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DOCTORAL THESIS

**Sitting Ducks: Banks, Mortgage
Lending, and the Great Depression
in the Chicago Area, 1923-1933**

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the London School of Economics and Political Science for the
degree of Doctor of Philosophy*

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Declaration of Authorship

I, Natacha Postel-Vinay, certify that the thesis I have presented for examination for the MPhil/PhD degree of the London School of Economics and Political Science is solely my own work other than where I have clearly indicated that it is the work of others (in which case the extent of any work carried out jointly by me and any other person is clearly identified in it).

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Abstract

What are the main causes of bank failure? This thesis contributes to answering this question by focusing on the city of Chicago during the Great Depression, which experienced one of the country's highest urban bank failure rates. Focusing on the long-term evolution of state banks' balance sheets, it finds that what greatly mattered for their survival was the inherent liquidity of their pre-Depression portfolios. Indeed, all banks, including survivors, suffered tremendous deposit withdrawals. Yet those that ended up failing could be identified as weak *ex ante*. Such weaknesses were linked to the inherent liquidity of their portfolios: the higher their amount of long-term illiquid assets (in particular, mortgages) before the Depression started, the more likely they were to fail *ex post*.

The first paper identifies mortgage holdings as the most important predictor of bank failure, and explains how their intrinsic lack of liquidity came to matter more than their low quality. The second paper zooms in on mortgage contracts themselves, and finds that debt dilution due to the "second mortgage system" led to a lower probability of repayment. Nevertheless, this second paper shows that increased default rates affected banks only insofar as foreclosure was a long drawn-out process that lasted more than eighteen months in Illinois – a great impediment to bank survival in case of a liquidity crisis. The third paper asks whether mortgage securitization would have solved the liquidity issue, and uncovers the extent of actual securitization taking place at the time in Chicago. However unbinding commitments and the lack of a regulated exchange created inefficiencies not unlike those of today.

Together these results reassert banks' responsibility in liquidity risk management. While credit risk continues to be an essential feature of banking, and has been recognized as such, renewed attention needs to be paid to the ways in which banks manage the inherent liquidity of their portfolios.

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Introduction

Motivation

The recent financial crisis of 2008 has raised important questions about the origins of bank failures. While many had thought that deposit insurance would significantly reduce the risk of bank runs and thus induce only insolvent banks to fail, banks in fact did face massive runs on their uninsured liabilities, which contributed to the worsening of the financial crisis. The question as to what primarily causes a bank to fail – whether a deterioration in asset quality or funding illiquidity – has thus taken centre stage once again, with strong implications for government policy (Bordo & Landon-Lane, 2010; Brunnermeier, 2008; Calvo, 2013; Gorton & Metrick, 2013; Kacperczyk & Schabl, 2010; Reinhart, 2011; Shin, 2009; Schleifer & Vishny, 2011; Stein, 2013).

On the one hand, it is often thought that if a bank's loans and investments are of low quality (implying a low probability of repayment on such loans), there is no good reason for the government to provide any kind of support. Providing it with emergency liquidity will not solve its solvency problem, and bailing it out will likely lead it to take more risks than is collectively desirable. Bank managers should be made responsible for their institution's failure. On the other hand, if a bank faces a sudden run from creditors who cannot know the precise quality of that bank's investments, it is believed that it may fail unjustifiably, suggesting a role for the government in providing it with liquidity to help it meet creditors' demands. In this case, bank managers who invested in loans and securities with high probabilities of repayment and fail nonetheless are

allegedly not to be blamed.

This thesis started out as a project to answer this question in the context of one of the deepest economic crises in the modern world: the Great Depression. In particular, it aimed to focus primarily on the city of Chicago, which had one of the highest urban bank failure rates in the U.S. during this period.¹ While Chicago has been the subject of a number of studies (Calomiris & Mason, 1997; Esbitt, 1986; Guglielmo, 1998; Thomas, 1935), none of these studies undertook to analyze the evolution of Chicago bank portfolios over time, from 1923 to 1933. Likewise, few differentiated between banks that failed earlier in the Depression from those that failed later. In doing both of these things, I hoped to uncover unknown facts about the causes of bank failures in Chicago.

Seminal work on the Great Depression claimed that most banks in the U.S. Great Depression failed unjustifiably, due to the occurrence of widespread deposit withdrawals. Friedman & Schwartz (1963), for instance, posited that “a contagion of fear” among depositors spread throughout the country after the failure of Bank of United States in New York City in December 1930. According to this view, mass withdrawals in a series of banking crises led to security fire sales, a severe contraction of the money supply, and eventually to the unwarranted failure of thousands of banks, up until Roosevelt called for a national bank holiday in March 1933. The Federal Reserve’s role was seen as crucial in this interpretation. Handicapped by the recent death of former President of the Federal Reserve Bank of New York Benjamin Strong, the Federal Reserve found itself with no charismatic leader to manage operations and influence other Reserve Districts away from the real bills doctrine.² Consequently, the Banks failed to reach consensus and often refused to expand the way the Bank of New York would have wanted (see also Wheelock (1991) and Wicker (1996)).

While Friedman and Schwartz concentrated on monetary and banking aggregates

¹Out of 193 state banks in June 1929, only 35 survived up to June 1933.

²The real bills doctrine was a pervasive ideology at the time according to which commercial banks should only engage in short-term commercial business.

in their study of the contraction, researchers started looking into individual bank balance sheets as what they considered the most promising tool of investigation into the causes of bank failures. The idea was that if a number of balance sheet items were – together – good predictors of a bank’s failure well before the start of the downturn, this bank should be seen as fundamentally weak *ex ante*. A contrast was thus drawn between a bank’s unwarranted failure due to runs and a bank’s more justified failure, this time due to its own weaknesses.³

White (1984), for instance, compared the national banks that failed during the first banking crisis (November-December 1930) with those that survived,⁴ and found that as far back as 1927 many financial ratios determined banks’ survival.⁵ He concluded that the similarities between coefficients from year to year meant that the causes of failure did not change significantly as banks entered the Depression, thus lending support to Temin (1976)’s view of the first banking crisis, according to which the banks that failed then were not so different from those that failed in the 1920s due to a fundamental economic crisis in agriculture.⁶

Calomiris & Mason (2003) analysed a panel of 8,707 member banks (out of 24,504 banks in total) throughout the U.S. from 1929 to 1933, using data on individual banks

³Note, however, that in the latter case it was not always clear whether banks’ failure was deemed to be mainly the result of bank mismanagement in setting certain ratios (eg. of loans to total assets) or the result of a general fall in these assets’ values, or both. In all of these situations, however, banks’ weaknesses were seen as “fundamental.”

⁴National banks accounted for only 12.4 percent cent of all suspensions, whereas state member and non-member banks made up 2.4 percent and 85.2 percent of all suspensions, respectively. Member banks are members of the Federal Reserve System, and 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 affirmed 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.).

⁵Although White did not examine their differential predictive power in detail, these ratios were: loans and discounts to assets, cash items to total deposits, and bills payable and other liabilities to assets.

⁶White also drew attention to “swollen loan portfolios” and their link to agriculture. Although he did this informally, he explained that the banks that failed in 1930 were in agricultural areas which suffered from the post- World War I agricultural land boom and bust. This is certainly true at least for November 1930 failures, which occurred mainly in agricultural areas. The links between the failure of Caldwell and Company, a Southern banking giant, and the agricultural failures that followed still needs to be assessed. For more information on this bank see McFerrin (1939).

