceived riskiness of a bank's portfolio?

Comparing the passbook rate to the short-term government rate suggests there was a risk premium. In Table 2 we report for each subperiod and the total period the average rate paid on passbook accounts for those banks in our sample that offered a passbook account. We also report the number of passbook banks and the average rate on U.S. notes and certificates (3 to 6 month maturities). Note that over the total period the passbook rate was 30 basis points higher than this short-term government rate. It was 50 basis points higher in the 1927 period, 70 basis points higher in the 1930 period, but 50 basis points lower in the 1929 period.

That the passbook rate on average was higher than the short-term government rate suggests there was a risk premium required on passbook accounts in the 1920s. Consider passbook accounts today. These are government insured accounts (up to $100,000) that the market shows dominate short-term Treasury securities. In April 1986 the ceiling rate that banks could offer on their savings accounts had been lifted; since then the Board of Governors of the Federal Reserve

System has been collecting average rates paid on such accounts. These data show that from April 1986 through April 1987 the average savings account rate was 5.29%. Over the same period, the 3-month Treasury bill rate averaged 5.64% or 35 basis points higher than the passbook rate. Since both investments are safe, the 35 basis point difference is a measure of the liquidity value of a passbook account. This liquidity value stems from the fact that Treasury bills are only available today in $10,000 denominations, while passbook denominations are variable, ranging from $5 to $100,000 for insured accounts.

The 1980s liquidity value of a passbook account helps us to estimate the 1920s risk premium on the same account. Treasury bills in the 1920s, like today, were issued in large denominations (approximately $10,000-$15,000 in today's dollars). Assume passbook accounts were considered safe by the public in the 1920s and assume the cost of providing a passbook account has not changed. Under these assumptions we should expect to find that the average passbook rate prevailing in the 1920s was roughly 35 basis points lower than the short-term government rate. That the average passbook rate was 30 basis points higher suggests a 65 basis point risk premium. Further, 65 points is probably a lower bound because, if the marginal cost of providing a passbook account has changed, it is surely lower today as the accounting is mostly automated.

Another reason to suspect that 65 basis points is a lower bound is that in the 1929 period, when the difference between the passbook rate and the government short-term rate was negative, the latter was expected to fall. At first this difference appears inconsistent with there being a risk premium on passbook accounts. However, the difference in this period was caused by a

significant rise in the government rate with virtually no movement in the passbook rate. Further, the rise in the government rate was clearly viewed as temporary since the yield curve in 1929 became negative after being slightly upward sloping throughout most of the 1920s. In 1929 the rate on Treasury notes and certificates climbed to over 5% in May; the long-term government bond rate never got above 4%. The markets, in other words, expected short rates to decline. Since the passbook rate applies to all passbook deposits, not just to new deposits, we would expect these rates to be a bit sluggish relative to other market rates. In particular, if there are good reasons to suspect the rise in short-term rates was temporary, we would expect no change in passbook rates. Consequently, if we assume the 1929 period does not give a very accurate picture of the normal spread between the passbook rate and the short-term government rate, the estimate of the spread jumps to 58 basis points (the average difference for the 1927 and 1930 periods only) and the estimate of the risk premium jumps to 97 basis points.

Is this a large premium? Notice that even assuming the risk premium was close to 100 basis points, one could argue that the existence of the Federal Reserve still influenced expectations and kept that risk premium from being much higher. This argument is a weaker version of the misled-public hypothesis; a version that may be more plausible but it's also more difficult to test. The evidence we have, though, provides little support for even this weaker hypothesis. In the year 1928 the difference between the prime commercial paper (4 to 6 month) rate and the short-term U.S. government securities rates was 90 basis points. So a 100 basis point risk premium makes banks approximately as risky as prime rated nonbank commercial firms. This seems reasonable for our sample of banks which contained only five failures, each managing to pay off its creditors at 79 cents on the dollar or higher. Thus, it is not

obvious that banks would have paid a higher risk premium without the Federal Reserve.

The evidence on the average risk premium is not the only evidence that raises doubts about the misled-public hypothesis. We also find that the variability of the passbook rate is correlated with at least some measures of bank risk.

