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What Caused Chicago Bank Failures in the Great Depression? A Look at the 1920s

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ABSTRACT

This paper analyses the long-term behaviour of financial ratios from 1923 to 1933, focusing on a total of 131 Chicago state banks, which suffered the highest urban failure rate in the US Great Depression. The banks that failed are divided into three cohorts. The first finding is that banks which failed early started investing in non-liquid assets as early as 1923. The second finding is that the share of real estate loans is the most important predictor of failure, from 1923 for the first failure cohort and after 1927 for the second failure cohort. Such results suggest a reassessment of the indirect role played by real estate in the Great Depression via the banking channel. At the same time, this paper re-asserts the importance of mass, non-discriminating deposit withdrawals as despite having the largest amount of mortgages, banks failing in the first episode did not lose significantly more deposits than others, and their deposit losses were not determined by mortgages. In the second episode, failing banks did lose significantly more deposits than others, but survivors suffered tremendous withdrawals too. The causes of bank failures in the third episode remain largely unexplained.

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Introduction

Recently, a significant number of researchers have shown that bank failures in the U.S. Great Depression could be linked to fundamental weaknesses already apparent just before the start of the depression, around June 1929 (White, 1984; Calomiris and Mason, 2003; Calomiris and Mason, 1997; Guglielmo, 2012). Various kinds of balance sheet weaknesses are usually emphasised, such as low shares of government bonds, cash items and retained earnings to net worth as opposed to high shares of loans to total assets, other stocks and bonds and banking expenses. Many point out similarities between banks that failed in the 1920s as a result of the post-war shock in agriculture and Great Depression failures. One related question that has not been researched yet is the following: if banks were indeed in fundamental turmoil beforehand, when did bank portfolios start to show unusual risk-taking? Another related question is whether any particular variables were more important than others in predicting failure, and if so when these variables started being significantly so. Finally, it would be interesting to find out what mechanism could explain the impact of these variables at the time of failure. My aim is to answer all three questions by focusing on the city of Chicago.

Chicago area banks suffered one of the highest failure rates in the US, especially in the summers of 1931 and 1932.[1] Indeed, out of 193 state banks in June 1929, only 35 survived up to June 1933. Perhaps for this reason Chicago has often been the subject of banking studies (Calomiris and Mason, 1997; Thomas, 1935; Esbitt, 1986; Guglielmo, 2012). Moreover, state banks (as opposed to national banks) represented more than 80 per cent of all suspended banks in the country,[2] and although many reports were issued in other states those from Illinois are particularly detailed.

I analyse the performance of Chicago state banks present in June 1929 during the 1920s, dividing them into two main groups: Great Depression survivors and failures. Failures are divided into three cohorts: June 1931 failures, June 1932 failures and June 1933 failures, each corresponding to six-month failure windows containing both panic and nonpanic failures. Key variables such as return on equity, reserve-deposit ratios and real estate loan shares are compared between the four cohorts. I look at the evolution of survivors and failures during the full decade from 1923 all the way up to 1933. Comparative research has already been conducted by other authors, but they all restricted themselves to mainly static comparisons at one or two points in time (often June 1929), without looking at long-term comparative trends (White, 1984; Calomiris and Mason, 2003; Calomiris and Mason, 1997; Thomas, 1935; Esbitt, 1986; Guglielmo, 2012).

[1] Chicago had the highest failure rate of any urban area (Guglielmo, 2012).
[2] See below on White (1984).

The first principal finding of the paper is that the banks which failed early in the Depression were those which had invested in non-liquid assets as early as 1923. The second principal finding is that the most important predictor of bank failure not only throughout the 1920s, but especially from 1928 onwards, is the ratio of mortgages to total assets – particularly for the first two failure cohorts. It is also the best predictor of time of failure. June 1933 failures behaved in general more erratically throughout the decade. Many other bank characteristics explain failure as early as 1923 (such as retained earnings to net worth), although not as consistently and not to the same degree as real estate loans.

Such results urge a reassessment of the role of real estate in the Great Depression. Chicago is well-known for its real estate boom in the 1920s, one that resembled both in character and magnitude the suburban real estate booms of some of the major cities of the American East North Central and Middle-Atlantic regions.[3] Given that the former region had one of the highest numbers of suspensions in the U.S., a causal connection between this number and the real estate booms is worth investigating.[4] The link between real estate and the depression is probably not a direct one, in the sense that the contribution of real estate to the decline in economic activity was small. A number of recent papers have demonstrated that, in the aggregate, the role of real estate in the Great Depression was indeed minor.[5] This paper assesses the indirect, probably larger contribution that real estate made to the deepening of the Great Depression via the banking channel. Analysis of the second largest city in the U.S. in 1930 points to a powerful relationship between real estate lending and commercial bank failures in the Great Depression.[6]

The paper also investigates possible failure mechanisms by looking at the interaction of real estate loan shares with the liability side of the balance sheet, focusing specifically on the first two failing cohorts. In the first failure episode, which saw the largest number of failures, depositors did not identify these banks as particularly weak even in the preceding nonpanic window, although out of all banks these held the highest share of real estate loans. Indeed, in this first episode all banks lost tremendous amounts of deposits, but the failing banks did not lose significantly more than the others, and their deposit losses are not well explained by their

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[3] The Chicago boom can be compared in particular to those of Detroit, Pittsburgh, Philadelphia (see Wicker, 1996, pp. 16, 118), and Toledo (Messer-Kruse, 2004).

[4] The East North Central region (which contains Chicago) had 2,770 suspensions in total between 1930 and 1933 (the term "suspension" refers to temporary or permanent bank failure, as opposed to "failure" which refers only to the latter category). Only the agricultural states of the West North Central region surpass this number with a total of 3,023 suspensions (Board of Governors of the Federal Reserve System, 1937, p. 868). These are the commonly used census regions. Note that the state of Pennsylvania also had a particularly high failure rate (ibid.).

[5] See, in particular, White (2009), and Field (2011).

[6] Chicago was home to 3,376,438 dwellers in 1930, as compared to New York City's population of 6,930,446 (Historical Statistics of the United States, 2006, Series Aa1-5).

share of mortgages. In the second episode the picture changed significantly: the banks that failed did lose more deposits than survivors, and mortgages are the main predictor of withdrawals in the year preceding failure. Nevertheless, survivors lost a tremendous amount of deposits as well (around 37 per cent), and it is not clear whether the differential in deposit losses can be taken as an important cause of failure. Thus, while underlining the significant role of the mortgage share of a bank's assets in its failure, this paper re-asserts the importance of non-discriminating withdrawals in the preceding nonpanic window.

Section I reviews the literature on banks' fundamental troubles during the U.S. Great Depression. Section II introduces the data and empirical approach adopted in this study. Section III presents results for the 1920s, focusing on all available variables except deposit losses, and provides a historical explanation for Chicago bank behaviour in the 1920s. Section IV analyses the impact of deposit losses at the time of failure. Section V concludes.

Section I: Literature review

When economic historians first started to look more deeply into the causes of Great Depression bank failures, and in particular at whether more "fundamental" causes existed than mass deposit withdrawals (Friedman and Schwartz, 1963), they mainly focused on the condition of banks right before the start of the Depression, around June 1929. The idea was (and still is, to a large extent) that if it could be shown that failures showed particular weaknesses before the start of the slump this meant that their fundamentals were impaired, which explained their later failure. Several authors argue that these banks had been suffering from weak loans and investments before they failed, and that there is little that the Federal Reserve could have done to alleviate the situation. Often, these bad investments are seen as overinvestment in typically slow assets (such as loans), or as underinvestment in more liquid types of assets (such as government bonds).

Surveying these studies the following question arises: if the banks that failed were indeed in deep trouble beforehand (especially in June 1929), when did they first start to get in trouble? One may also wonder whether any particular variables may have played a more significant role, and if so through which mechanism.

In a first study focusing on bank insolvency, White (1984) compared the national banks that failed during the first banking crisis (November-December 1930) with those that survived. National banks accounted for only 12.4 per cent of all suspensions, whereas state member and

non-member banks made up 2.4 per cent and 85.2 per cent of all suspensions, respectively.[7] Logit regressions were conducted to determine whether certain financial ratios on these banks' balance sheets one year prior to the crisis had a significant impact on their chances of survival. The first conclusion was that, indeed, failures' balance sheets on December 31, 1929 strongly determined their success or failure during the first banking crisis. The exercise was repeated, this time looking at their 1928 and 1927 balance sheets. Again, it was found that as far back as 1927 these variables determined the survival of banks from November to December 1930. The final conclusion was that "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 study thus delivered crucial conclusions as to the possibility of banks' fundamental troubles, and presented important information regarding the continuity of banks' conditions from the onset of the slump up to and including the first banking crisis.

Its author also drew attention to "swollen loan portfolios" and their link to agriculture. Although he did this informally, he explained that the agricultural banks that failed in 1930 "were in agricultural areas where overly optimistic financial commitments [were] made during the post-World War I [agricultural land] boom." This is certainly partly true at least for November 1930 failures, which occurred mainly in agricultural areas.[8] But if these ratios, even taken as early as 1927, were indeed important factors for bank failures, when did they start showing anomalous risk-taking on the part of banks?[9]

In a second countrywide study, Calomiris and Mason (2003) analysed a panel of 8,707 member banks (out of 24,504 banks in total) from 1929 to 1933, using data on individual banks at two points in time, namely December 1929 and December 1931. They applied a survival duration model which allowed various variables (including aggregate and regional economic indicators) to determine chances and length of survival for each bank at various points in time. They concluded that the financial ratios indeed determined the length of survival, at least for the first two Friedman-Schwartz crises. The only real exception was the fourth banking crisis (early

[7] Member banks are members of the Federal Reserve System. A bank suspension occurs when a bank is temporarily or permanently closed, as opposed to a failure which occurs when a bank will permanently close and receivers take control of it to dissolve it. White excluded suspended banks that reopened as they represented only a small proportion (White, 1984). Note also that White affirms that the causes of failure of state and national banks were generally similar, as they competed strongly with one another in almost all parts of the country (ibid.).

[8] Mention needs to be made of the failure of the main investment bank in the South, Caldwell and Company, in November 1930. The links between the failure of this bank and the agricultural failures that followed still needs to be assessed. For more information on this bank see McFerrin (1939).

[9] A further question which I will not address here regarding agricultural failures in the first banking crisis is whether these banks were still suffering from the repercussions of the 1920-21 downturn in agriculture, or whether there had been overinvestment for a second time, after this recession, so that banks would be suffering from a second boom and bust.

1933) which "saw a large unexplained increase in bank failure risk" (ibid., 2003). This study thus went further in the analysis of survival duration and dynamics.[10]

There have been slightly more regional studies of bank failures, perhaps because crises have remained regional in character up to 1933, and perhaps also because of data availability. The majority of studies (four in total) have concentrated on Chicago, possibly due to the outstanding magnitude of the Chicago failure rate.

The two oldest studies used very similar methods and obtained similar results. While Thomas (1935) compared the June 1929 balance sheets of survivors with 1931 failures, Esbitt (1986) analysed the 1927, 1928 and 1929 portfolios of 1930, 1931 and 1932 failures. Both found that, in general, failures had more loans on real estate, had accumulated smaller surpluses, had fewer secondary reserves and had invested more in bank building. Esbitt failed to comment on the comparison between 1927, 1928 and 1929 balance sheets. More recently, Calomiris and Mason (1997) found that banks failing during the summer 1932 crisis had more in common with other banks failing during 1932 than with survivors, thereby showing that widespread depositor fear was not the primary cause of failure. These banks, in particular, had lower ratios of reserve to demand deposits, lower ratios of retained earnings to net worth, and higher proportions of long-term debt in December 1931. Finally, Guglielmo (2012) compared the June 1929 balance sheets of both Chicago and Illinois survivors with all Depression failures, using similar methods as the others, and drew very similar conclusions.[11]

While Chicago has been relatively popular as a candidate for banking studies, some key questions remain to be answered, and it is the aim of this paper to answer the three mentioned above: how did financial variables evolve; what was their relative explanatory power for bank failure; and what was the precise mechanism of failure?

Section II: Data and Empirical Approach

The analytical core of this research will be a mapping of the evolution of the 131 state bank balance sheets (by cohort) from June 1923 to June 1933 of both Great Depression survivors and failures.