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 (late 1930 and March-August 1931). The only real exception was the fourth banking crisis (early 1933) which “saw a large unexplained increase in bank failure risk” (ibid.).

The majority of regional balance sheet studies (four in total) have concentrated on Chicago due to the outstanding magnitude of the Chicago failure rate. The two oldest studies used very similar methods and obtained similar results. Both Thomas (1935) and Esbitt (1986) 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. More recently, Calomiris & Mason (1997) found that banks failing during the summer 1932 crisis had more in common with other banks failing earlier in 1932 than with survivors, thereby suggesting that widespread depositor fear was not the primary cause of failure. These banks, in particular, had lower ratios of reserves to demand deposits, lower ratios of retained earnings to net worth, and higher proportions of long-term debt in December 1931. Finally, Guglielmo (1998) compared the June 1929 balance sheets of both Chicago and Illinois survivors with all Depression failures, using similar methods, and drew very similar conclusions.⁷

An important feature common to many of these studies was that banks’ weaknesses were not always clearly defined. They usually included a range of possible acts of negligence on the part of bankers, from the setting of low capital ratios to overinvestment in long-term loans to the maintenance of low cash reserves. This was a natural consequence of these studies’ main purpose, which was to find out whether pre-Depression

⁷Guglielmo (1998) provided much more detail on the history of Chicago banking in the 1920s, for instance describing at length the rise in mortgage lending, but he drew no explicit and quantitative conclusions about the role of real estate in banks’ failure.

balance sheet items could *together* efficiently predict bank failure.⁸ Yet concentrating on the comparative importance of each such item seemed important to me.

One reason for focusing on the relative importance of balance sheet items was that some of these items were in fact linked to banks' liquidity, not just to the quality of their investments in terms of credit risk or default probability. For example, the importance of cash holdings in predicting bank failure was obviously linked to banks' capacity to meet cash withdrawals. Likewise, long-term loans could be riskier from a liquidity point of view, because of the increased maturity mismatch. Some balance sheet items were indeed intrinsically more liquid than others, regardless of their quality.⁹ In other words, it became clear to me that if the best predictors of failure *ex ante* happened to be assets whose intrinsic liquidity mattered, banks' weaknesses in such cases could be more clearly specified as resulting from liquidity mismanagement.

Differentiating between credit risk mismanagement and liquidity risk mismanagement seems important when tackling Friedman and Schwartz's argument that the banks that failed were "simply" illiquid. According to Friedman and Schwartz, banks failed unjustifiably. But if banks face depositor runs, aren't those that are the most prepared for such runs, that is, those that have most attended to their portfolio's inherent liquidity, more likely to survive? Conversely, aren't those that have kept few liquid assets more likely to fail? Thus, if one considers that banks should as much as possible be able to face runs from creditors, then the question of liquidity risk management arises.¹⁰

⁸As noted earlier, in some cases it was not always clear whether banks' failure was deemed to be mainly the result of bank mismanagement in setting certain ratios or the result of a general fall in certain asset values, or both. For example, if the variable "other loans to total assets" was significant, it was sometimes unclear whether banks should be blamed for having too many of such loans, or if a general recession caused a fall in the value of those loans regardless of banks' actions, or both.

⁹Of course, higher quality usually increased an asset's liquidity if it could be sold in the secondary market or rediscounted at the Federal Reserve, which is still the case today. Note however that many loans at the time could not be sold in the secondary market and were not securitized, while the Federal Reserve was notoriously reluctant to rediscount many types of different assets during the Depression.

¹⁰Because of the natural mismatch between banks' assets and liabilities, any kind of run will constitute a major threat to their survival (Diamond & Dybvig, 1983). Nevertheless, the very fact that some banks survive runs shows that some banks can be in a better position than others to

The question may not arise in a world of deposit insurance, where runs are supposed to be unlikely. Nevertheless, the recent crisis has shown that runs can occur on uninsured parts of the credit system (Brunnermeier, 2008; Gorton & Metrick, 2013). Moreover, deposit insurance can increase moral hazard by inducing banks to take on more credit risk, which itself could potentially lead to a greater risk of a run on uninsured items. The rise of the shadow banking system makes such runs even more likely. Thus, taking into account the possibility of bank runs regardless of their origins, it is important for banks to maintain as liquid portfolios as possible.

Perhaps somewhat surprisingly, making banks responsible for their liquidity risk management – not just for their credit risk management – is an idea that has only taken hold in the past few years. While it was considered an important aspect of bank regulation from the nineteenth century to the early twentieth century in the U.S., it was then more or less abandoned, to be replaced since the 1980s with a much more pressing focus on credit risk and, in particular, capital requirements (Calomiris, 2008; Goodhart, 2008; Shin, 2009).

Determined to understand not just whether, but which items on Chicago banks' balance sheets predicted their failure *ex ante*, I thus undertook a longitudinal study of all Chicago state banks from 1923 to 1933. It is to the findings of my study that I now turn. I will then move on to the implications of my results for the literature on banking crises, for bank regulation, and for the literature on the Great Depression more generally.

Methodology and findings

Using a range of methods and evidence, this thesis finds that all banks in Chicago suffered tremendous deposit withdrawals. At the same time, it also finds that the banks that failed could be identified as weak *ex ante*. But these weaknesses can be

withstand them.

linked to the intrinsic liquidity of banks' portfolios – indeed, the banks that failed had significantly larger amounts of illiquid real estate loans. The proof that the illiquidity of real estate loans, not their quality, was the real problem, lies in the fact that mortgages had a 50 percent average loan-to-value (LTV) ratio, and that land values in Chicago did not fall by more than 50 percent until 1933. These results suggest that the banks that failed were partly responsible for their own failure, despite mass deposit withdrawals: they had invested too much in less liquid assets.

In the first paper of the thesis I focus exclusively on Chicago state banks' balance sheets from 1923 to 1933, and find that illiquid mortgages were the most important predictor of bank failure econometrically, together with deposit withdrawals. The second paper looks more precisely into mortgage contracts, and finds that they were conducive to low probabilities of repayment on some loans, but given the 50 percent LTV this high default risk mattered only insofar as it took 18 months on average to foreclose in Illinois, which made these loans particularly illiquid. In the third paper I ask whether mortgage securitization would have solved the liquidity problem, and find that mortgage securitization was actually conducted in Chicago to some extent. I show however that the securitization process was inefficient. Below I provide more detailed summaries of each paper.

Chapter 1: What Caused Chicago Bank Failures in the Great Depression? A Look at the 1920s

In this paper I analyze the balance sheets of all Chicago state-chartered banks from 1923 to 1933, dividing them into four ordered cohorts: the banks that failed between January and June 1931, those that failed between January and June 1932, those that failed between January and June 1933, and survivors. Examining banks graphically over time, real estate loans appear to be the best predictor of failure as well as of timing of failure. Cohorts are most clearly ordered in terms of their mortgage holdings: the

higher a bank's amount of mortgages, the earlier it failed. The ordering is not so clear for other items (such as capital, reserves, stocks and bonds, and other loans). This is confirmed econometrically through an ordered logistic model which suggests that mortgages have the largest predictive power over time.