In Table 3 we report the results of estimating a simple regression model designed to test for a relationship between several measures of bank risk and the risk premium on deposits as measured by the difference between the passbook rate and the rate on U.S. notes and certificates (3 to 6 month maturities). The four variables we use to measure risk, that is, the risk exposure of a bank's depositors, are the capital to asset ratio, the loan to deposit ratio, the liquid asset to deposit ratio and the log of total assets.

Under the misled-public hypothesis the coefficients of this model should not be significantly different from zero. Like today, the public should have cared little about bank risk if they believed bank deposits were protected by the government. Under the alternative hypothesis the public should have cared about bank risk and should have weighed risk measures as they compared bank deposits to other forms of investment.

The results in Table 3 are a weak rejection of the misled-public hypothesis. The first column of Table 3 lists the expected sign of each coefficient under the alternative hypothesis that the public did monitor bank risk. Thus, the higher the capital to asset ratio, the less risk for a

depositor and other things equal, the smaller the risk premium. Similarly, the higher the liquid asset to total deposit ratio (where liquid assets are defined as reserves at the Federal Reserve, vault cash and all other cash items), the less risk for a depositor and the smaller the risk premium. On the assumption that loans are the riskiest asset a bank can hold, the risk premium will be higher the higher the loan to deposit ratio. Finally, the larger the bank (as measured by total assets), the more it can diversify and, therefore, hold a safer portfolio; thus, the larger the bank, the smaller we expect the risk premium under the alternative hypothesis.

Columns 2 and 3 of the Table contain the estimation results. In column 2 we present the results based on using the Ordinary Least Squares technique for estimating regression coefficients. Column 3 contains the Fuller-Battese estimates, a method for estimating regression coefficients when dealing with cross-section time series data, which is more appropriate for our sample. The OLS estimates are presented only for comparison.

The Fuller-Battese estimates provide some evidence to reject the misled-public hypothesis. The capital to asset ratio and the loan to deposit ratio have their expected signs, although the coefficients are not significantly different from zero. The coefficient on the liquid asset to deposit ratio is significant at the 10% level of confidence and the coefficient on the log of total assets is significant at the 5% level of confidence. And both coefficients have their expected signs. Thus, contrary to previous research that could find no correlation between rates on bank deposits and the riskiness of a bank, we were able to find some.[4/]

5. Summary and Conclusions

The evidence gleaned from bank examination records for the years just prior to the banking crisis of the 1930s suggest that the public was not misled into believing the Federal Reserve was supposed to insure bank deposits. Deposit rates, in particular the passbook savings rate, were too high to simply reflect a safe rate of return. Further, the passbook rate correlates across banks with at least some measures of bank risk. Both results are inconsistent with the view that the public expected deposits of member banks to be protected by the Federal Reserve.

The misled-public hypothesis, of course, is not the only explanation of the 1930s banking collapse. At least three others have been proposed. Our results, however, do not help to distinguish amongst the remaining three. One often cited explanation is that banking is inherently unstable; that is, a possible equilibrium is a run by depositors on the entire system. (See Diamond and Dybvig (1983) for an explicit model of bank runs that captures the notion of inherent instability.) A second view is that the banking collapse simply reflected the depressed real economy. With falling asset values, depositors concerned over the value of their claims on banks began to withdraw their funds as quickly as possible. (See Fisher (1922, pp. 64-65)). A third and more recent view, blames the government for starting the collapse. Speculation in early 1933 about whether or not the U.S. would abandon the gold standard caused a run on the dollar which, in turn, caused a run on bank deposits (See Wigmore (1986)). Since all three explanations are consistent with a risk premium on bank deposits, our results can only be viewed as raising doubts about one of the four leading explanations of the 1930s banking collapse.