[10] Richardson (2007) also analyses this question.
[11] Guglielmo provides much more detail on the history of Chicago banking in the 1920s.

Sources

There are two main sources of data that are detailed enough for this kind of study. The most complete one is semi-annual and focuses solely on state-chartered banks (both members and non-members of the Federal Reserve System): it is the *Statements of State Banks of Illinois*, published by the Illinois Auditor of Public Accounts. There were other such *Statements* for other states, but the ones for Illinois are unusually detailed. Banks generally reported in June and December of each year, which allows me to look at balance sheets in all years from 1923 up 1933. There are five volumes missing for the 1920-23 period, and since they concern mainly the 1920-21 recession,[12] it is not examined here. At any rate, many of the banks that went through the Great Depression did not yet exist at that time, so the main analysis will focus on the 1923-1933 period.[13] The full dataset includes the following data points: December 1923, December 1924, June 1925, June 1926, June 1927, June and December 1928, June and December 1930, June and December 1931, June and December 1932 and June 1933. All *Statements* give asset book values.

Another important source of data used for this study was the *Rand McNally Bankers' Directory*. This is a recognised source for tracking down bank name changes and consolidations (see **Appendix A** for more detail).

Cohorts

For the analysis of the Great Depression banks have been divided into four groups: survivors, June 31 failures, June 32 failures, June 33 failures. The survivor category tracks down each bank and makes sure to include only the banks present at every point in time from June 1929 to June 1933. This system allows me to keep the same sample size at least over the whole depression period (more on sample sizes below). For the same reason it is reasonable to make each cohort "exclusive" in the sense that each cohort excludes the banks that failed before the "window of failure" for the whole cohort. For example, the June 1931 exclusive cohort does not include banks that had failed by December 1930. It only includes banks that had survived until December 1930 and failed between the start of 1931 and June of that year.

The choice of the windows of failure was necessarily somewhat arbitrary but not entirely so. Chicago suffered banking crises in December 1930, but especially in the spring of 1931 and

[12] The NBER defines this recession as going from the spring of 1920 to the summer of 1921. However, James (1938, p.939) and Hoyt (1933, p. 236) see the real recovery only start in early 1922.
[13] For example, of the 46 June 1931 failures only 18 existed in May 1920, whereas 28 of them already existed by December 1923.

in the spring and early June of 1932 (Wicker, 1996). Thus selecting the banks that failed between January and June 1931 and banks that failed between January and June 1932 allows me to include banks that were especially affected by banking crises as well as nonpanic failures, so as not to bias the samples in a way that would include more of the latter.

Table 1 shows the different cohorts and the corresponding reporting dates. It should be noted that for each cohort (except for survivors) there is never a data point for the date by which banks failed. This is logical: as the banks no longer exist there is no data for these banks. Thus, for instance, the June 1931 failure curve will stop in December 1930, the June 1932 failure curve stops in December 1931, and so on.

For the 1923-1928 analysis there is a data point for banks from a particular Great Depression (GD) cohort which existed then. Often some of the banks that were part of a GD cohort were not present in every year from 1923 to 1928. For example, there were 46 June 1931 failures, but only 39 of them were present in June 1926. This number may fluctuate between December 1923 and June December 1928 as, say, a fall from 40 to 39 banks may occur twice if different banks have appeared and disappeared.[14] I could have chosen to reduce the whole cohort sample to 28 banks (since this is the lowest number of banks for this cohort in the 1920s) but I give priority to full population study in the years of the depression itself. It is important to keep in mind, however, that this may cause the variation between years to increase, especially for the June 1933 failures whose sample size is never over 12 banks in this period. The variation in sample sizes will not directly affect the econometric analysis of the pre-1929 period as, on the one hand, multinomial logistic regression only uses cross-sections in one particular year, and, on the other hand, survival analysis in principle allows for banks to drop in and out of the sample over time. **Table 2** shows the sample sizes for each cohort at various points in time.

Consolidations

Note first that some banks were closed at some point and then reopened. As **Table 1** indicates, such banks were excluded from the depression samples (there were very few of them) as was also done by White (1984).

A consolidation was "the corporate union of two or more banks into one bank which continued operations as a single business entity and under a single charter" (Richardson, 2007).

[14] In some rare instances a bank could temporarily close and re-open. This happened for a few banks especially around June 1926.

During the depression, mergers were pointed out as "shotgun weddings", as opposed to takeovers which were part of the "purge and merge system" (James, 1938, p. 994). Both of these operations (merger and takeover) are usually considered in the literature as a major sign of weakness. I follow Calomiris and Mason (2003) in counting as failures banks that were taken over by other banks. This occurred in 14 cases from June 1929.

The treatment of mergers that ended up failing can be trickier as it is not clear which of the two parties in the merger was the weakest. A healthy bank may have merged with a less healthy bank which may have dragged the former into bankruptcy. So instead of categorizing such mergers as a failure of both banks at the time of merger, when possible both banks were kept alive by splitting the merger's balance sheet in proportional parts until the merger failed. Only one merger survived, the Central Republic Bank and Trust Co. For this bank the same procedure was adopted except that the bank was kept alive until the end.[15] **Appendix A** provides more detail on each merger, on the fate of Continental Illinois, and on name changes.

Section III: 1920s Results

This section examines some of the most important ratios linked to the well-being of a bank.[16] Section IV will deal with deposit losses and their interacting effects with mortgages. Note that geometric means are used throughout this section.[17]

Figure 1 shows the real estate loan share (both residential and commercial) by cohort from 1923 onwards.[18] The rise in the share of real estate loans after June 1929 should not be surprising as most banks suffered a large fall in total assets (see **Figure 14** in **Referee Appendix I**). It will be seen later on that other kinds of assets however declined as a share of total assets during the Depression, indicating that real estate loans were more difficult to liquidate. In the pre-depression era, it appears in general that survivors often had the lowest

[15] The results are robust either way. Calomiris and Mason (1997) emphasize that "Central Republic was a solvent bank saved from failure by the collective intervention of other Loop banks."

[16] When examining these graphs, it will often appear that a large gap between any cohort and survivors signifies that the variable is a good predictor of failure. A gap between failing cohorts themselves means that it is a good predictor of time of failure. Note also that sometimes the least one or two points in time on the graph have been removed because the error bars were so large that it reduced the visibility of the graph. This will not affect the analysis up to and including June 1932.

[17] Geometric means have been shown to be the most representative measure of financial ratios in the financial accounting literature (see, in particular, Lev and Sunder, 1979, Tippett, 1990 and McLeay and Trigueiros, 2002). This is because financial ratios often have a right skew, and are rarely normally distributed, which was indeed the case with most of my financial ratios. For the same reason all regressions in the next sub-sections use log transformations of the explanatory variables, which are also recommended in this literature. I thank Mark Tippett for extensive statistical advice on the study of financial ratios.

[18] There is no decomposition of real estate loans on the books of Chicago state banks.

share during most of the 1920s, followed closely by June 1933 failures. June 1932 failures had a substantially higher share, and the June 1931 failures' share was even higher.

This is evidence that the banks which failed early were those that had invested in non-liquid assets as early as 1923. In other words, the share of mortgages at least partly explains not only the event of failure but also its timing.[19] The question is of course to what extent this was the case, and the econometric results discussed below will provide an answer.

Interestingly, some form of divergence between June 1932 failures and survivors from around 1926 onwards is also noticeable, and this difference becomes significantly larger starting in June 1928. This will be confirmed by the econometric results.

Regarding the size effect, it is interesting to note that four of the five largest state banks in Chicago were survivors, and each of these four banks had a particularly low ratio of real estate loans to total assets, even compared to the survivors average: in June 1929 Continental Illinois had .7 per cent, Central Trust Company of Illinois around 2 per cent, Harris Trust and Savings .05 per cent, and the Northern Trust Company .7 per cent.[20] The fifth largest bank was part of the latest failure cohort, and had a larger share invested in real estate (around 11 per cent), which is representative of this cohort's average at the time.

One may wonder how a non-increasing share of real estate to total assets may have substantially weakened banks. **Referee Appendix II** deals with mortgage growth rates.

The econometric results for the whole period show the importance of most financial ratios in explaining the timing and frequency of failure, although they also demonstrate the particular significance of the mortgage variable in this explanation. First, survival analysis was conducted for the 1923-33 period, followed by a separate analysis of the 1929-33 period. Since it is difficult to restrict survival analysis to pre-depression years given that there were no failures then among the three failing cohorts, and since it would be interesting to assess the impact of variables in each single year of the 1920s, multinomial logistic regression was conducted for every single year from 1923 to June 1929. This second type of analysis also allows for differentiation between cohorts.[21]

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[19] See footnote 17 above.
[20] See also Appendix B on bank size.
[21] The results are robust when controlling for size. In most cases the size variable (the log of total assets) was insignificant, and when likelihood ratio tests were performed it turned out that the model without this control had a better fit.

The results of the positive duration (Weibull) survival model applied to the whole period are presented in the first column of **Table 3**.[22] The model includes the following variables: capital to total assets; reserves (cash, other cash resources, due from other banks and US government investments) to total deposits; US government bonds to total bonds and stocks; real estate loans (all categories) to total assets; banking house, furniture and fixtures (bank expenses) to total assets; retained earnings to net worth (a common measure of bank profitability);[23] other real estate (an asset consisting of property repossessed by the bank in the face of real estate foreclosures) to total assets; borrowed funds (bills payable and rediscounts, a form of long-term, high interest debt, which banks are best likely to take on when facing large deposit withdrawals (see Calomiris and Mason, 1997) to total assets); loans on collateral security to total assets; and other loans to total assets.

Clearly, many ratios predict failure quite well for this period. Capital to total assets predicts failure positively with low significance,[24] but the reserve-deposit ratio and government bonds significantly decrease the likelihood of failure. The outstanding predictors are mortgages and retained earnings to net worth, with the coefficient on mortgages about four times as high as that on retained earnings. Loans on collateral security and other loans to total assets do not appear to be important predictors, which remains true even when mortgages are dropped from the regression.

In the 1929-33 period, the Cox proportional hazards model depicts a slightly different picture.[25] In the second column of **Table 3** the most important items both in terms of magnitude and significance are mortgages, retained earnings and other real estate. As borrowed funds should theoretically have a high significance in this period, a second model was produced including solely the most significant variables in column two with the addition of borrowed funds.[26] In this last model borrowed funds have very high significance and magnitude, although not as high as other real estate whose coefficient is abnormally large. This can be

[22] The cumulative hazard ratio was increasing at an increasing rate throughout the 1920s, thus justifying the use of a Weibull (parametric) model.
[23] On 1929 financial statements retained earnings appear in the form of "undivided profits" or "the volume of recognised accumulated profits which have not yet been paid out in dividends" (Rodkey, 1944, p. 108, and Van Hoose, 2010, p. 12).
[24] This weak correlation between the capital ratio and the time of failure is confirmed by many authors, who on average simply do not report this ratio in their analysis, or find it insignificant (White, 1984, Thomas, 1935, Esbitt, 1986, Calomiris and Mason, 1997, 2003, Guglielmo, 2012). See in particular Figure 16 in Appendix E.
[25] The cumulative baseline hazard increases at a roughly constant rate during this shorter period. At the same time, the assumption that the forces of change are exactly constant over time is not theoretically justified. This justifies using a Cox proportional hazards (semi-parametric) model, in which the assumption of proportion hazards was verified (Prob>chi2 = 0.860).
[26] A likelihood ratio test indicated that the full model did not explain failure rates better than the second one (assumption: (3) nested in (2): 0.0179).

explained by the fact that other real estate is the only variable that shoots up from 1929 onwards, while at the same time representing a very low percentage of total assets (this shall be discussed in more detail below). Note that the standard errors are large for most of the variables in this regression, which suggests a lack of precision in the estimation. It remains that other real estate and real estate are the most important variables, with real estate loans' coefficient magnitude about twice that of retained earnings.

Multinomial logistic analysis allows for the study of specific years (cross-sections) as well as the importance of each variable for each failure cohort.[27] The results for two of the most important years – 1924 and 1928 – are shown in **Tables 4 and 5**, while the tables for the other years are available in **Appendix B**. These years were chosen as they were thought to best represent the evolution of variables throughout the 1920s. The dependent variable in each table includes four different outcomes: survivor, failure in period one, failure in period two, and failure in period three. Each table reports how each financial ratio predicts each different possible outcome, with survivor as the base category, in each cross-section.