At the same time, all cohorts suffered tremendous deposit withdrawals throughout the period, including survivors. What suggests that the liquidity of these loans mattered more than their quality in predicting failure? First, it should be noted that despite an average contract maturity of 3 to 5 years, most real estate loans were renewed in the 1920s, giving them a realized maturity of about 8 years. Thus, a portion of mortgages during the Depression would not be due until a number of months or years. Regarding mortgages that would come due, a high probability of default would not have induced any losses on banks due to the 50 percent LTV and a fall in land values that never exceeded 50 percent until 1933. Further evidence shows that bank failure rates within Chicago were uncorrelated with differences in land value falls. Finally, banks' capital ratios are not good predictors of failure, thus indicating that losses cannot have been the main cause of failure.

It is probable that prohibitions on branching played an important – though difficult to quantify – role in the failure of these banks. Illinois laws only allowed unit banking, which prevented banks from diversifying their assets both geographically and in terms of the nature of those assets. In the paper I document the significant building boom witnessed by Chicago in the 1920s, in which many unit banks were chartered simply to take part in the boom. This part of the paper suggests that banks perhaps would not have been so focused on real estate lending had they been allowed to branch in other parts of the country.

Chapter 2: Debt Dilution in 1920s America: Lighting the Fuse of a Mortgage Crisis

In this second paper I zoom in on mortgage contracts themselves, drawing on documentation from the National Association of Real Estate Boards archives in Chicago. Here I find that in spite of the 50 percent average LTV most first mortgage borrowers could not make a 50 percent down payment, and took on a 20 to 25 percent second mortgage from a different lender to help them make the high down payment. This in effect increased the default risk on first mortgages due to debt dilution, itself aggravated by a seniority reversal effect whereby second mortgages acquired *de facto* seniority over first mortgages. The latter was the result of the better amortization and shorter maturities of second mortgages.

This was problematic for banks only insofar as the foreclosure process in Illinois took more than eighteen months on average – a great impediment for a bank facing a liquidity crisis. Thanks to the 50 percent LTV, banks should not have incurred any substantial losses on these loans. Nevertheless, it is notable that debt dilution was, and still is, highly detrimental to credit. Albeit for different reasons than in the 1920s, the 2000s witnessed a rise in “piggyback” mortgage lending, which allegedly led to a similar debt dilution problem. Indeed, recent studies have shown that a large portion of defaulted loans in the current crisis had piggybacks attached to them.

Chapter 3: Out of the Shadows: Commercial Bank Mortgage Securitization in Great Depression Chicago

The first paper made clear that mortgages’ intrinsic lack of liquidity was what made it most difficult for banks to be able to face deposit withdrawals. One reason why mortgages were so illiquid was that they could not be rediscounted at the Federal Reserve, nor could they be sold in secondary markets. Then the question arises as

to whether the securitization of these loans would have substantially increased their liquidity. While this in theory should have been the case, this third paper suggests there were great inefficiencies in the way Chicago bankers experimented with mortgage securitization.

Indeed the first thing this paper does, based on new archival evidence from various sources, is to uncover the fact that a great number of Chicago commercial banks did engage in some form of mortgage securitization. For instance, to lend on a large building a bond would be issued and split into denominations as low as \$100, designed for both big and small investors. The aim was not exactly to increase the liquidity of existing loans – rather it was to release new funds for additional loans, and, in particular, very large loans.

Nevertheless, this paper suggests that even in this more humble securitization endeavour conditions for efficiency were not met. Bonds were sold over the counter and did not benefit from a regulated securities exchange. More importantly, there was never a full legal guarantee on the part of the issuer, so that most bonds remained off-balance sheets. The fact that these conditions were not met increased moral hazard and induced the quality of bond issues to deteriorate over time. Perhaps for those reasons, no secondary market for these securities ever developed in the 1920s. As will be seen later on, those inefficiencies are not dissimilar to those affecting U.S. mortgage securitization in the 2000s.

Implications for the literature on banking crises and bank regulation

This thesis highlights the importance of a combination of deposit withdrawals and illiquid investments as an explanation of bank failures. True, without any deposit withdrawals, it is unlikely that any of these banks would have failed. Does this imply

that their failure was unwarranted, and imposed unjustified social costs on the economy? This thesis suggests that the answer is no. Quite simply, it reasserts the role of banks in managing the liquidity of their portfolios, not just their credit risk. This is because, as the recent crisis has shown, funding illiquidity crises are likely to occur even in the presence of deposit insurance.¹¹

The concept of bank liquidity management is a relatively recent one.¹² Although implicit in many prewar accounts of banking crises, it has only become a research focus in the past few years. In a world without frictions, there would be no need for banks to manage the liquidity of their assets. The need for liquidity risk management arises from frictions such as informational asymmetries about asset quality, which may give rise, for instance, to bank runs (Cornett et al., 2011; Diamond & Rajan, 2011; Gatev et al., 2009; Goodhart, 2008; LaGanga & Vento, 2009).

It is not the aim of this paper to find the origins of deposit withdrawals in Chicago during the Depression. Two kinds of explanation have usually been put forward. On the one hand, Diamond & Dybvig (1983) describe them as being caused by depositors either observing a sunspot or suddenly needing an increased amount of cash. On the other hand, Calomiris & Kahn (1991) see bank runs as a form of monitoring: unable to costlessly value banks' assets, depositors observing a specific shock to those assets use runs to reveal the weakest banks.¹³ In Chicago, depositors in theory could know which banks had the highest amounts of mortgages thanks to official publications of balance sheet summaries every six months. This suggests that the cause of those withdrawals is indeed still to be determined.

¹¹The question of deposit insurance will be dealt with in more detail in the Conclusion of this thesis. While some might infer from such results that deposit insurance should be extended to all possible forms of bank liabilities, such an inference should certainly not be drawn too quickly. This is mainly because deposit insurance provides incentives for banks to take on more credit risk, and thus leads to increased moral hazard (Calomiris, 2010).

¹²The Board of Governors of the Federal Reserve System defines liquidity risk management as "(1) prospectively assess[ing] the need for funds to meet obligations and (2) ensur[ing] the availability of cash or collateral to fulfill those needs at the appropriate time by coordinating the various sources of funds available to the institution under normal and stressed conditions." See <http://www.federalreserve.gov/bankinfo/reg/topics/liquidity_risk.htm>.

¹³By "weak," they imply that banks suffered a shock to the quality and value of their assets.

Nevertheless, in terms of the consequences of those runs, the interpretation presented in this paper contrasts with Diamond and Dybvig's, in which bank runs are usually undesirable phenomena causing even "healthy" banks to fail. Although in their view "healthy" usually means "solvent," I suggest that a solvent but particularly illiquid bank *ex ante* is not necessarily healthy.

Now, of course a bank is by nature illiquid to some extent, due to its important role in maturity transformation. Moreover, banks may find themselves particularly illiquid due to freezing markets during crises in which asymmetric information makes it suddenly more difficult for potential investors to buy certain products whose quality they doubt. In the recent crisis, for instance, it became particularly difficult for banks to sell mortgage-backed securities, let alone at a reasonable price. It is for these reasons that central banks are often created with a mandate to provide liquidity against good collateral in times of liquidity crisis.

Although central bank intervention in a liquidity crisis is essential, following Bagehot's rule is not always an easy task. Good collateral is sometimes difficult to gauge, especially if the underlying assets have longer term maturities, implying increased uncertainty relative to repayment probabilities and values in the future (Goodhart, 1999, 2008). Some collateral may be good now but turn out bad in the future. Some of the recent interventions by the Federal Reserve, for instance, have been controversial for this reason (Bordo & Landon-Lane, 2010; Reinhart, 2011; Schleifer & Vishny, 2011; Gorton & Metrick, 2013; Stein, 2013).