Table 1

New York City State Member Banks With Examination Reports

		1927	1929	1930
1.	Amalgamated Bank	1/28	2/29	7/30
2.	American Exchange (Irving Trust Company)	11/27	9/28	-
3.	American Trust Company	10/27	10/28	5/29
4.	American Union Bank (.835)*	11/26	8/28	7/30
5.	Bank of Europe Trust Company (.808)*	8/27	2/29	10/29
6.	Bank of New York and Trust Company	7/26	12/28	12/29
7.	Bank of U.S. (.791)*	11/27	11/28	6/29
8.	Bank of Yorktown	8/27	1/29	10/29
9.	Central Union Trust Company**	2/27	1/29	-
10.	Continental Bank of New York and Trust Company	7/27	1/29	12/29
11.	Corn Exchange Bank and Trust Company	11/26	11/28	11/29
12.	Farmers Loan and Trust Company	2/28	2/29	-
13.	Federation Bank and Trust Company	2/27	3/29	3/30
14.	Fidelity Trust Company of New York	3/27	11/28	12/29
15.	Fifth Avenue Bank	7/27	11/28	4/30
16.	Fulton Trust Company	3/27	3/29	3/30
17.	International Acceptance Securities Trust Company	9/26	11/28	-
18.	International Union Bank and Trust Company	7/26	6/28	-

*Failed bank (total rate of return to creditors as of 1937)
**Merged to Central Hanover Bank and Trust

Table 1 (Cont.)

		1927	1929	1930
19.	International Germanic Trust Company	4/28	9/28	1/30
20.	Interstate Trust Company	4/27	12/28	-
21.	Merchants Bank	-	8/28	7/30
22.	The Murray Hill Trust Company	8/27	8/28	-
23.	Pacific Coast Trust Company	9/27	8/28	-
24.	Times Square Trust Company (.921)*	9/27	7/28	3/30
25.	Trade Bank of New York	3/27	8/28	7/30
26.	United States Mortgage and Trust Company	7/27	5/28	-
27.	United States Trust Company of New York	4/27	12/28	9/30
28.	Bank of America	9/27	-	-
29.	Bank of the Manhattan Trust Company	2/26	-	7/29
30.	Bankers Trust Company	8/27	-	-
31.	Central Hanover Bank and Trust Company	-	-	9/29
32.	Central Mercantile Bank and Trust Company	5/26	-	-
33.	Chemical Bank and Trust	-	-	5/30
34.	Commonwealth Bank of New York	5/27	-	-
35.	Guaranty Trust Company of New York	10/26	-	4/30
36.	Harbor State Bank	-	-	10/30
37.	International - Madison and Trust Company (.834)*	-	-	8/30
38.	International Union Bank	3/27	-	-

*Failed bank (total rate of return to creditors as of 1937)

Table 1 (Cont.)

		1927	1929	1930
39.	Longacre Bank	2/27	-	-
40.	Manufacturers	12/26	-	3/30
41.	The Mutual Bank of New York	1/27	-	-
42.	New Netherlands Bank of New York	12/26	-	-
43.	New York Trust Company	8/26	-	-
44.	Standard Bank	4/27	-	-
45.	Park Row Trust Company	-	-	7/30
46.	Plaza Trust Company	-	-	7/30

Table 2

Average Short-Term Government Rate Versus
Average Passbook Rate at New York City Banks
(1926-1930)

Period	# of Banks With Passbook Accounts	Passbook Rate	Rate on U.S. Notes and Certificates 3 to 6 Months
1927 (May 1926-April 1928)	28	3.7	3.2
1929 (May 1928-April 1929)	18	3.8	4.3
1930 (May 1929-October 1930)	20	4.0	3.3
May 1926-October 1930	66	3.8	3.5

Table 3

Determinants of the Average Risk Premium
Paid on Passbook Accounts by
State Member Banks Located in New York City
1926 to 1931
(t values in parenthesis)

Independent Variables	Expected Impact on Risk Premium	Ordinary-Least Squares Estimates	Fuller-Battese Estimates
Capital to Asset Ratio	-	- .0037 (-.27)	- .0079 (-.66)
Liquid Asset to Deposit Ratio	-	- .0178 (-.91)	- .0315 (-1.79)**
Loan to Deposit Ratio	+	- .0008 (-.18)	.0005 (.12)
Log (Total Assets)	-	- .0036 (-3.6)*	- .0032 (-3.6)*
Intercept		0.068 (4.0)*	.063 (4.1)*
Degrees of Freedom		61	61
R^2		.36	

Dependent Variable: Passbook account rate less the rate on 3 to 6 month U.S. notes and certificates.