In every year shown here and in **Appendix B**, the coefficients usually have the expected signs at least for the first two failure cohorts. In terms of significance, retained earnings are again often found to be relatively important before 1926 for all cohorts, and after 1926 for June 1933 failures. This is also illustrated in **Figure 2**, which is quite reminiscent of that of real estate loans, and is interesting in that the last failing cohort behaves quite differently from survivors after 1926. Other variables such as the reserve deposit ratio, government bonds and banking house seem to have mattered somewhat at various points in the 1920s, and their corresponding graphs can be viewed in

Appendix C

More importantly, the role of the real estate loan share should be emphasised. For June 1931 failures, it is always the most important predictor of failure, both in terms of magnitude and significance, from as early as 1923.[28] For June 1932 failures, its mild significance is only first apparent in 1926.[29] Interestingly, however, mortgages become the most significant variable after 1927 (see **Table 5**). The gain in significance and magnitude for June 1932 failures' mortgages

[27] As capital was seen to be either insignificant or to have inconsistent coefficients, it was dropped from the regression for increased degrees of freedom. This was also done for other real estate and borrowed funds which are generally unimportant for the pre-depression period. Other controls seen to be sometimes significant were kept in the regressions.
[28] Note that June 1927 stands out as an anomaly for the first two failure cohorts.
[29] Again, the year 1927 stands out somehow as an anomaly when taking all time periods into account, including for the first failing cohort. See previous footnote.

may be traced back to the divergence noted previously. This divergence may have started in late 1927 but it is impossible to tell given the absence of data for December 1927.

These results are strong evidence that the amount of mortgages held was a crucial factor for survival.

The variable "other real estate" from **Table 3** deserves special attention. Other real estate is an asset consisting of property repossessed by the bank in the face of real estate foreclosures. It is usually recognised by bankers as an undesirable asset and held only to minimize loan losses. This variable should then be one of those variables representing a backfire effect of real estate investment in the 1920s if the quality of mortgages deteriorated. **Figure 3** shows precisely this.

First, I should point out that the graph showing other real estate as an absolute value is almost the same, meaning that the effect of total assets on the ratio is negligible (probably due to the very small share of "other real estate" compared to other assets). Again, the pattern seen in the analysis of the real estate loan share appears, although not so much in the 1920s since foreclosures only started to rise later on. An interesting feature of this graph is again the ordering of shares by cohort, although the differences between June 1932 and survivors do not seem large at first glance. Another striking feature is the high share of other real estate held by June 1931 failures throughout the 1920s, with an astonishing spike in December 1924. One explanation could be that these banks had more links to agricultural communities, and thus suffered from the agricultural land boom and collapse of WWI and after. These banks may have been severely weakened by this event and never completely recovered. They may also have taken part in the suburban land boom in 1926 despite their earlier experience, which may explain the new rise in other real estate starting in December 1928. This behaviour might possibly suggest that banks particularly affected by a recession may still be tempted to overextend themselves in later years, perhaps to compensate for losses.

One might question the importance of this variable in explaining bank failures given the very low percentages shown in Figure 3 which never go much beyond 3 per cent. However, two important facts need to be emphasised in this regard. First, banks may have failed because they faced deposit losses while holding a high share of mortgages which by nature are difficult to liquidate, without the quality of these mortgages necessarily deteriorating (more on this in Section IV). Second, each cohort's last data point represents its status at the last call before failure, and each call occurred only every six months. This means that if many banks failed between April and June, which was the case for the first two failing cohorts, it is likely that much of their repossessed property would not have been recorded by December before this date. Moreover, foreclosure was a lengthy process, which increases the odds that many of the

effects of foreclosure are not visible on this graph. Third, the importance of second mortgages should be mentioned here. It is possible that the banks that owned second liens on first mortgages foreclosed by other banks or financial institutions incurred 100 per cent losses on their second liens without any of the repossessed property entering banks' balance sheets. This argument calls for further research on the impact of second mortgage lending.[30]

Finally, how can mortgages have mattered so much in explaining banks' failure in the first and second episodes? While the next section deals with the interaction of real estate loans with deposit withdrawals, it is first necessary to understand the role Chicago banks played in the 1920s building boom.

An article published in an August 1929 issue of the Chicago Tribune entitled "Claim Illinois is Overloaded with Banks" expressed concern about the fact that too many banks were in operation for too small a number of people (Chicago Tribune, 1929). More importantly, according to James, "[these banks'] soundness was intimately related to the building boom" (James, 1938, p. 953). Indeed, many of these banks were created on the outlying regions of Chicago to respond to the expanding suburbs of the time.

The boom itself was linked to excessive predictions of future population growth. In the 1920s the US experienced a significant general business boom, which affected urban centers in particular (Hoyt, 1933, p. 235). Chicago was particularly well placed at the time because it lay next to large agricultural areas which experienced serious trouble after World War I. Indeed, Hoyt shows how both the return of soldiers and sailors and the coinciding fall in the price of foodstuffs during the 1920-21 farming crisis were conducive to the great expansion of Chicago both demographically and economically. The business and population boom fed on itself as workers were attracted to the higher wages of the city, including many black people from the

[30] It is difficult to know to what extent second mortgages were carried by commercial banks, (rather than individual firms) as there has been no nationwide study of second mortgages by type of lender. First, one should note that these second mortgages were indeed widely used by property owners. Hoyt remarks regarding Chicago that thanks to second-mortgage loans owners could borrow up to 80 per cent of the peak value of their property (Hoyt, 1933, p. 265). Also regarding Chicago, Bodfish and Bayless show that in 1925 almost half of Chicago properties were financed using second mortgages as well (Bodfish and Bayless, 1928). In addition, over 35 per cent of Home Owners Loan Corporation (HOLC) mortgages had second liens (Ghent, 2010). As regards types of lenders, one study comparing five North-Eastern states shows great variation in terms of first, second and third mortgage providers. It was carried out in 1936 on HOLC loans so may not be entirely representative of 1920s loans. Nevertheless, it is striking to see that in Ohio, one of the states in which the building boom arguably presented some of the most similar characteristics to Illinois's, nearly 20 per cent of the amount of second mortgages were provided by bank and trust companies. Individual firms provided around 50 per cent, while the rest was mainly provided by building and loans associations and financial and mortgage companies (Federal Home Loan Bank Board, 1936, p. 352).

South (ibid.).[31] As a result the Chicago population increased by more than a third from 1918 to 1927.

The excitement that the progress in economic activity and the near-constant arrival of new dwellers (at least in the first half of the 1920s) brought to the city led to an extremely fast development of credit, termed "financial elephantiasis" by James (ibid., p. 939). Eichengreen and Mitchener (2003) stress the interaction between the structure of the financial sector and the business boom. The rapid growth of installment credit first started with nonbank institutions.[32] However, very quickly many sorts of financial institutions ended up competing for consumers' credit.

One of the consequences of this credit expansion in Chicago was a substantial building boom, which may have been particularly strong in the Chicago area, although so far there has been no major academic study on 1920s real estate activity at a disaggregated level for the country as a whole.[33] The Chicago real estate boom was excessive in the sense that it reflected predictions of population increases that went far beyond the actual increase. Hoyt shows how as Chicago's population started growing at an unusually rapid rate investors imagined that a "new era" was born and that Chicago would have grown up to 18 million by 1974 (Hoyt, 1933, p. 403).[34] While from 1918 to 1926 the population of Chicago increased by 35 per cent the number of lots subdivided in the Chicago Metropolitan Region increased by 3,000 per cent (ibid., p. 237). In 1928, Ernest Fisher, associate professor of real estate at the University of Michigan, studied real estate subdividing activity and found that "periods of intense subdividing activity almost always force the ratio of lots to population considerably above the typical" (Fisher, 1928, p. 3). His explanation was that "the only basis for decision is the position of the market at the time the manufacturer [makes] his plans," which leads to procyclicality. Yet a population slowdown occurred in 1928, just before the start of the depression. **Figure 4** below shows that the Chicago building boom reached a peak in 1925 and then receded abruptly.

The role that small state banks played in allowing this building boom to occur was a determinant one. In December 1929, state banks made up 95.5 per cent of all banks in the city (University of Illinois Bulletin, 1930). There were only 10 national banks; however these banks were large. Indeed at the time they reported close to 40 per cent of the aggregate resources of

[31] In fact, the two largest banks in the U.S. operated and owned by black people were in Chicago: the Douglass National Bank and Binga State Bank (James, 1938, p. 955).
[32] For example, in 1919 General Motors established the General Motors Acceptance Corporation (GMAC) to finance the development of its mass market in motor vehicles.
[33] White (2009) studies the question for the country as a whole but does not disaggregate into the various regions and cities of the US. For a journalistic account see Sakolski (1932).
[34] Hoyt humorously depicts "distinguished scholars'" assessments of the situation, which were often quite surprising (Hoyt, 1933, p. 388).

all banks (ibid.). The largest of these national banks, First National, rivaled in size the largest bank in Chicago (Continental Illinois, which was state-chartered). As a contemporary made clear, "by the summer of 1929, then, the Continental Illinois and the First National towered over the Chicago money market like giants" (James, 1938, p. 952). Indeed, together they were responsible "for about half of the banking business transacted in the city" (ibid.). Yet a huge number of small unit banks swarmed around the city, most of them state-chartered. As James put it "around these great banks of the Loop, there nestled, however, some 300 outlying commercial banks, each of which appeared microscopic with the Continental or the First although, in the aggregate, they handled a considerable proportion of the city's business." Perhaps more importantly according to James, "most were the outgrowths of the real estate boom" (ibid., p. 953). Indeed, Illinois banking law facilitated the chartering of small unit banks to compete with national banks, and thus contributed to the empowerment of relatively incompetent managerial staff whose interests often coincided with those of property developers (see **Appendix D** for more detail).

It has recently been claimed that the particular structure of mortgage lending characteristic of the 1920s (which changed radically in the 1930s) was particularly safe and could not have led to substantial trouble among mortgage borrowers and lenders. Specifically, three of the major characteristics of these so-called "balloon" mortgages are often mentioned: the average of 3- to 5-year maturity of these loans, a 50 per cent down payment, and repayment of the principal at the end (White, 2009; Field, 2011; Snowden, 2010). Since these loans were of such short maturity, it is likely that if the peak in new mortgage lending was reached around 1926, most of these loans would have been repaid by the start of the Depression. **Figure 5** shows the increase in new mortgages in Cook county at the time.

However, an inquiry into the practice of mortgage refinancing gives a different picture. Indeed, precisely because these loans were quite short-term (and perhaps for other reasons) borrowers in general expected to be able to roll over these loans at maturity. As Saulnier made clear in his 1956 study of 1920s mortgage lending in the US, "the much lauded feature of full repayment by maturity has been won at the price of extended maturities" (Morton, 1956, p. 8). The precise average contract length for loans made in 1926 was 3.6 years (for commercial banks), and 3.1, 2.5 and 3.2 years for loans made in 1925, 1927 and 1928 respectively (Morton, 1956, p. 174).[35] For 1927 loans, maturity would be reached around mid-1929, and for 1928 loans around mid-1931. In 1925 the amount of new mortgages in Cook County was slightly

[35] Since these figures are based on National Bureau of Economic Research survey of urban mortgage lending, their absolute precision may be taken with care. The survey was made in 1947 on a sample of 170 commercial banks, "representing about one-third of the commercial banks' total nonfarm mortgage portfolio as of mid-1945." It included "commercial banks… of all sizes" (Morton, 1956, p. 71).

lower than in 1927, but taking this year into account would still mean that a large portion of mortgages were expected to be refinanced in early 1929 (the average contract length for 1925 loans was 3.1 years). Morton points out that even for mortgages made before 1924 inclusive (so likely unaffected by the Depression), the realized maturity was in fact 7.5 years. For the 1925-29 period, the realised maturity was 8.8 years (ibid., p. 119). Evidence thus shows that it is unlikely that most of these loans would have been repaid by 1929.

In this context it is interesting to quote from a document published by the Federal Home Loan Banks in 1952 on the matter:

> "Another thorn was the uncertainty and recurring crises in the credit arrangements inherent in the then prevalent practice of buying a home with a first mortgage written for one to five years, without any provision for paying back the principal of the loan during that time. This latter device was a fair weather system, and, as is the case with most such systems, nobody suspected that there was anything wrong with it until the weather changed.
>
> What usually happened was that the average family went along, budgeting for the interest payments on the mortgage, subconsciously regarding the mortgage itself as written for an indefinite period, as if the lender were never going to want his money back… This impression was strengthened by the fact that lenders most frequently did renew the mortgage over and over again when money was plentiful…"
>
> (Federal Home Loan Banks, 1952, pp. 2-5).