This thesis's focus on banks' pre-crisis weaknesses suggests a preventive role for regulatory authorities in mitigating liquidity risk, thus making up for any lender-of-last resort deficiencies. Possible implications for bank regulation include renewed emphasis on cash ratios or other liquidity requirements, which were almost absent from the Basel I and Basel II regulations (whose main focus was on capital ratios), and recently made a comeback in the Basel III regulations (Basel Committee on Banking Supervision,

2008). However it is important to note that so-called liquidity coverage ratios can lead to some confusion and to regulatory arbitrage due to their complexity. Perhaps focusing on simple cash ratios would be a better alternative.¹⁴

Implications for the literature on the U.S. Great Depression

The implications of my research for the literature on the U.S. Great Depression more generally are intimately linked to its implications for the banking literature. The debate on the American Depression has focused to a large extent on the question as to, put simply, whether banks deserved to fail or not. Most recent scholarship has debated this question with relentless vigour (see, in particular, Bordo & Landon-Lane (2010), Calomiris & Mason (1997), Calomiris & Mason (2003), Guglielmo (1998), Richardson (2007), Temin (1976), and White (1984)). And this debate has in turn informed the debate on the causes of bank failure more generally (Calomiris & Mason, 1997; Calomiris & Wilson, 2004).

Although this dissertation does not emphasize the importance of credit risk in the failure of Chicago banks, it does highlight the significant role of the 1920s building boom in providing incentives for banks to greatly invest in real estate loans (see, in particular, Chapter 1). Unit banking may have also played a role in leading banks to focus on the opportunities offered by the local market rather than a more regional or even national one. In this sense, my research relates to an emerging literature on credit booms (Eichengreen & Mitchener, 2003; Schularick & Taylor, 2012).

It is also closely related to the more recent literature on the role of real estate in the U.S. Great Depression, which was spurred by the obvious role of mortgage lending in the more recent crisis. Most of this research focuses on the government's policy

¹⁴This has also been suggested by Calomiris et al. (2012), who also suggest that forcing banks to hold extra cash may help curb their incentives to take on excessive credit risk.

response to mortgage distress in the 1930s (Fishback et al., 2001, 2009, 2013; Rose, 2011; Wheelock, 2008).¹⁵ Nevertheless, both White (2009) and Field (2013) study the relationship between housing and the Depression, and argue that the 1920s real estate boom cannot have been an important cause of the following slump.

White (2009) focuses on the U.S. as a whole, and begins by documenting the nationwide residential and commercial real estate building boom which peaked in 1926, comparing it to the 2000s boom in terms of size. Although commercial banks were not the main lenders on real estate at the time – individuals, building and loans (B&Ls), and mutual savings banks were – he examines in some detail the question as to whether commercial banks may have significantly suffered from the boom and bust too, given the importance of bank failures in the Depression. He stresses that laws applied to nationally-chartered banks almost entirely forbade such banks to invest in real estate, up until some time into the boom, in 1927. He concedes, however, that since such laws did not apply to state banks, “real estate loans bulked much larger in the portfolios of state banks.”¹⁶ Yet, he points out that most banks were well-capitalized according to today’s standards. Moreover, citing data from Morton (1956), he emphasizes the conservative features of commercial bank mortgage loans at the time: their short (official) maturity and their particularly low loan-to-value ratio. This, to him, implies both that most loans would have been repaid by 1930, and that losses on such loans would have been quite small.

Field (2013) also tackles this question, and his arguments are quite similar to White’s, although he lays more emphasis on the fact that the ups and downs in real estate prices were milder than in the current crisis. Like White, he stresses the conservatism of commercial bank mortgage loans at the time, whose LTV rarely

¹⁵Temin (1976) dwells very little on the real estate market and simply mentions that a fall in construction may have been at the origin of the contraction. Note also that Snowden analyses the mortgage market in the 1920s and 1930s, without attempting to determine the existence of a causal link with the Depression (Snowden, 2003, 2010).

¹⁶Real estate loans accounted for 14 percent of assets and 23 percent of all loans in 1922, and reached 16 percent of assets and 27 percent of all loans in 1926 (ibid).

exceeded 50 percent and whose maturity was particularly short compared to today's loans. And like him, he points out that although the Chicago real estate boom is well-known from general accounts of the Depression (see, in particular, Wicker (1996)), Chicago probably had unique characteristics which set it apart from other cities in the U.S..

While Chicago certainly had the greatest real estate boom and bust in the country (along perhaps Florida), it also had one of the highest urban bank failure rates in the country. Moreover, Chicago was only unique in its number of commercial banks taking part in the building boom compared to other institutions. Indeed, although U.S. banks on average were not the main mortgage lenders, Bayless & Bodfish (1928) point out that Chicago was specific in that commercial banks supplied at least 50 percent of the market. It is also important to note that Chicago banks' mortgage lending terms do not seem to have differed significantly from average lending terms in the country. Their mortgages, like other mortgages in the country, also had a 50 percent LTV and an official maturity of only five years or less (*ibid.*). In other words, if one accepts that the Chicago bank failure rate was partly due to the city's outstanding real estate boom, one also needs to explain how this may have happened given the conservatism of these mortgages.

This thesis suggests that focusing on the illiquidity of these loans provides an answer to this question, and gives new insights into the role of mortgage lending in banking crises. Real estate loans were illiquid because although their official maturity was five years or less, their *de facto* maturity was much longer. In addition, these loans required no amortization payments, only interest payments, and a "balloon" payment at maturity. They could not be sold in a secondary market, nor could they be rediscounted at the Federal Reserve. This intrinsic lack of liquidity made banks holding a large share of mortgages particularly vulnerable to mass deposit withdrawals.

Outline

Chapter 1 will focus on Chicago banks' balance sheets. The focus of Chapter 2 will be mortgage contracts. Finally, Chapter 3 will deal with commercial bank mortgage securitization in Chicago. In the conclusion I will draw further parallels with the recent crisis, focusing on the role of mortgage securitization as a liquidity-enhancer, and will provide some suggestions for future research.

Chapter 1

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

1.1 Introduction

The recent financial crisis has raised significant questions about the causes of bank failures. While many thought that deposit insurance would prevent the incidence of bank runs and thus induce only insolvent banks to fail, bank runs did in fact occur (on uninsured liabilities) and greatly worsened the crisis. The question as to whether banks fail primarily because of reckless investments or because of funding illiquidity has thus once again been at the centre of debates, with strong implications for government policy (Bordo & Landon-Lane, 2010; Brunnermeier, 2008; Calvo, 2013; Gorton & Metrick, 2013; Kacperczyk & Schabl, 2010; Reinhart, 2011; Shin, 2009; Schleifer & Vishny, 2011; Stein, 2013).

On the one hand, it is commonly believed that if banks' asset quality is low (giving rise to low repayment probabilities on banks' investments), there is no good reason for the government to intervene. Providing them with emergency liquidity will not

solve their solvency problem, and bailing them out will likely lead them to take more risks than is collectively desirable. On the other hand, if banks face large withdrawals despite high-quality investments (with high *ex ante* probabilities of repayment), their failure is usually viewed as unjustified – suggesting a role for government intervention in the form of liquidity provision by the central bank.