*Significant at the 5% level

**Significant at the 10% level

Appendix

Copy of a 1929 Federal Reserve Bank of New York's
Examiner's Report of Condition

3

ANALYSIS SENT
APR 11 1929
TO F. R. BOARD

Examiner's Report of the Condition

of the _____

at the close of business on the 2nd *day of* January, 1929 *as found upon examination made by the direction and authority of the Superintendent of Banks of the State of New York*

Location _____

By whom examined F.W.Pidgrit

Number of assistants if any 5

ASSETS	BOOK VALUE	DEDUCTIONS	ALLOWED
1. Cash on hand	$ 41 728 46	$	$ 41 728 46
2. Due from Federal Reserve Bank (Reserve Acct.)	651 592 47		651 592 47
3. Exchanges and demand cash items	200 356		200 356
4. Other items in cash			
5. Due from Banks & Trust Cos. (Res. Depositories)			
6. Due from other Banks, Trust Cos., etc.	244 456 50		244 456 50
7. Due from Banks (Foreign)			
8. Foreign Currency on hand			
9. Stock and bond investments	618 225 44	13 417 94	604 807 50
10. Loans and discounts	6 056 347 35		6 056 347 35
11. Overdrafts (Domestic)	1 306		1 306
12. Overdrafts (Foreign Banks, etc.)			
13. Bonds and mortgages			
14. Banking house			
15. Other real estate			
16. Furniture, fixtures and vaults	19 699 14		19 699 14
17. Accrued interest entered on books	5 345 41		5 345 41
18. Accrued interest not entered on books			
19. Customers liability on acceptances	88 106 41		88 106 41
20. Customers liability on unused balances L/C	147 018 20		147 018 20
21. Other Assets:			
22. Suspense account	7		7
23. Organization expenses	9 871 11	9 871 11	0
24. Prepaid expense	2 180 07	2 180 07	0
25. do insurance	2 540 38		2 540 38
26.			
27.			
28.			
29.			
30.			
31.			
32.			
33.			
Total	$ 8 088 908 54		$ 8 040 136 54

		BOOK	AS FOUND BY EXAMINER
1.	Capital Stock	$ 1 000 000	$ 1 000 000
	Deposits:		
2.	Due New York State Savings Banks		
3.	Due New York State Savings and Loan Associations, Credit Unions and Land Bank		
4.	Deposits of the State of New York	50 000	
5.	Deposits of the Superintendent of Banks of the State of New York		
6.	Deposits due as executor, administrator, guardian, receiver, trustee, committee or depositary — Time		
7.	Deposits due as executor, administrator, guardian, receiver, trustee, committee, or depositary — Demand		
8.	Deposits secured by pledge of assets Postal Savings System	10 647 62	
9.	Deposits otherwise preferred, if any		
	Total amount of preferred and secured deposits (Extend in second column)		60 647 62
10.	Deposits subject to check	4 559 305 60	
11.	Due trust companies, banks and bankers		
12.	Time deposits, certificates and other deposits, the payment of which cannot legally be required within thirty days	87 686 47	
13.	Other certificates of deposit	2 000	
14.	Deposits withdrawable only on presentation of pass-books — Time	1 086 855 50	
15.	Deposits withdrawable only on presentation of pass-books — Demand		
16.	Cashier's checks outstanding, including similar checks of other officers	46 609 06	
17.	Certified checks	85 765 91	
18.	Unpaid dividends		
19.	Deposits in foreign currency — Time		
20.	~~Deposits in foreign currency — Demand~~		
	Total Deposits $ 5,835,866.16		5 778 220 84
21.	Bills payable, bills rediscounted or sold with agreement to repurchase	625 000	625 000
22.	Acceptances outstanding	85 106 41	85 106 41
23.	Unused balances on letter of credit	147 018 20	147 018 20
24.	Mortgages on real estate owned		
25.	Reserve for taxes and expenses	845 39	845 39
26.	Accrued interest entered on books	10 267 09	10 267 09
27.	Accrued interest not entered on books		
28.	Unearned discount		
29.	Accrued taxes and expenses	39 550 86	39 550 86
30.	Reserve for contingencies		
31.	Other Liabilities:	132 90	132 90
32.	Suspense account	30 798 88	30 798 88
33.	Reserve for gift account	7 618	7 618
34.			
35.			
36.			
37.			
38.			
	Totals	7 785 205 89	7 785 205 89
	Surplus	$ 300 402 45	$ 274 935 33