As this excerpt shows, it is difficult to exclude the possibility that loans made in 1926-7 had at least some impact during the Great Depression.

There are unfortunately no good statistics on the rate of foreclosure for commercial banks in Chicago. Most of the numbers are provided by Hoyt (1933, pp. 269-270), and they concern the total amount of foreclosures: "Foreclosures were mounting rapidly, the number increasing from 5,818 in 1930 to 10,075 in 1931…, [and] reached a new peak in 1932, rising to…15,201." While it is thus not possible to describe banks' precise losses in real estate, it is still worth investigating the links between their mortgage shares and deposit losses as determinants of bank failure, which is the topic of the next section.

Section IV: Interactions with the liability side

This section examines the interactions between mortgages as a determinant of failure and the liability side of the balance sheet (in particular, deposit losses). Key variables used in this section are the rate of decline in deposits from June 1929 to December 1930 (just before the first failure cohort drops out), from December 1930 to December 1931 (just before the second failure cohort drops out), and the cumulative rate of decline from June 1929 to December 1931. Note that the data on deposits come from the last call before failure, which for some failures was almost six months before their failure date. As both 1931 and 1932 panics occurred in April and/or June, this means that on average, for banks that failed during panics, these variables do not reflect their losses at the last panic before failure.

The first thing to note is that all banks lost tremendous amounts of deposits. In 1930 the first failure cohort lost on average 22 per cent of deposits, and from 1930 to 1931 the second, third and survivor cohorts lost respectively 37 per cent, 59 per cent and 43 per cent.

Figure 6 shows the cumulative growth rate of total deposits, and **Table 8** shows each cohort mean as well as tests of differences between them. In such circumstances it would be expected that banks with the highest amounts of illiquid assets (mortgages in most cases) would not be able to liquidate their assets fast enough to cover the deposit losses and would thus fail.

However, it would be interesting to know to what extent the shock to liabilities was endogenous to a shock on mortgages since the real estate loan share was shown above to be the main *ex ante* predictor of failure for the first two cohorts. While this question is difficult to answer certain pieces of evidence can help to draw a few preliminary conclusions.

Table 9 provides results of an OLS model with deposit losses as the dependent variable and the usual *ex ante* variables on the right-hand side. From this model it appears that for June 1931 failures none of the fundamental variables explain their deposit losses between June 1929 and December 1930, thus suggesting that withdrawals from these banks were on average not information-based, despite an absence of significant panics in this period (Wicker, 1996).[36] This is confirmed by the figures on deposit losses provided above in **Table 8** where it appears that the difference in deposit losses between this first failure cohort and survivors is only borderline significant, and is not significant when comparing to other failure cohorts. On the other hand, for the second failure cohort, mortgages predict 1931 deposit losses very well, a result consistent with the fact that the magnitude of their withdrawals significantly differed from

[36] Note that bank statements were released to the public every six months by the State Auditor.

survivors'.[37] Yet even in this case deposit losses were very large for survivors (around 37 per cent as opposed to 59 per cent for June 1932 failures). Together these results suggest that while mortgages remain essential to explain Chicago bank failures, the role of mass, non-discriminating deposit withdrawals cannot be disregarded.

Mortgages were notoriously difficult to liquidate in this period**. Figure 1** showed how real estate loans increased as a share of total assets for all banks during the Depression, at the same time as assets as a whole were diminishing (see **Figure 14** in **Referee Appendix I**). Other types of loans, on the other hand, were promptly liquidated in this period. **Figure 7** shows the share of loans on collateral security owned by banks.[38] **Figure 8** shows the general decline in "other loans" as a share of total assets.

One may wonder whether banks failing in the first and second episodes did so simply because they had a particularly large share of mortgages regardless of their quality, or because of the particularly low quality of these mortgages. While the second hypothesis cannot be excluded, it is clear that they faced tremendous liquidity challenges.

The implications of these results for the current debate on the nature of the causes of bank failures during the Great Depression are not straightforward. On the one hand, some have emphasised the importance of massive and non-discriminatory bank runs which caused even solvent banks to fail (Friedman and Schwartz, 1963). On the other hand, many have insisted that banks suffered fundamental troubles beforehand, and that insolvent banks were the most likely to fail even during asymmetric-information panics (Calomiris and Mason, 1997, 2003; White, 1984). In particular, Calomiris and Mason (1997) have shown that Chicago banks failing during the June 1932 panic had in fact lost a higher amount of deposits in 1931, thereby indicating that depositors identified beforehand which banks were potentially insolvent, and that the differential in cumulative deposit losses may have been important in explaining actual failure.

While confirming Calomiris and Mason's (1997) findings regarding the importance of banks' fundamentals prior to failure, and insisting on the importance of mortgages in particular, the results on deposit losses may suggest a slightly different picture for the first failure cohort. Indeed for this cohort, it is the combination of impaired fundamentals on the one hand, and a

[37] Note that these figures differ slightly from Calomiris and Mason (1998)'s as their sample included national banks as well. Their survivor category also includes my June 1933 failures cohort.

[38] Very little is known about the type of collateral used for these loans. Guglielmo (2012) suggests that they may have been backed by both real estate and stocks and bonds, and thus depicts these loans as potentially very risky. Yet the relationship is almost inverse to that of the real estate loan share, although the differences between cohorts are not as clear-cut. Indeed, survivors and June 1933 failures always have a higher share of these loans than the other two failure cohorts.

general run on deposits on the other which seems to have mattered. For the second failure cohort, the results are clearer in the sense that depositors did discriminate against the banks having a large amount of mortgages in 1931. Nevertheless, survivors lost an enormous amount of deposits as well in this period, and it is not clear whether the differential in deposit losses was an important cause of failure. Determining whether this was the case is beyond the scope of this paper.

Section V: Conclusion

Many authors have shown the vulnerability of banks prior to their failure in the Great Depression. This paper shows that Chicago banks' risky behaviour had been a fact of most of the 1920s. Graphical analysis of these banks through time and dividing them into failing cohorts according to time of failure indicates an element of continuity in their behaviour. However, these graphs also reveal some heterogeneity regarding the importance of each balance sheet ratio for predicting failure and time of failure. In particular, it appears that differences between each cohort were larger for the real estate loan share, especially after 1927, thus suggesting that it was an important predictor of failure and of failure time. The survival analysis and multinomial logistic analyses show that it was indeed a particularly good predictor of failure for June 1931 failures since 1923, and for June 1932 failures after 1927. Further divergence thus occurred after this latter date. The last cohort, June 1933 failures, behaved differently.

Combining this analysis with that of liabilities, it appears that banks failing in each of the three episodes presented quite distinct characteristics. In the first episode, the banks that failed invested the highest amount in mortgages, and thus likely indulged in the Chicago real estate boom of the 1920s. However, depositors did not withdraw more of their assets from these banks in the year preceding failure; they in fact ran on most banks with little discrimination. The banks failing in the second episode surfed the boom, but suffered significantly larger withdrawals compared to other banks. These withdrawals were determined to a large extent by their share of real estate loans. Yet, even in this second episode, survivors lost a tremendous amount of deposits too. In the third episode, banks failed for reasons that are still relatively obscure. Their amount of retained earnings seems to have been an important factor, while their cumulative deposit losses up to December 1932 were extremely large and only slightly larger than survivors' and these banks (59 per cent and 63 per cent respectively). How exactly the deterioration in asset values affected each failure cohort is a question for future research.

Table 1. The Great Depression Cohorts

Bank Existed ?	June 1929	Dec 1929	June 1930	Dec 1930	June 1931	Dec 1931	June 1932	Dec 1932	June 1933
Survivors	YES	YES	YES	YES	YES	YES	YES	YES	YES
June 1931 Failures	YES	YES	YES	YES	**NO**	**NO**	**NO**	**NO**	**NO**
June 1932 Failures	YES	YES	YES	YES	YES	YES	**NO**	**NO**	**NO**
June 1933 Failures	YES	YES	YES	YES	YES	YES	YES	YES	**NO**

Source: Statements of State Banks of Illinois

Table 2. Great Depression Survivors and Failures, 1923-1933

	Number of Survivors	Number of June 1931 Failures	Number of June 1932 Failures	Number of June 1933 Failures	Failure Rate (as % of the 193 banks existing in June 1929)	Compound Failure Rate
Dec 1923	28	28	27	7		
Dec 1924	30	37	31	8		
June 1925	31	38	30	8		
June 1926	32	39	34	9		
June 1927	31	40	34	9		
June 1928	33	44	36	11		
Dec 1928	31	41	35	12		
June 1929	**35**	**46**	**36**	**14**	**0%**	**0%**
Dec 1929	35	46	36	14	7%	7%
June 1930	35	46	36	14	6%	12%
Dec 1930	35	46	36	14	7%	19%
June 1931	35	0	36	14	24%	43%
Dec 1931	35	0	36	14	10%	53%
June 1932	35	0	0	14	18%	72%
Dec 1932	35	0	0	14	3%	74%
June 1933	35	0	0	0	9%	83%

Source: Statements of State Banks of Illinois.

Notes: The 193 banks in total for June 1929 mentioned in the introduction include even those that are not part of any cohort, eg. those that failed between the chosen windows of failure. The actual bank total for June 1929 as the sum of each cohort is 131 banks.

Table 3. Weibull estimation for positive duration dependence, 1923-1933 and Cox proportional hazards estimation, 1929-33 (hazard ratios)[39]

	Weibull (1), 1923-33	Cox (2), 1929-33	Cox (3), 1929-33
Capital	4.087* (3.12)	.512 (.44)	
Reserve-deposit	.003** (.01)	.001** (.00)	
Gvt bonds to total bonds and stock	.101** (.10)	.159* (.17)	
Mortgages	45.748*** (59.40)	86.691*** (109.52)	192.614*** (236.59)
Banking house	1.052 (.50)	1.438 (.78)	
Retained earnings to net worth	.010*** (.02)	.0045*** (.01)	.001*** (.00)
Other real estate	5.346 (22.06)	53488.24** (292102)	240560.1 (1214028)**
Borrowed funds	.190 (.24)	6.539 (10.61)	52.152*** (72.85)
Security loans	.781 (.85)		
Other loans	2.309 (3.38)		
Likelihood	-19.443	-154.534	-160.501
Observations	1508	768	768
Prob>chi2	0.000	0.000	0.000

Notes: * significant at α= 0.01

** significant at α= 0.05

*** significant at α= 0.10

The denominator is total assets unless otherwise specified.

[39] This is the only model in this paper which does not use log transformations of the explanatory variables (see footnote above on geometric means and log transformations). This is because the inclusion of other real estate and borrowed funds in the model, for which many observations are zero, makes the use of log transformations result in a considerably smaller sample (the number of observations drops from 1508 to 139).