The aim of this paper is to answer this question with respect to one of the deepest financial crises in modern times – the U.S. Great Depression. More specifically, it focuses on the city of Chicago, which had one of the highest urban bank failure rates in the country.¹ Although other authors have focused on Chicago, this paper’s method departs from previous research along three dimensions. First, I introduce a novel way of examining Chicago state bank failures by separating them into three cohorts ordered through time: June 1931 failures, June 1932 failures and June 1933 failures, each corresponding to six-month failure windows containing both panic and non-panic failures. Second, rather than focusing on banks’ 1929 balance sheets, I look at the evolution of survivors and failures during the full decade from 1923 all the way up to 1933. Third, I specifically examine the relative importance of each financial ratio in predicting failure.

This third methodological input seems particularly important, as recent balance sheet studies of Depression bank failures usually have not specifically focused on the comparative significance of each balance sheet ratio. Rather, they have concentrated on examining whether any pre-Depression ratios could *together* successfully predict bank failure. Such balance sheet studies naturally emerged in response to Friedman & Schwartz (1963)’s work, which by analyzing banking aggregates suggested that banks failed through no fault of their own, having to face mass deposit withdrawals in a series of banking panics. The idea behind balance sheet studies was to ask whether any pre-Depression balance sheet items could predict failure, in which case banks should better be seen as “weak” *ex ante* (White, 1984; Calomiris & Mason, 1997, 2003; Esbitt, 1986;

¹Out of 193 state banks in June 1929, only 35 survived up to June 1933.

Guglielmo, 1998; Thomas, 1935).

Such studies have greatly advanced our state of knowledge on the causes of bank failure in the Great Depression by showing that many banks indeed presented major weaknesses prior to their failure. Nevertheless, an important feature common to many of them was that these weaknesses were not always clearly defined. They usually included a range of possible acts of negligence on the part of banks, from the setting of low capital ratios to overinvestment in long-term loans to the maintenance of low cash reserves.²

Some of these items are in fact linked to banks' liquidity, not just to the quality of their investment (ie. not just to their probability of default). For example, the importance of cash holdings in predicting bank failure is obviously linked to banks' capacity to meet cash withdrawals. Likewise, long-term loans can be riskier from a liquidity point of view, because of the increased maturity mismatch. Some balance sheet items are intrinsically more liquid than others, regardless of their quality. In other words, if the best predictors of failure *ex ante* happen to be assets whose intrinsic liquidity matters, banks' weaknesses can be more clearly specified as resulting from liquidity mismanagement.

Differentiating between credit risk management and liquidity risk management seems important when tackling Friedman and Schwartz's argument that the banks that failed were simply "illiquid," and thus failed unjustifiably. Of course, banks are by nature illiquid to some extent, due to their important role in maturity transformation.³ But if banks face depositor runs, aren't those that are the most prepared for such runs, that is, those that most attended *ex ante* to their portfolio's inherent liquidity, more likely to survive? The question may not arise in a world of deposit insurance, where

²In some cases it was not always clear whether banks' failure was deemed to be mainly the result of bank mismanagement in setting certain ratios or the result of a general fall in certain asset values, or both. For example, if the variable "other loans to total assets" was significant, it was sometimes unclear whether banks should be blamed for having too many of such loans, or if a general recession caused a fall in the value of those loans regardless of banks' actions, or both.

³In addition, banks may find themselves particularly illiquid due to freezing markets during crises in which investors doubt the quality of certain assets and refuse to buy them at their original price.

runs are supposed to be unlikely. Nevertheless, the recent crisis has shown that runs can occur on uninsured parts of the banking system (Brunnermeier, 2008; Gorton & Metrick, 2013). Moreover, deposit insurance can increase moral hazard by inducing banks to take on more credit risk, which itself would potentially lead to a greater risk of a run on uninsured items.

This paper's principal finding is that real estate loan holdings are the best predictor of failure as well as of timing of failure. Examining cohorts of bank failures graphically through time, it appears that they are most clearly ordered in terms of their mortgage holdings: the higher a bank's amount of mortgages, the earlier it failed. The ordering is not so clear for other items (such as capital, reserves, stocks and bonds, and other loans). This is confirmed econometrically by an ordered logistic model, which suggests that mortgages have the largest predictive power.

At the same time, this paper also shows that all cohorts suffered tremendous deposit withdrawals throughout the period, including survivors. It therefore emphasizes mortgages' inherent lack of liquidity as a determinant risk factor. The quality of mortgages cannot have mattered significantly, for three reasons. First, most mortgages had a 50 percent loan-to-value (LTV) ratio, while land values did not fall by more than 50 percent in Chicago until 1933. This means that banks cannot have incurred any significant losses on defaulting loans. Second, although mortgages had short contract maturities (three to five years), most of these loans were renewed in good times, creating renewal expectations and increasing their *de facto* maturity. Long maturities, the absence of secondary markets and the inability for these loans to be rediscounted at the Federal Reserve meant that they were inherently less liquid than other types of loans. Third, I show that sectoral differences in land values within Chicago did not have a differential impact on bank failure rates.

The view that illiquid assets were the cause of the crisis is supported by evidence that all banks engaged in fire sales. In this process, mortgages could not be liquidated.

Indeed, 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 declining. Other types of loans, such as loans on collateral security and “other loans,” were promptly liquidated.

It is not the aim of this paper to find the origins of deposit withdrawals in Chicago during the Depression. Two kinds of explanation have usually been put forward. On the one hand, Diamond & Dybvig (1983) describe them as being caused by depositors either observing a sunspot or suddenly needing an increased amount of cash.⁴ On the other hand, Calomiris & Kahn (1991) see bank runs as a form of monitoring: unable to costlessly value banks’ assets, depositors observing a specific shock to those assets use runs to reveal the weakest banks.⁵ In Chicago, depositors in theory could know which banks had the highest amounts of mortgages thanks to official publications of balance sheet summaries every six months. This suggests that the cause of those mass withdrawals is indeed still to be determined.

In terms of the consequences of those runs, the interpretation presented in this paper contrasts with Diamond and Dybvig’s, in which bank runs are usually undesirable phenomena causing even “healthy” banks to fail. Although in their view “healthy” usually means “solvent,” I suggest that a solvent but particularly illiquid bank *ex ante* is not necessarily healthy.

Such findings suggest significant policy implications from a regulatory point of view. While not excluding an important role for lenders of last resort as a within-crisis solution, emphasis on banks’ long-term investments in illiquid assets implies a role for regulatory authorities in crisis prevention. Such regulatory measures may include, for instance, renewed emphasis on cash ratios or other liquidity requirements. This is all the more important given that central banks cannot always precisely predict the quality of banks’ collateral (especially in the case of assets maturing at a much later date), making their task a highly complex (and thus possibly imperfect) one

⁴Note that this increased need for cash could be one of the consequences of the Depression.

⁵By “weak,” they imply that banks suffered a shock to the quality and value of their assets.

(Goodhart, 2010).

Making banks responsible for their liquidity risk management – not just for their credit risk management – is an idea that has only taken hold in the past few years (Goodhart, 2008). While it was considered an important aspect of bank regulation from the nineteenth century to the early twentieth century in the U.S., it was then more or less abandoned, to be replaced by a much more pressing focus on credit risk, and, in particular, capital requirements, since the 1980s. Liquidity requirements were indeed almost absent from the Basel I and Basel II regulations, and only recently made a comeback in the Basel III regulations.⁶

The results of this paper also suggest 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.⁷ Given that the former region had one of the highest numbers of suspensions in the U.S., the close connection between bank failures and the real estate booms seems worth investigating.⁸ The link between real estate and the Depression is probably not a direct one, in the sense that the direct 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.⁹ 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

⁶However it is important to note that so-called liquidity-coverage ratios can lead to some confusion and to regulatory arbitrage due to their complexity. Perhaps focusing on simple cash ratios would be a better alternative.