Call or demand loans	1 011 849 26	Secured by collateral readily marketable	478 455 38
Time loans	4 975 515 05	Secured by real estate mortgages or other liens on realty	74 800
		Secured by stocks and bonds of realty companies	3 400
Past due paper	65 660 24	Secured by other collateral	228 495 40
Advances	5 325	Loans to holding companies for real estate	
		Purchased paper	
		Paper with one or more names without collateral	
		Secured by bank stocks	4 584 808 15
		do by bills receivable	502 185 65
		do by assigned accounts	10 825 11
		Advances against foreign bills	168 387
			5 325
TOTAL	6 056 347 55	TOTAL	6 056 347 55

INVESTMENTS IN SECURITIES OF DOUBTFUL VALUE OR NOT READILY MARKETABLE

No. of shares or par value of bonds		*Par value	BOOK VALUE	MARKET VALUE	REMARKS
	None				

*Where less than $100 per share.

	NAMES	ANNUAL SALARY	DESCRIPTION OF BOND
Chairman of the Board			
President	Geo. M. Adrian	15 000	
Vice-President	Louis J.Adrian	15 000	
Vice-President	Wm.F.Heide	0	
Vice President			Bankers' blanket surety bond
Vice President			of Fid. & Deposit Co.,Md. for
Treasurer			50M, also excess policy of 50M.
Secretary or Cashier	Harry Engel	6 500	
Trust Officer			
Assistant Cashier	James O'Brien	3 600	
Assistant			
Assistant			
Assistant			
Assistant			
Assistant			
Assistant			
Assistant			
Number of clerks 40	Their total compensation	75 950	
	Total salaries	116 850	

RESERVES

Reserves on hand: Cash			
Reserves on hand: Deposits with F. R. B.	651 392 47		
With reserve agents			
Total reserves		651 392 47	
Reserves on hand required: ~~Time~~	34 685 68		
Reserves on hand required: ~~Demand~~	599 469 72		
Reserves permitted with agents			
Total reserves required		634 155 40	
Total reserves short		0	
Reserves on hand short			

DEPOSITS ON WHICH INTEREST IS PAID

2 % is paid on	2 750 000	
2½ %	200 000	
3 %	50 000	
4 %	1 085 600	
4½ %	50 000	
%		
%		
%		
%		
%		
Total deposits on which interest is paid	4 135 600	

DIVIDENDS DECLARED DURING PRECEDING TWELVE MONTHS

RATE	DATE	REMARKS	AMOUNT
		None	

EARNINGS AND CHARGES SINCE LAST EXAMINATION AS SHOWN BY THE BOOKS

(Give date of last examination) Aug.1, 193 8

EARNINGS:		
Discounts received	94 412 08	
Interest received	45 384 68	
Rents received from real estate		
Rents received from safe deposit boxes		
Commissions received	3 068 49	
Recoveries		
Exchange received	172 55	
Foreign department profits	14 57	
Profit on securities sold	95 13	
Miscellaneous	425 18	
Trans.from res.	8 000	
Total earnings		149,572.80
CHARGES:		
Salaries paid	40 526 06	
Interest paid to depositors	36 107 25	
Other interest paid	7 933 37	
Rent paid	1 504	
Chg.off Organiz.exp.	1 500	
Real estate expenses		
Loss on securities sold		
Charged off on securities		
do do F & F	2 025	
Charged off for other losses	13 741 87	
Taxes paid & res.	1 400	
Foreign department losses		
Legal	2 185 45	
Dividends		
Miscellaneous	4 546 75	
Staty. & Ptg.	5 181 47	
Insurance	804 96	
Res.for cont.	7 [illegible]	
Total charges		131,956.16
Gain ~~this year~~		17,625.64
Book surplus this examination	300 402 45	
Book surplus last examination	282 778 81	
Gain ~~this year~~		17,625.64

(over omitted)