Table 4. Multinomial logistic model, December 1924

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	-3.517** (1.38)	-3.216** (1.33)	-2.982** (1.25)
Gvt bonds	-.067 (.12)	-.156 (.12)	-.071 (.12)
Mortgages	1.958*** (.64)	.436 (.40)	-.166 (.47)
Other loans	.708 (.46)	.738 (.45)	.082 (.66)
Banking house	.186** (.08)	.091 (.06)	.150 (.09)
Retained earnings	-1.329*** (.39)	-.933** (.37)	-.397 (.47)
Const	-3.220 (3.05)	-5.280 (2.80)	-6.608 (4.00)
Likelihood **Observations** **Prob>chi2**	-95.69 95 .012		

Table 5: Multinomial logistic model, June 1928

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	1.258 (1.12)	-.043 (1.04)	-.883 (1.24)
Gvt bonds	-.231 (.21)	-.273 (.21)	-.195 (.22)
Mortgages	1.548*** (.48)	.896** (.40)	-.078 (.35)
Other loans	.886** (.34)	.069 (.21)	.295 (.44)
Banking house	.229** (.10)	.067 (.05)	.067 (.08)
Retained earnings	-.559 (.35)	-.283 (.36)	-.736* (.37)
Const	6.528 (3.22)	.572 (2.97)	-4.336 (3.25)
Likelihood	-123.90		
Observations	117		
Prob>chi2	.002		

Table 8. Tests of differences between mean deposit growth rates

	Survivors				June 1931 Failures	June 1932 Failures			June 1933 Failures		
	(1)	(2)	(3)	(4)	(1)	(1)	(2)	(3)	(1)	(3)	(4)
Mean deposit growth	-.084 (.07)	-.301 (.05)	-.372 (.06)	-.585 (.08)	-.221 (.04)	-.174 (.03)	-.511 (.03)	-.592 (.03)	-.003 (.13)	-.427 (.10)	-.630 (.09)
June 1931 failures	1.806*										
June 1932 failures	1.298	3.628***	3.380***		-.995						
June 1933 failures	-.527	.707	.472	.366	-1.606	-1.288	-1.603	-1.550			
Observations					35				14		

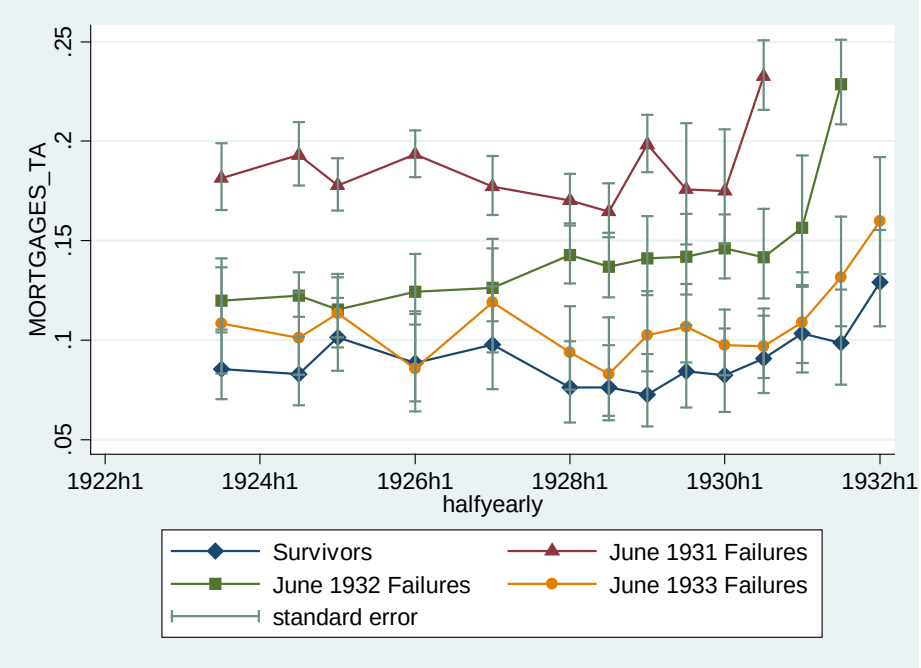
Notes: (1) June 1929 – Dec 1930 deposit losses
(2) Dec 1930 – Dec 1931 deposit losses
(3) June 1929 – Dec 1931deposit losses (cumulative)
(4) June 1929 – Dec 1932 deposit losses (cumulative)
First row gives the mean deposit growth rates (standard errors in parentheses).
Next rows give t-statistics of differences between two means.

Table 9. OLS Results (dependent variable: deposit losses), June 1929

	June 1931 failures & Survivors	June 1932 failures & Survivors			June 1933 failures & Survivors		
	(1)	(1)	(2)	(3)	(1)	(3)	(4)
Cash reserves to total assets	-.032 (.14)	.029 (.19)	.149 (.16)	.096 (.24)	.053 (.27)	.308 (.25)	.222 (.40)
Gvt bonds	.008 (.01)	.002 (.01)	.022 (.01)	.018 (.01)	.009 (.02)	.013 (.02)	-.011 (.02)
Mortgages	-.074 (.05)	-.074 (.05)	-.052*** (.02)	-.151*** (.05)	-.063 (.06)	-.113* (.07)	-.065 (.05)
Other loans	-.044 (.04)	-.012 (.04)	.021 (.04)	.011 (.05)	-.057 (.06)	-.005 (.06)	-.096 (.09)
Banking house	.004 (.01)	-.000 (.01)	-.017** (.01)	-.015* (.01)	-.001 (.01)	-.022* (.01)	-.014 (.02)
Retained earnings	.081 (.05)	.015 (.04)	.069 (05)	.089 (.07)	.013 (.04)	.070 (.06)	.190* (.10)
Const	-.190 (.37)	-.167 (.50)	-.043 (.43)	-.514 (.57)	-.173 (.68)	-.043 (61)	-.588 (.99)
Obs **R-squared** **Prob > F**	75 .11 .101	66 .09 .111	66 .30 .124	66 .31 .106	45 .08 .416	45 .34 .378	45 .17 .091

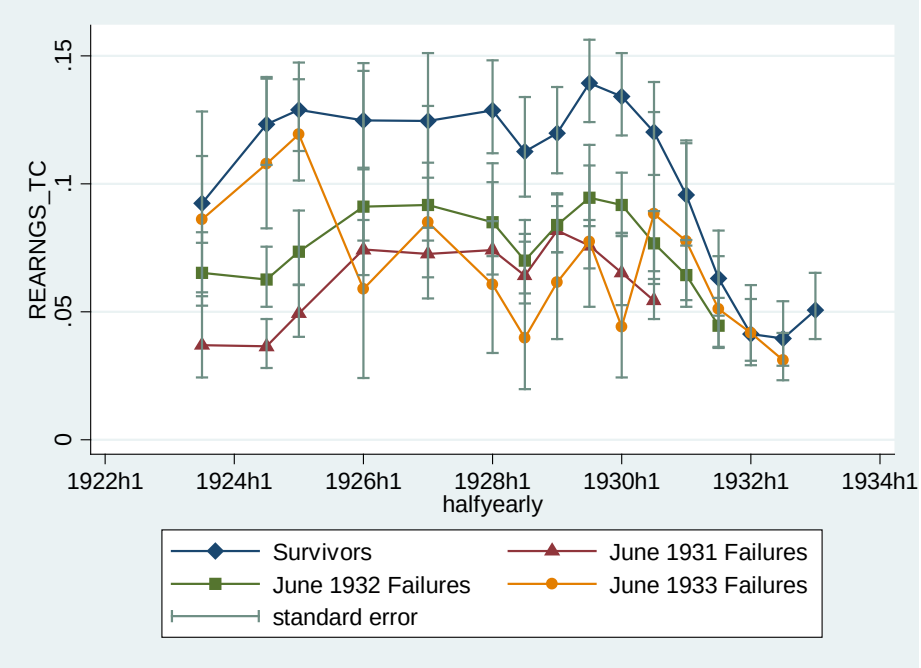
Notes: Dependent variable is deposit losses in
(1) June 1929 – Dec 1930
(2) Dec 1930 – Dec 1931
(3) June 1929 – Dec 1931 (cumulative)
(4) June 1929 – Dec 1932 (cumulative)

Figure 1: Real estate loans to total assets (all categories)



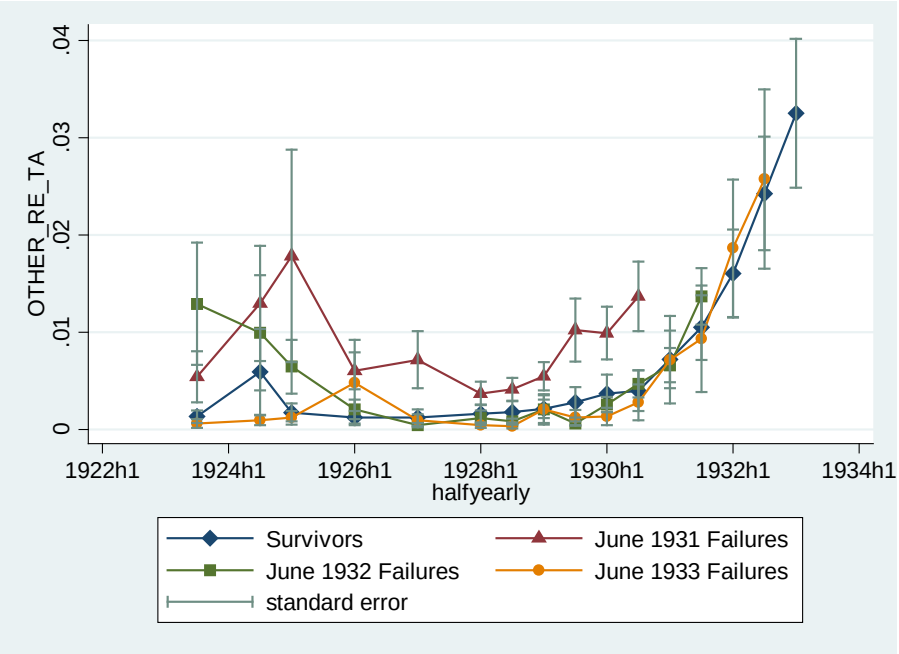
Source: Statements

Figure 2: Retained earnings to net worth



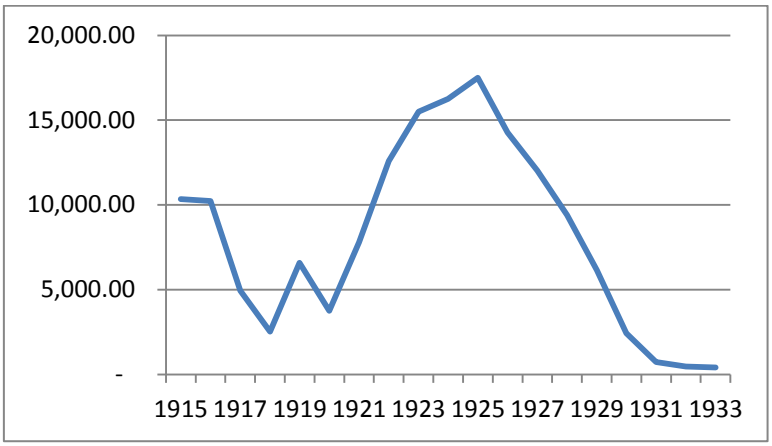
Source: Statements

Figure 3: Other real estate (repossessed property after foreclosure) to total assets.



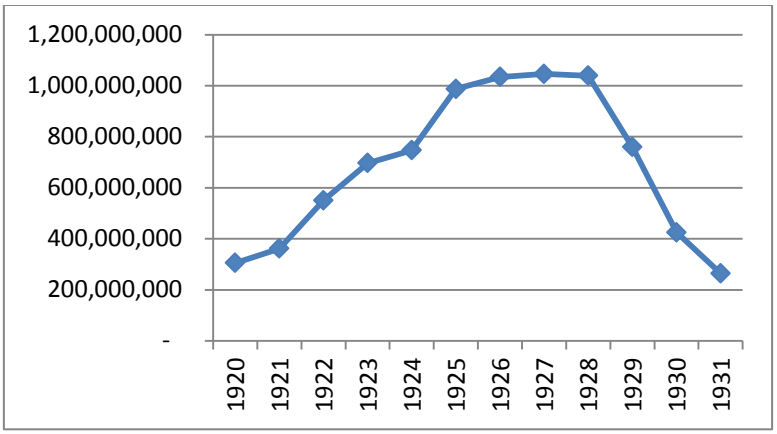
Source: Statements

Figure 4: Annual amount of new buildings in Chicago.



Source: Hoyt (1933, p. 475).