⁷These were commonly used census regions. The Chicago boom can be compared in particular to those of Detroit, Pittsburgh, Philadelphia (see Wicker, 1996, pp. 16,18), and Toledo (Messer-Kruse, 2004). See also Allen (1931).

⁸The 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). Note that the state of Pennsylvania also had a particularly high failure rate (*ibid.*).

⁹See, in particular, White (2009), and Field (2013).

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.¹⁰

Section 1.2 reviews the literature on banks' fundamental troubles during the U.S. Great Depression. Section 1.3 introduces the data and empirical approach adopted in this study. Section 1.4 presents empirical results on the relative importance of financial ratios and on deposit losses. Section 1.5 focuses on the role of mortgages' illiquidity in the crisis. Section 6 concludes.

1.2 Literature review

This section provides a more precise overview of the literature on the Great Depression. The seminal work on the Depression was undoubtedly that of Friedman & Schwartz (1963), who emphasized a “contagion of fear” among depositors, which spread throughout the country after the failure of Bank of United States in New York City in December 1930. According to this view, mass deposit withdrawals occurred in a series of four banking panics until Roosevelt called a national bank holiday in March 1933. The money supply fell by one-third, due to a decrease in the deposit-currency ratio, which led to fire sales of securities and eventually to the failure of thousands of banks. The Federal Reserve's role was seen as crucial in this interpretation, since it generally failed to increase the amount of liquidity available in the system (see also Wheelock (1991) and Wicker (1996)). In a similar vein, Richardson & Troost (2009) found that the more expansionary policies characterizing the Atlanta Federal Reserve Bank led to lower bank failure rates in its District than the more timid policies of the St Louis District in the same state, Mississippi (see also Richardson (2007)).

Following in the footsteps of Temin (1976), White (1984), on the other hand, compared the balance sheets of the national banks that failed during the first banking crisis

¹⁰Chicago was home to 3,376,438 dwellers in 1930, as compared to New York City's population of 6,930,446 (Carter et al., 2006, Series Aa1-5).

(November-December 1930) with those of the banks that survived.¹¹ He found that as far back as 1927 many financial ratios determined banks' survival. He concluded that the similarities between coefficients from year to year meant that the causes of failure did not change significantly as banks entered the Depression. This study thus delivered crucial results 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.¹²

Calomiris & 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 (late 1930 and March-August 1931). The only real exception was the fourth banking crisis (early 1933) which "saw a large unexplained increase in bank failure risk" (*ibid.*).

The majority of regional balance sheet studies (four in total) have concentrated on Chicago 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)

¹¹National banks accounted for only 12.4 percent of all suspensions, whereas state member and non-member banks made up 2.4 percent and 85.2 percent of all suspensions, respectively. Member banks are members of the Federal Reserve System, and 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.*).

¹²White also drew attention to "swollen loan portfolios" and their link to agriculture. Although he did this informally, he explained that the banks that failed in 1930 were in agricultural areas which suffered from the post- World War I agricultural land boom and bust. Note that the links between the November 1930 failure of Caldwell and Company, the investment banking giant of the South, and the agricultural failures that followed still needs to be assessed. For more information on this bank see McFerrin (1939).

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. More recently, Calomiris & Mason (1997) found that banks failing during the summer 1932 crisis had more in common with other banks failing earlier in 1932 than with survivors, thereby suggesting that widespread depositor fear was not the primary cause of failure. These banks, in particular, had lower ratios of reserves to demand deposits, lower ratios of retained earnings to net worth, and higher proportions of long-term debt in December 1931. They also lost more deposits in 1931. Finally, Guglielmo (1998) compared the June 1929 balance sheets of both Chicago and Illinois survivors with all Depression failures, using similar methods, and drew very similar conclusions.¹³

Some studies have also emerged focusing on the role of real estate in the U.S. Depression. Most of this research examines the government's policy response to mortgage distress in the 1930s (Fishback et al., 2001, 2009, 2013; Rose, 2011; Wheelock, 2008).¹⁴ A number of these studies emphasize the role of the Depression in causing many building and loan (B&L) institutions to fail. Although commercial banks on average were not the main mortgage lenders – individuals, B&Ls, and mutual savings banks were –, Bayless & Bodfish (1928) point out that Chicago was specific in that commercial banks supplied at least 50 percent of the market. Both White (2009) and Field (2013) study the relationship between housing and the Depression, tackling the role of commercial banks in particular, and argue that the 1920s real estate boom cannot have been an important cause of the following slump. Some of their most important arguments will be examined below.

¹³Guglielmo (1998) provides much more detail on the history of Chicago banking in the 1920s, for instance describing at length the rise in mortgage lending, but he draws no explicit and quantitative conclusions about the role of real estate in banks' failure.

¹⁴Temin (1976) dwells very little on the real estate market and simply mentions that a fall in construction may have been at the origin of the contraction. Note also that Snowden analyzes the mortgage market in the 1920s and 1930s, without attempting to determine the existence of a causal link with the Depression (Snowden, 2003, 2010).

1.3 Data and empirical approach

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

1.3.1 Sources

There are two main sources of data that are detailed enough for this kind of study. The most complete one is the semi-annual *Statements of State Banks of Illinois*. Published by the Illinois Auditor of Public Accounts, they focus solely on state-chartered banks (both members and non-members of the Federal Reserve System). 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 for the first time.¹⁵ 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.¹⁶

The second main source of data used for this study was the *Rand McNally Bankers Directory*. This is a recognized source for tracking down bank name changes and consolidations (see Appendix 1.7.1 for more detail) .

¹⁵The NBER defines the early 1920s 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. Those years are not analyzed here as financial ratios would likely reflect the effects of this recession, which is not the subject of this study. 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. For example, of the 46 June 1931 failures only 18 existed in May 1920, whereas 28 of them already existed by December 1923.

¹⁶See Section 1.5.1 and Appendix 1.7.1 for information on national banks and reasons for their exclusion from this study.

Table 1.1: Classification of Great Depression Cohorts

Bank existed?	Jun 1929	Dec 1929	Jun 1930	Dec 1930	Jun 1931	Dec 1931	Jun 1932	Dec 1932	Jun 1933
Survivors	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
June 1931 Fail- ures	Yes	Yes	Yes	Yes	No	No	No	No	No
June 1932 Fail- ures	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
June 1933 Fail- ures	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

1.3.2 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 only includes the banks present at every point in time from June 1929 to June 1933. This system allows me to keep the same sample size over the Depression period (more on sample sizes below).¹⁷

The choice of the windows of failure was necessarily somewhat arbitrary but not entirely so. Chicago faced banking crises especially in the spring of 1931 and in the spring and early June of 1932 (Wicker, 1996, pp. 68-9, 112). 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 non-panic failures, so as not to bias the samples in a way that would include more of the latter.¹⁸

¹⁷For 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.