Name: (

Date of Examination: January 1919

Dist. No. 2

Resources		Liabilities		
Loans and Discounts	$ 6056	Capital		$ 1000
Overdrafts	1	Surplus		250
F. R. Bank Stock	37	Undivided Profits		50
Investments	581	Reserves for D. & L.		0
Furniture and Fixtures	20	Due to Banks		0
Banking House	0	Demand Deposits		4684
Other Real Estate Owned	0	Time Deposits		1155
Due from F. R. Bank	830	Borrowed Money:		
Due from Banks, Cash and Exchanges	308	Bills Payable (Fed.)	625	
Other Assets		Rediscounts (Fed.)	0	
[illegible]		Other	0	625
[illegible] Miscell Expenses	15	Other Liabilities		
Customers liability on acceptances	85	Reserve for interest, taxes etc		58
Accrued Interest	5	[illegible]		31
		Acceptances outstanding		85
Total Resources	$ 7938	Total Liabilities		$ 7938

CAPITAL AND SURPLUS

Total Surplus, Profits and Reserves for L. & D.	300	
Add - Estimated appreciation	0	
Market value of assets not shown on books	0	300
Deduct - Losses and depreciation		25
Adjusted net undivided profits		25
Surplus impairment - deficit		None
Capital impairment - deficit		None

RECAPITULATION OF ALL CRITICISED ASSETS

Slow	(Per cent to Capital and Surplus — %)	1
Doubtful	(Per cent to Capital and Surplus 2.1 %)	27
Losses	(Per cent to Capital and Surplus 2. %)	25
		53

Abstracted Freeland
Checked Reams 3/22/29

REMARKS

CHARACTER OF MANAGEMENT

Good

VIOLATIONS OF FEDERAL RESERVE ACT, REGULATIONS OR CONDITIONS OF MEMBERSHIP

One loan exceeding ~~limit~~ prescribed limit by state law

SUMMARY OF EXAMINER'S CRITICISMS AND REMARKS

~~Institution does not hesitate to charge off items which appear to be worthless~~

No adverse criticisms

DOES THE EXAMINATION REVEAL A CONDITION THAT WOULD WARRANT THE FEDERAL RESERVE BOARD TAKING ACTION TO DISCONTINUE THE MEMBERSHIP OF THIS BANK?

No.

PLEASE STATE WHETHER THE CONCLUSION IS CONCURRED IN BY ANY OR ALL OF THE FOLLOWING:

(a) Federal Reserve Agent and Governor.
(b) Executive Committee.
(c) Board of Directors.

Abstracted by N. Faulds

Federal Reserve Agent.

NOTE: When a report of examination indicates a bank to be in an unsatisfactory condition please furnish in detail such additional information as will permit the Board to intelligently consider the recommendations submitted.

Notes

1/ To date we have only obtained a copy of the Minneapolis Fed's examination report. But, based on conversations we have had with other Reserve Banks, it is doubtful that a table comparable to the New York interest rate table exists.

2/ CAMEL is an acronym for Capital, Assets, Management, Earnings, and Liquidity. These are the five broad areas on which bank examiners formally grade banks and determine an overall quantitative ranking.

3/ Alternatively, we could have identified rates on deposits subject to check. The checking account, though, does not appear to have been as uniform an account as the passbook account. In the examiner's report reproduced in the Appendix, 2% looks like the rate paid on a checking account. However, deposits subject to check were over 60% greater than deposits on which 2% interest was paid. We suspect many checking accounts had better terms than the 2% account, but paid no interest. This makes estimating a demand deposit rate much more difficult than a passbook rate, although admittedly this problem is a matter of degree. While passbook accounts may not have varied within a bank, the way interest was computed on these accounts varied considerably across banks. In a study published by the American Bankers Association (1929), at least 52 different methods for computing interest on passbook accounts existed in the 1920s.

4/ Under the misled-public hypothesis size and the risk premium could also be negatively correlated. Like today, the public in the 1920s may have believed that the Federal Reserve would not let the largest banking organizations fail. A closer look at the data, however, suggests that the significant negative coefficient on the total asset variable was not just the result of the largest banks having the lowest passbook rates. The Bank of United States, for example, which was the fifth largest bank in our study and one of the largest banks in the country, had a 4% passbook rate in 1929, one of the higher rates offered at the time.

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