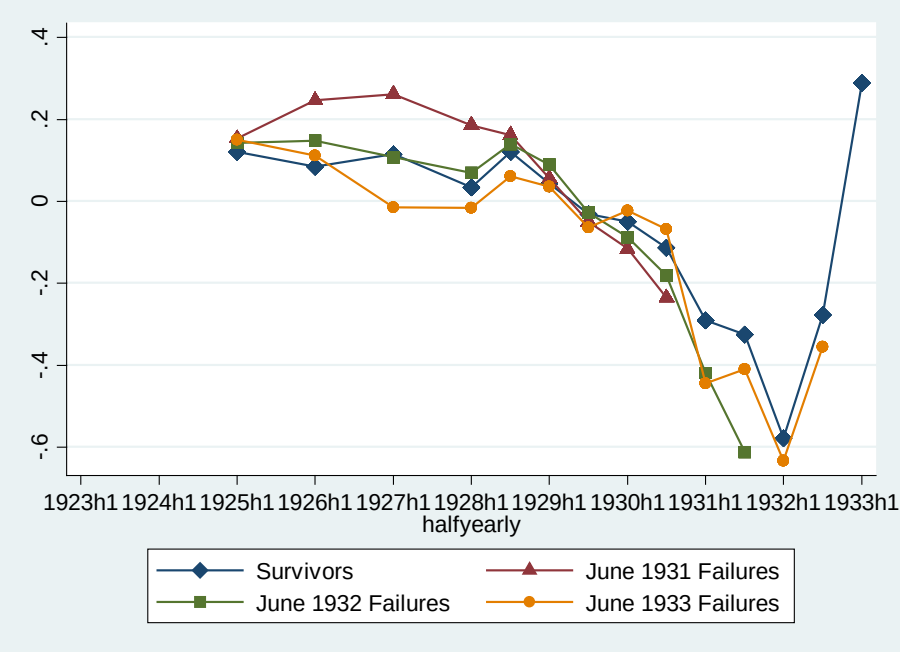
Figure 5: New mortgages and trust deeds, Cook County, Illinois ($).



Note: the source does not specify whether new mortgages include renewed mortgages or not.

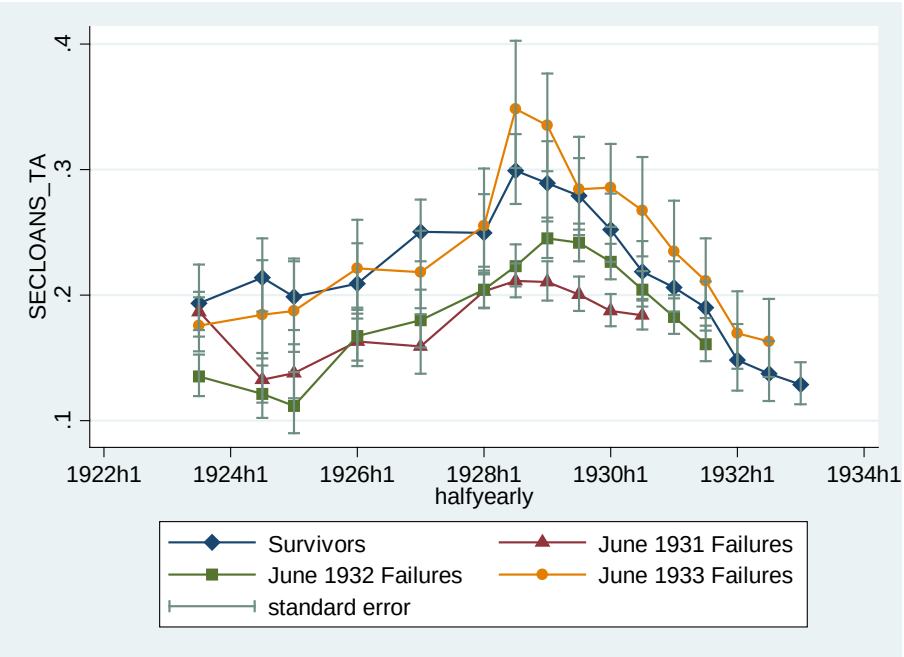
Source: Hoyt (1933, p. 473).

Figure 6: Median cumulative growth rate of total deposits (six months to six months)



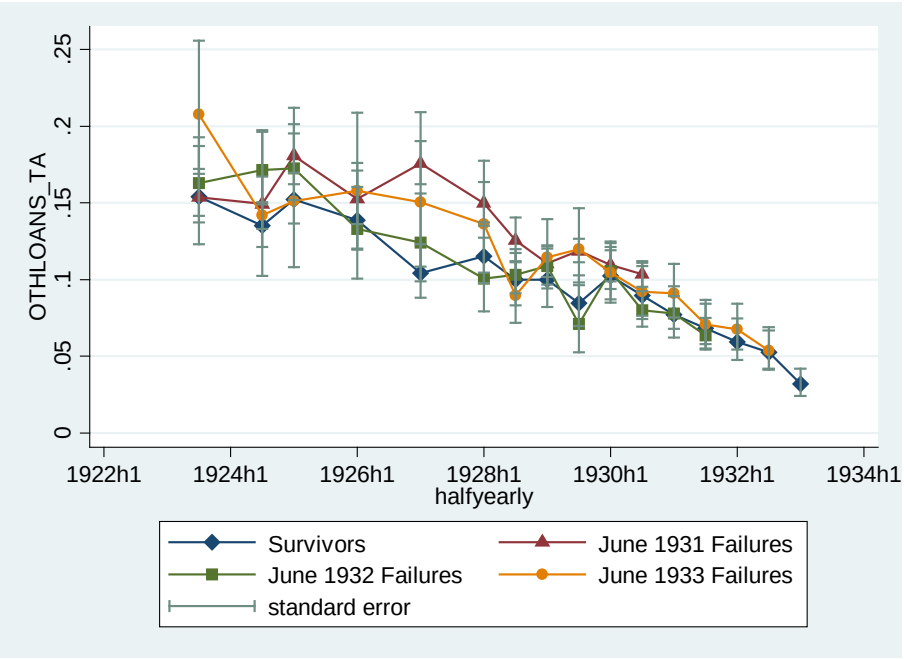
Source: Statements.

Figure 7: Loans on collateral security to total assets.



Source: Statements

Figure 8: Other loans to total assets.



Source: Statements

READER APPENDICES

Appendix A: Sources, name changes and consolidations

This study uses the *Statements of State Banks of Illinois*. The *Reports of Condition* from the Office of the Comptroller of Currency focus on all member banks (both state and national) nationwide at disaggregated levels, and contain very detailed information on individual banks, including qualitative information. For my study these reports would have proved insufficient: the extant reports for state member banks are available for the same dates as the *Statements* and are less complete since they include only state member banks, and for national member banks the only available reports are for December 1929 and December 1931.[40] There are no reports for 1930, which is a crucial year for this research. Focusing on state banks should not be a problem since as pointed out before, state banks accounted for 87.6 percent of all suspensions, whereas national banks accounted for only 12.4 percent of suspensions (White, 1984).

Creating cohorts is an essential way of keeping track of the same sample of banks, whether failures or survivors (aside from its advantages for economic analysis). Another essential feature of this aim is linked to name changes and consolidations. As previously mentioned, I had all the data needed for this purpose. Name changes were corrected in 26 instances. However, I still had to make decisions about whether to include a merger or acquisition in the failing or surviving categories.

Most authors include such consolidations as failures; that is, a bank that was taken over is usually considered a failure, and so are both of the banks that merged, even when the merger itself ended up surviving the Depression. For instance, Calomiris and Mason (2003) specify that their data "contain almost seventy different ways a bank can exit the dataset, ranging from all imaginable types of mergers and acquisitions to relatively simple voluntary liquidations and receiverships; [...] together, we term [them] failures." The *Reports of Condition* they used were more detailed in this respect, and I do not have data on "all types of mergers and acquisitions." Nevertheless, the *Rand McNally* directory gives sufficient detail at least on whether a merger or a simple takeover occurred.

As in Calomiris and Mason (2003) I thought reasonable to count as failures banks that were taken over by other banks. This occurred in 14 cases since June 1929. The banks that were taken over before June 1929 are not taken into account in the sense that only the resulting consolidation should be part of a GD cohort. Exactly the same applies to pre-June 1929 mergers: only the resulting merger can be part of a GD cohort and thus only this bank will be

[40] Details of the available volumes are described in Mason (1998).

tracked down as early as possible in the 1920s. Table 10 shows the mergers that occurred since June 1929 and whether the merger ended up failing or not.

For the mergers that had failed by June 1933, there is no apparent dilemma regarding how to classify the original consolidating banks. That is, when a merger ended up failing, the two original banks' data could be kept until they merge under a new name, at which point the new merger's data could be excluded from the dataset, making the two original banks failures at the time of consolidation. Yet this decision sounds slightly arbitrary given the fact that a healthy bank may have merged with a less healthy bank which may have dragged the former into bankruptcy. Nevertheless, the first two cases below are peculiar cases which would have made it impracticable to do otherwise. In the first case, the Foreman Trust and Savings Bank only starts existing in December 1929, which means that it is not part of any failing cohort. Therefore the merger's balance sheet could not effectively be divided among the two original banks. In the second case, the merger itself fails in August 1930 so would not be part of any cohort either. In the third case, it is actually possible to divide the merger's balance sheet in two equal parts and make the two original banks continue until the time the merger itself closes (only six months later). Results are robust for a different categorisation.

In the dataset only one state merger actually survived in Chicago: the Central Republic Bank and Trust Co, a July 1931 consolidation of Central Trust Co of Illinois and of Chicago Trust Co. It was decided that both banks would be kept "alive" by taking the items on the balance sheet of the new merger and splitting them in two parts proportional to each original bank's share of the total.[41]

Finally, it seems necessary to specifically discuss the case of the Continental Illinois Bank and Trust Company, which was the largest bank in Chicago in 1929, and which with the First National Bank (a national bank, so not part of the sample) "towered over the Chicago money market like giants" (James, 1938, p. 952). Together they were responsible for about half of the business transacted in the city (ibid.). Initially this bank was not included in the sample, for the simple reason that it apparently failed in December 1932 and thus could not be part of a particular cohort. However, it was soon discovered that the "failure" of the bank was in fact due to a rare phenomenon at the time: the fact that it adopted a national charter. The Chicago Tribune titled in October 1932 "CONTINENTAL GETS NATIONAL BANK CHARTER" which was at the time seen as a strange kind of event (Chicago Tribune, 1932). One of the reasons this happened, as the article explained, is that national banking laws were in the process of being changed to allow branching everywhere, including in states that technically forbade it. As the crisis made clear to some bank managers the potential benefits of branching, it is not surprising

[41] The results are robust either way.

that a strong bank like Continental Illinois sought after a national charter, and was granted one.[42] Although there is no data for this bank from the Office of Comptroller of the Currency for December 1932 nor June 1933, there is for December 1933. It was decided that this data would be included in June 1933, and the bank was manually categorised as a survivor.[43]

Table 10. Mergers between June 1929 and June 1933

Bank 1	Bank 2	New Merger	First Reporting Date	Failing?	Decision Made
The Foreman Trust and Savings Bank	State Bank	Foreman-State Trust and Savings Bank	Dec 1929	Yes, Jan 1931	Banks 1 and 2 FAILED
Roosevelt State Bank	Bankers State Bank	Roosevelt-Bankers State Bank	June 1930	Yes, Aug 1930	Banks 1 and 2 FAILED
Builders and Merchants State Bank	Capital State Savings Bank	Builders and Merchants Bank and Trust Co	Nov 1930	Yes, April 1931	Banks 1 and 2 FAILED
Central Trust Co of Illinois	Chicago Trust Co	Central Republic Bank and Trust Co	July 31	No	Banks 1 and 2 SURVIVED

Source: Statements of State Banks of Illinois, and *Rand McNally Bankers' Directory*.

[42] The adjective "strong" here is based on the fact that Continental Illinois in June 1929 had healthier ratios than even the average of survivors. I do not know of any other state banks in Chicago which adopted a national charter at that time.

[43] I thank Joseph Mason for kindly making this data available to me.