¹⁸No cohort was included for 1930 as the wave of bank failures following that of Caldwell and Company in November 1930 was confined to the Southern regions of Tennessee, Arkansas and Kentucky, while the failure of Bank of United States in December 1930 in New York did not lead to a panic at the time (Wicker, 1996, p. 58). On the other hand, the early 1933 crisis was nationwide, prompting me to analyze the few banks that failed in Chicago at the time (Wicker, 1996, p. 108) – although some may argue that many of these banks failed for exogenous reasons (many of these closures were ordered by the government). In general, while some banks failed before - and between - these cohorts, I selected the cohorts that seemed most important to explain Chicago bank failures.

Table 1.1 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 cohort which existed then. Often some of the banks that were part of a 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 1926.¹⁹ The variation in sample sizes will not directly affect the econometric analysis of the pre-1929 period as ordered logistic regression only uses cross-sections in one particular year. Table 1.2 shows the sample sizes for each cohort at various points in time.²⁰

1.3.3 Consolidations

Note first that some banks were closed at some point during the Depression 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). Including them in the analysis did not significantly change the results.

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). During the Depression, mergers were pointed out as “shotgun

¹⁹This 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. (In some rare instances a bank could temporarily close and re-open; this happened for a few banks especially around June 1926.) 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 in results between years to increase, especially for the June 1933 failures whose sample size is never over 12 banks in this period.

²⁰Note that in the regression models below sample sizes may not exactly equal those shown here. The reason is that some of these banks lacked data for some particular explanatory variables (including, for instance, such crucial variables as total deposits) and were thus automatically excluded by the statistical software.

Table 1.2: Survivors and failures

	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	46	36	14	24	43
Dec 1931	35	46	36	14	10	53
June 1932	35	46	36	14	18	72
Dec 1932	35	46	36	14	3	74
June 1933	35	46	36	14	9	83

Notes: The 193 banks in total for June 1929 mentioned in the sixth column and in the introduction include 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. *Source: Statements of State Banks of Illinois.*

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 & Mason (2003) in counting as failures banks that were taken over by other banks. This occurred in 14 cases from June 1929, though the results are robust to a different treatment.

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.²¹ Appendix 1.7.1 provides more detail on each merger, on the fate of Continental Illinois, and on name changes.

1.4 Empirical results

1.4.1 *Ex ante* balance sheet ratios

This section examines some of the most important ratios related to bank health. Note that geometric means are used throughout.²²

Figure 1.1 shows the share of real estate loans (both residential and commercial) to total assets by cohort from 1923 onwards.²³ In the pre-Depression era, survivors often

²¹The results are robust either way. Calomiris & Mason (1997) emphasize that “Central Republic was a solvent bank saved from failure by the collective intervention of other Loop banks.” This can be considered as controversial however, as several sources point to political motives for its rescue (see in particular Vickers (2011)).

²²Geometric means have been shown to be the most representative measure of financial ratios in the financial accounting literature (see, in particular, Lev & Sunder (1979), Mcleay & Trigueiros (2002), and Tippett (1990)). 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. I thank Mark Tippett for extensive statistical advice on the study of financial ratios.

²³There is no decomposition of real estate loans on the books of Chicago state banks.

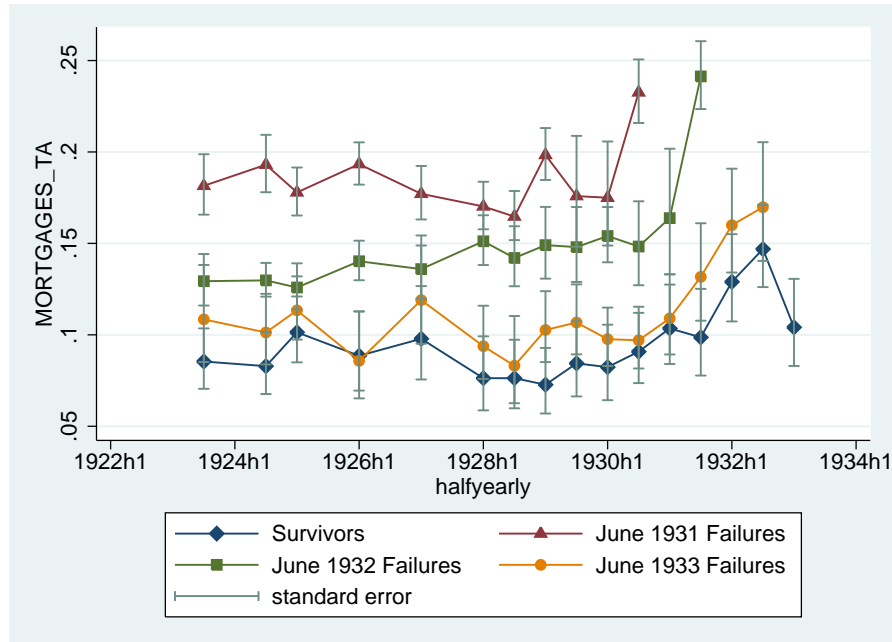


Figure 1.1: Real estate loans to total assets (all categories)

Source: Statements.

had the lowest mortgage share during most of the 1920s, followed closely by June 1933 failures.²⁴ June 1932 failures had a substantially higher share, and the June 1931 failures share was even higher. 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 is evidence that the banks which failed earlier were those that had invested more in real estate loans 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.²⁵ The question is of course to what extent this was the case, and the econometric analysis provided below will seek to give an answer.

The rise in the share of real estate loans after June 1929 is not surprising as most banks suffered a large fall in total assets (see Figure 1.14 in Appendix 1.7.5). It will be seen later on that other kinds of assets however declined as a share of total assets

²⁴Note that June 1933 failures may have failed for reasons other than pure market discipline, as many were closed during the national bank holiday in March 1933.

²⁵When 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.

during the Depression, indicating that real estate loans were more difficult to liquidate.

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 percent, Central Trust Company of Illinois around 2 percent, Harris Trust and Savings .05 percent, and the Northern Trust Company .7 percent.²⁶ The fifth largest bank was part of the latest failure cohort, and had a larger share invested in real estate (around 11 percent), which is representative of this cohort's average at the time.²⁷

Although no other balance sheet item is as clearly graphically ordered as mortgage holdings (see Figure 1.2 in this section, Figures 1.5, 1.7, 1.8, and 1.9 in Section 1.5.2, and Figures 1.10, 1.11, 1.12 and 1.13 in Appendix 1.7.2), it is necessary to test the precise importance of each variable econometrically. A simple way to do so is to introduce an ordered logistic model, which for this study presents several advantages over other estimation procedures. While in binary logistic models the outcome variable can only take one of two values (“survivor” or “failure”), ordered logistic regression allows the outcome variable to include several categories of failure, as well as the survivor one. And while a discrete-time hazard framework necessarily takes into account within (ie. post-1929) Depression variables, ordered logistic models allow one to focus exclusively on the impact of pre-Depression variables on the outcome.²⁸ This matters because external shocks may affect bank variables during the Depression, whereas *ex ante* variables are more likely to reflect banks' pre-Depression portfolio decisions, which are the subject of this study. Nevertheless I report discrete-time hazard estimations in

²⁶See also Appendix 1.7.5 on bank size.

²⁷One may also wonder how a non-increasing share of real estate to total assets may have substantially weakened banks. Appendix 1.7.6 deals with mortgage growth rates.

²⁸A discrete-time hazard model necessarily includes time-varying covariates up until the time of failure or censoring, which in this dataset occurred mainly during, not before, the Depression. Although it is in theory possible to test the significance of pre-Depression variables by adding interactions with time dummies, it is not possible to do so with this dataset as the hazard rate is very often zero prior to 1929. A hazard rate of zero means that time dummies will perfectly predict failure, which leads to such dummies being automatically omitted from the model.