Appendix B: Additional multinomial logistic results

Table 12. Multinomial logistic model, December 1923

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	-2.037 (1.89)	-2.311 (1.84)	-2.411 (1.94)
Gvt bonds	-.135 (.12)	-.236** (.10)	-.130 (.20)
Mortgages	1.983*** (.72)	.560 (.50)	.272 (.82)
Other loans	-.034 (.33)	.225 (.35)	.640 (.73)
Banking house	.258* (.15)	.163** (.07)	.457 (.30)
Retained earnings	-.217 (.35)	-.059 (.33)	.067 (.67)
Const	.816 (4.08)	-2.229 (4.13)	-1.609 (4.68)
Likelihood **Observations** **Prob>chi2**	-83.20 80 .006		

Table 13. Multinomial logistic model, June 1925

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	-1.635* (.93)	-1.408 (.86)	-1.190 (.89)
Gvt bonds	-.010 (.10)	-.166* (.09)	-.085 (.11)
Mortgages	1.240** (.52)	-.017 (.34)	-.012 (.42)
Other loans	.784* (.47)	.353 (.43)	-.077 (.76)
Banking house	.141 (.09)	.028 (.05)	-.004 (.09)
Retained earnings	-1.091*** (.36)	-.888** (.36)	-.202 (.36)
Const	-.882 (2.45)	-4.525 (2.23)	-4.330 (3.41)
Likelihood	-106.20		
Observations	100		
Prob>chi2	0.000		

Table 14: Multinomial logistic model, June 1926

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	-1.851 (1.00)	-1.402 (1.00)	-1.242 (1.01)
Gvt bonds	-.163 (.14)	-.201 (.14)	.022 (.15)
Mortgages	2.171*** (.37)	.682* (.37)	-.156 (.31)
Other loans	.394* (.24)	.087 (.24)	.312 (.63)
Banking house	.157 (.06)	.023 (.06)	.086 (.12)
Retained earnings	-1.084** (.46)	-.518 (.41)	-.201 (.52)
Const	-.764 (2.77)	-2.758 (2.44)	-3.308 (3.38)
Likelihood	-110.		
Observations	106		
Prob>chi2	.022		

Table 15. Multinomial logistic model, June 1927

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	-.013 (1.65)	-.674 (.50)	-.764 (.68)
Gvt bonds	-.169 (.14)	-.216 (.14)	-.175 (.16)
Mortgages	1.131** (.54)	.340 (.30)	-.057 (.40)
Other loans	1.119*** (.33)	.121 (.26)	.421 (.57)
Banking house	.168** (.07)	.069 (.05)	.089 (.10)
Retained earnings	-.926** (.43)	-.283 (.40)	-.676 (.54)
Const	2.736 (3.94)	-1.259 (1.93)	-3.444 (2.70)
Likelihood	-117.17		
Observations	106		
Prob>chi2	.035		

Table 16. Multinomial logistic model, December 1928

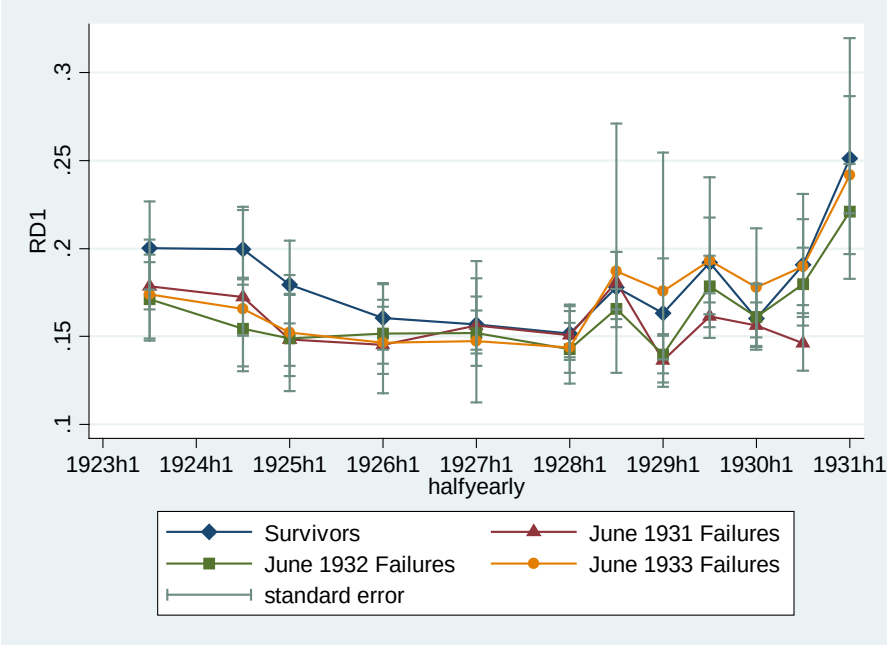
	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	1.171 (1.60)	-.531 (1.28)	-2.573 (1.72)
Gvt bonds	-.164 (.11)	-.179* (.11)	-.183 (.11)
Mortgages	1.823*** (.61)	.880** (.40)	.185 (.38)
Other loans	1.239*** (.43)	.262 (.37)	-.092 (.47)
Banking house	.193** (.09)	.060 (.06)	-.040 (.07)
Retained earnings	-.537* (.31)	-.500 (.32)	-.862** (.44)
Const	7.670 (3.73)	.103 (2.90)	-8.585 (4.39)
Likelihood	-115.97		
Observations	110		
Prob>chi2	.003		

Table 17: Multinomial logistic model, June 1929

	June 1931 failures	June 1932 failures	June 1933 failures
Reserve-deposit	-1.100 (.91)	-1.483* (.79)	-1.358 (.85)
Gvt bonds	-.144 (.10)	-.167* (.09)	-.120 (.09)
Mortgages	1.689*** (.50)	.776** (.37)	.374 (.27)
Other loans	.716* (.37)	.341 (.32)	.317 (.46)
Banking house	.172* (.09)	.054 (.06)	-.062 (.07)
Retained earnings	-.523 (.34)	-.369 (.34)	-.935** (.40)
Const	2.044 (2.65)	-1.660 (2.31)	-5.157 (2.97)
Likelihood	-132.87		
Observations	122		
Prob>chi2	.083		

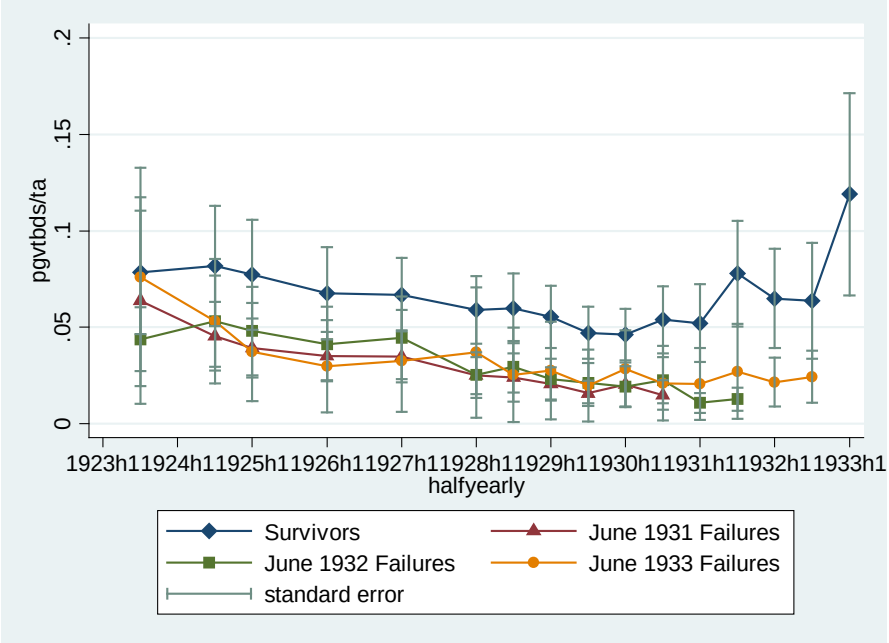
Appendix C: Additional Financial Ratios

Figure 9: Reserve-deposit ratio (includes cash, other cash resources, due from other banks and US government investments)



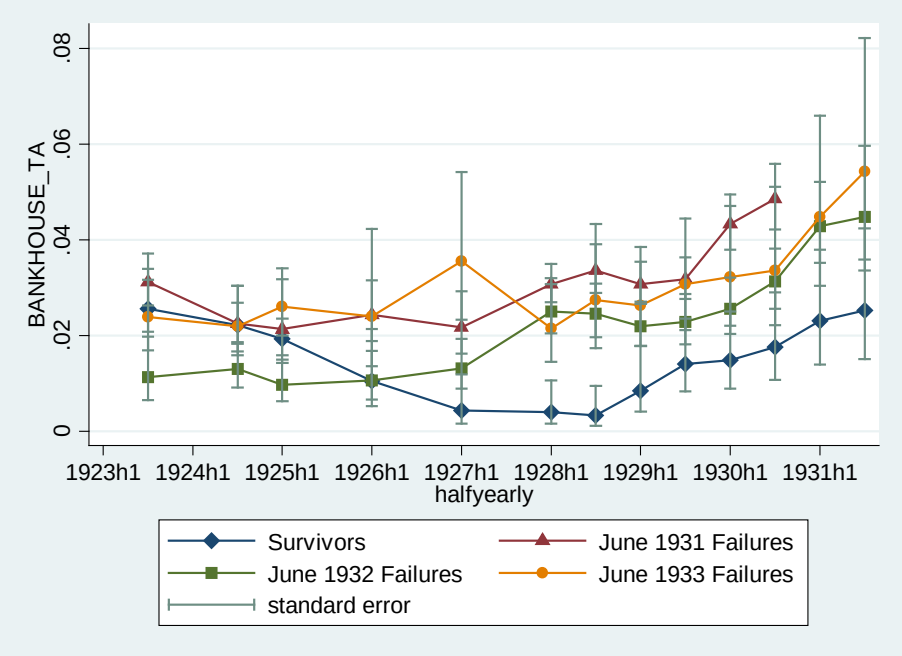
Source: Statements

Figure 10: US government bonds to total assets.



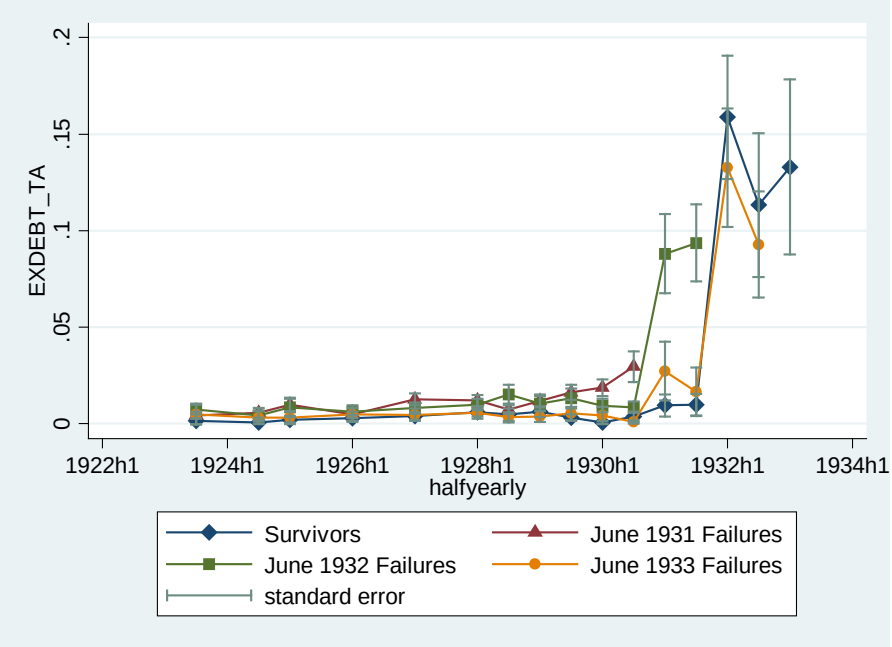
Source: Statements

Figure 11: Banking house, furniture and fixtures to total assets.



Source: Statements

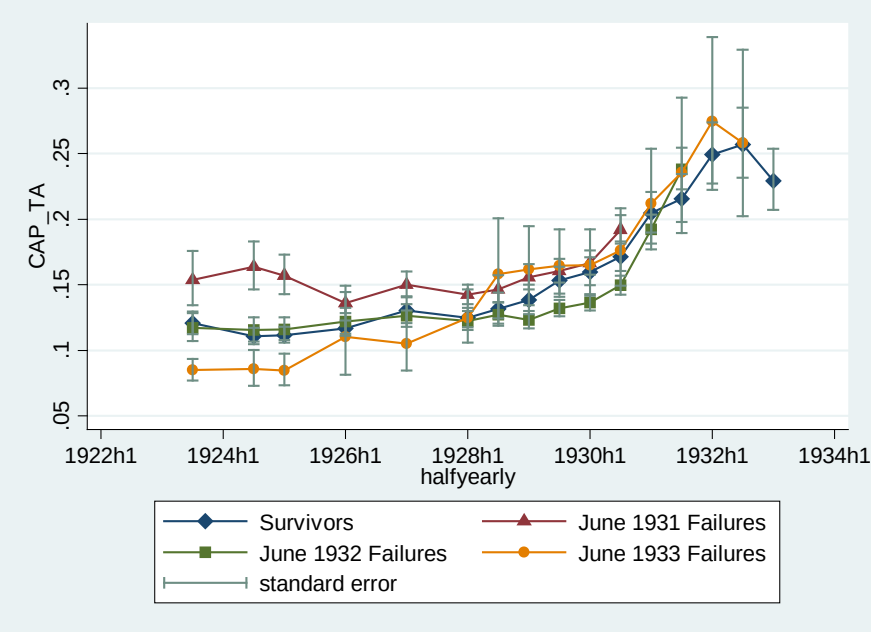
Figure 12: Bills payable and rediscounts to total assets



Source: Statements

Notes: Bills payable and rediscounts are a form of long-term, high interest debt, which is in fact a good indicator of bank trouble. This is due to the fact that when deposits are withdrawn from risky banks, they are forced to rely on high-cost, borrowed debt (Calomiris and Mason, 1997). **Figure 12** shows banks' race for liquidity as they started losing deposits, and a similar ordering as before is noticeable. As a side note, the June 1932 spike for survivors and late failures may be due to a Reconstruction Finance Corporation (RFC) plan to inject liquidity in banks that it deemed sound during the June 1932 crisis (Calomiris and Mason, 1997).

Figure 13: Capital to total assets



Source: Statements

Appendix D: Problems with unit banking

In the 1920s all Chicago state banks operated under the unit banking system; they were not allowed to open branches as Illinois banking law forbade it. Problems linked to unit banking were numerous. The main reason branch banking is usually thought of as an advantage is that it increases portfolio diversification. Branch banking can be contrasted to group or chain-banking as branches of the same bank can pool their assets and liabilities together. This is not true in the case of chain banking whereby different banks are affiliated through "interlocking directorates, common officers, or common stock ownership," and thus keep separate their assets and liabilities (Guglielmo, 2012). When there is a liquidity shortage at one of the banks in the chain, other member banks cannot simply transfer funds to that bank for help, a problem which does not even arise in the branch banking system. This may partly explain the collapse of the Bain chain in June 1931 which triggered the banking crisis at that time (James, 1938, p. 994).

Yet the lack of portfolio diversification was not necessarily directly due to the unit banking system. Indeed, Rodkey points to the fact that many small bankers prior to the depression felt a moral duty to "meet all demands for good local loans" (Rodkey, 1944, p. 4). It also seems that the lack of portfolio diversification was not the only disadvantage of unit banking. Rodkey blamed this system for fostering the incompetence of bank managers:

> "This system leads naturally to a multiplicity of small banks under local control, owned locally, and operated usually by citizens of the home community who may or may not have some knowledge of the fundamental principles of sound banking"
>
> (Rodkey, 1935, p. 147).

Thus, by triggering the establishment of many small banks, unit banking made it easier for inexperienced bankers to become managers.[44] Rodkey also pointed out that little attention was given to the ability of the borrower to meet his interest payments (ibid., p. 122).

Financial regulation in the 1920s and at the time of the depression was lax, and Illinois was one of the states with the most lax legislation (Guglielmo, forthcoming). Despite having set

[44] Nevertheless, the debate on branch banking has not completely ended. So far, at least four studies have shown that the branch-banking system was detrimental to bank survival during the depression. While Calomiris and Wheelock (1995) concede that it has usually been a good thing in U.S. history, they find that such was not the case in the Great Depression. Some of the largest branching networks collapsed in the 1930s, which may have been due to a form of moral hazard: branching banks thought they were better protected against local risk, and thus were less careful with their asset management (see also Carlson, 2001). Calomiris and Mason (2003) confirm the negative effect of branch-banking, and so does Carlson (2004). On the other hand, Mitchener (2005) finds a positive effect, while Gambs (1977) finds no effect at all.

a capital requirement of $25,000 (which was quite high compared to other states), nothing ensured that banks followed this requirement in Illinois. And indeed, in June 1929 90% of state banks did not (ibid.). Moreover, Rodkey deplored the competition between state banking departments and the federal Government for granting charters to promoters of new banks. This race to the bottom resulted in "laxity in the granting of new charters" and a "difficulty of limiting such charters to competent persons" (Rodkey, 1935, p. 147). Many states also "failed to recognize how vitally important the functions of bank examiners really [were]:"

> "The niggardly salaries paid to examiners lead to a large turnover in the examining staff. Men leave the staff while still young and thus have no opportunity to develop the essential qualities which have been described. As a matter of fact, it is customary to look upon a place on the examining staff of most states, not as a life position, but merely as a stepping-stone to the vice-presidency of some particular bank"
>
> (ibid., p. 160).

The relative incompetence of examiners, the ease with which almost any kind of manager could open a small community bank, and the resulting lack of experience of such unit bank managers in Illinois stand out as particularly serious problems when the Chicago mortgage boom is taken into account.

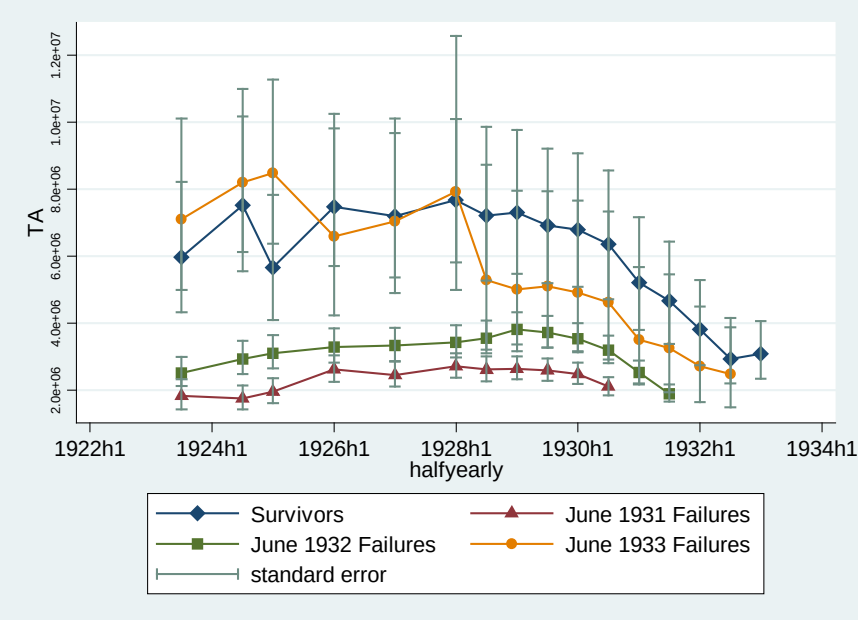
REFEREE APPENDICES

Referee Appendix I: Bank size

This appendix deals with the problem of bank size. First of all, it should be noted that bank size is not necessarily a problem in the sense that it does not necessarily introduce bias in the results. Most of the time it does not because authors make a point of studying mainly financial ratios (for example, US government investments to total bonds and stocks). When looking at the main indicators of bank size (total assets, total capital, and sometimes total deposits), it appears that larger banks did tend to have a higher survivor rate. However, one of the aims of this paper is precisely to show that this was certainly not the only reason for their survival (of course, it may be that there is a correlation between larger bank size and better management practice). **Table 11** shows the failure rate per size group, using the whole population of 193 banks (see notes below Table 2).

From this table it appears that there is indeed a relationship between size and failure, although this relationship is not very strong. True, whether large or small, banks had a high failure rate, always above 70 per cent. Nevertheless, it is still noticeable that banks with less than $250,000 in capital had 89 per cent chances of failing, whereas banks whose capital went beyond $800,000 "only" had a failure rate of 73 per cent. Looking at total assets for the whole period, the differences are even more striking (see **Figure 9**).

Figure 14: Total assets



Source: Statements

Table 11. Relationship between Bank Size and Failure Rate between June 1929 and June 1933

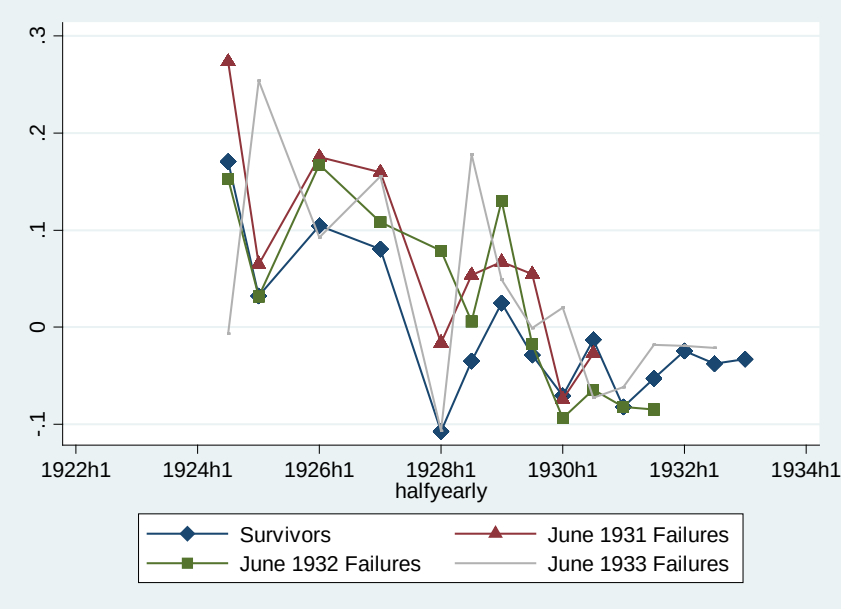
Total Capital	Number of Banks	Number of Failures	Failure Rate
Less than $250,000	87	77	89%
$250,001-$375,000	16	14	88%
$375,001-$800,000	45	36	80%
More than $800,000	45	33	73%

Source: Statements.

Referee Appendix II: Mortgage growth rates

One may wonder how a non-increasing share of real estate to total assets may have substantially weakened banks. First note that the data only start in 1923, which as will be seen in section IV below was already some way into the boom. The real estate boom may also be hidden by the fact that banks grew significantly throughout the 1920s. This is shown in Figures 10 and 11. **Figure 10** represents the median growth rate of mortgages as an absolute value, a useful (albeit highly approximate) measure in the absence of data on new mortgages made by year. It shows substantial growth rates between 1923 and 1927 for all cohorts, as well as the fact that June 1931 failures always had a higher growth rate than June 1932 failures, which had a higher growth rate than survivors (the June 1933 failures cohort, in light grey for better visibility, behaves much more erratically, as is often the case).

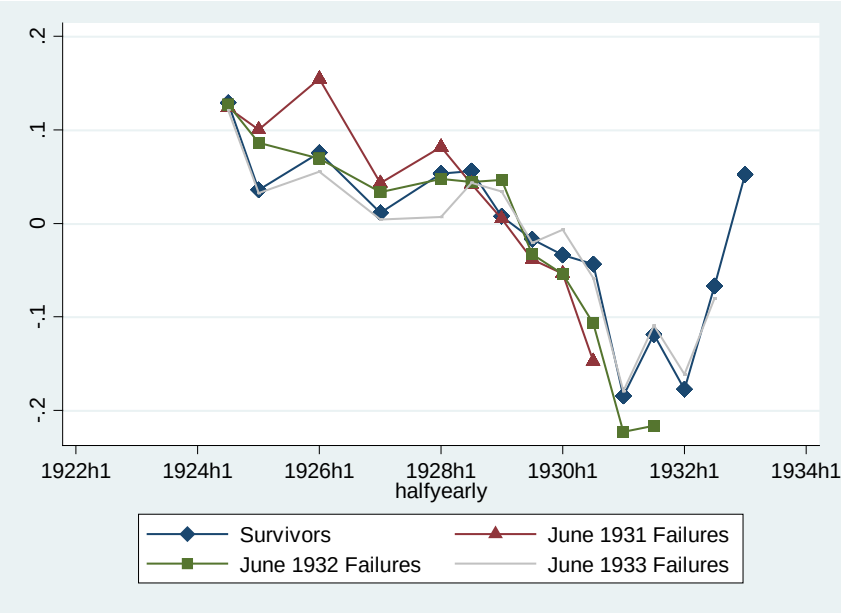
Figure 15: Median growth rate of mortgages (six months to six months).



Source: Statements

The graph of the median growth rate of total assets looks similar (see **Figure 11**), although most cohorts had a slightly higher mortgage than asset growth rate. It is interesting to see that the June 1931 failure cohort grew particularly fast in the mid-1920s.

Figure 16: Median growth rate of total assets (six months to six months).



Source: Statements

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