Table 1.3: Variable definitions

Variable	Description
<i>failure_type</i>	ordinal dependent variable (1: June 1931 failure; 2: June 1932 failure; 3: June 1933 failure; 4: Survivor)
<i>size</i>	log (total assets)
<i>capital</i>	capital ÷ total assets
<i>reserve_dep</i>	(cash balances + due from other banks) ÷ (demand deposits + time deposits + due to other banks)
<i>gvtbds</i>	government bonds ÷ total assets
<i>secloans</i>	loans on security collateral ÷ total assets
<i>mortgages</i>	real estate loans (all categories) ÷ total assets
<i>other_re</i>	other real estate ÷ total assets
<i>othloans</i>	other loans ÷ total assets
<i>bankhouse</i>	banking house ÷ total assets
<i>rearnngs</i>	retained earnings ÷ total capital
<i>age</i>	dummy 1 = existed in May 1920; 0 = did not exist in May 1920

Notes: All variables except for *size* and *age* have been multiplied by 100 to ease interpretation of the odds ratios. The variable *mortgages* contains both residential and commercial mortgages as no decomposition was available on the original bank statements.

Appendix 1.7.3 for reference.

The dependent variable in the ordered logit model is thus an ordinal variable (*failure_type*) in which each category represents a bank's failure type. The categories are ordered so that the first category is June 1931 failure (1), the second category is June 1932 failure (2), the third category is June 1933 failure (3), and the last category is Survivor (4). Formally, I estimate a probabilistic model of bank failure such that

$$\begin{aligned}
 failure_type = & \alpha + \beta_1 size + \beta_2 capital + \beta_3 reserve_dep + \beta_4 gvtbds + \beta_5 secloans \\
 & + \beta_6 mortgages + \beta_7 other_re + \beta_8 othloans + \beta_9 bankhouse \\
 & + \beta_{10} rearnngs + \beta_{11} age + \epsilon
 \end{aligned}
 \tag{1.1}$$

where *size* is a value of bank size, *capital* is the capital ratio, *reserve_dep* is the reserve-deposit ratio, *gvtbds* is the share of U.S. government bonds, *secloans* represents loans

on security collateral (short-term loans backed by stock-market securities), *mortgages* is the share of real estate loans, *other_re* is the share of repossessed real estate after foreclosure, *othloans* is the share of other loans, *bankhouse* is the share banking house, furniture and fixtures (bank expenses), *rearngs* is retained earnings to net worth (a common measure of bank profitability),²⁹ and *age* is a dummy variable equal to 1 if a bank already existed in May 1920 and zero otherwise. The precise description of each variable is given in Table 1.3.

Table 1.4 presents the results for this model, in odds ratios. Each column represents a separate regression in which predictors are restricted to one particular year. For instance, the 1923 column helps find out which 1923 variables best predict failure during the Depression.

Clearly, many ratios predict failure quite well throughout the pre-Depression period. In particular, government bonds, other loans and especially retained earnings to net worth significantly each reduce the likelihood of failure. The relative importance of the latter is also illustrated in Figure 1.2, 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.

Of greater interest is the role of the real estate loan share. This variable stands out as the most significant one overall. Already in December 1923, for a one percent increase in the proportion of mortgages to total assets, the odds of surviving versus failing (all failure categories combined) were .94 times lower, holding other variables constant in the model.³⁰ This coefficient retains its significant predictive power compared to all other variables throughout the 1920s, up until the eve of the Depression (June 1929). No other variables is as consistently significant as the real estate loan

²⁹On 1929 financial statements retained earnings appear in the form of “undivided profits” or “the volume of recognized accumulated profits which have not yet been paid out in dividends.” See Rodkey (1944, p. 108) and Van Hoose (2010, p. 12).

³⁰Recall that all ratio variables were multiplied by 100. This makes interpretation of the odds ratios more practical, as a one-unit increase in the explanatory variable can now be interpreted as a “one percent” increase in the original proportion. An odds ratio above one increases the likelihood of survival, whereas an odds ratio below one decreases it.

Table 1.4: Ordered logistic model of bank failure (odds ratios), 1923-1929 (dependent variable: *failure_type*)

	Dec 1923	Dec 1924	Jun 1925	Jun 1926	Jun 1927	Jun 1928	Dec 1928	Jun 1929
<i>size</i>	1.620 (.56)	1.421 (.43)	1.207 (.29)	1.708** (.49)	1.568 (.46)	1.206 (.31)	1.120 (.28)	1.196 (.27)
<i>capital</i>	1.027 (.06)	.978 (.04)	1.059 (.04)	1.026 (.04)	1.051 (.04)	1.057 (.04)	1.056 (.04)	1.020 (.04)
<i>reserve_dep</i>	1.036 (.05)	1.037 (.04)	1.059 (.04)	.988 (.03)	.935 (.04)	.965 (.04)	.970 (.02)	1.007 (.02)
<i>gutbds</i>	1.070* (.04)	1.044 (.04)	1.070* (.04)	1.046 (.05)	1.048 (.05)	1.070 (.06)	1.061 (.05)	1.141** (.06)
<i>secloans</i>	.987 (.03)	1.020 (.03)	1.025 (.03)	.999 (.02)	1.035 (.02)	1.030 (.02)	1.044** (.02)	1.023 (.02)
<i>mortgages</i>	.937** (.03)	.928** (.03)	.951* (.03)	.919*** (.03)	.940** (.03)	.940** (.03)	.930** (.03)	.927*** (.03)
<i>other_re</i>	.985 (.12)	1.037 (.09)	.937 (.12)	.560** (.15)	.477* (.20)	.670 (.23)	.568 (.24)	.776 (.18)
<i>othloans</i>	1.012 (.02)	.971 (.02)	.969* (.02)	.978 (.02)	.951** (.02)	.973 (.02)	.938** (.02)	1.003 (.02)
<i>bankhouse</i>	.961 (.08)	1.000 (.08)	.939 (.07)	1.072 (.05)	.992 (.07)	.922 (.06)	.940 (.05)	1.003 (.06)
<i>rearngs</i>	.995 (.03)	1.030 (.03)	1.025 (.03)	1.057** (.03)	1.068** (.03)	1.035 (.02)	1.036 (.03)	1.060** (.03)
<i>age</i>	.828 (.49)	1.103 (.55)	1.334 (.64)	1.294 (.64)	1.664 (.80)	2.189* (1.00)	3.249** (1.55)	(1.290) (.55)
n	86	102	103	111	112	122	116	128
<i>Prob > chi²</i>	.006	.000	.000	.000	.000	.000	.000	.000
Likelihood	-98.78	-109.87	-111.91	-119.98	-116.85	-135.62	-125.21	-140.32

Notes: *** significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, * significant at $\alpha = 0.10$. The dependent variable (*failure_type*) is an ordinal one, ordered in the following way: 1. June 1931 failure; 2. June 1932 failure; 3. June 1933 failure; 4. Survivor. Each column represents a separate model run with variables taken each year before the start of the Depression. The table shows odds ratios, with standard errors based on the original coefficients in parentheses. An odds ratio above one increases the likelihood of survival, whereas an odds ratio below one decreases it. Each variable except for *size* and *age* has been multiplied by 100 so that a one unit increase can be interpreted as a one percentage increase in the ratio. *Source: Statements.*

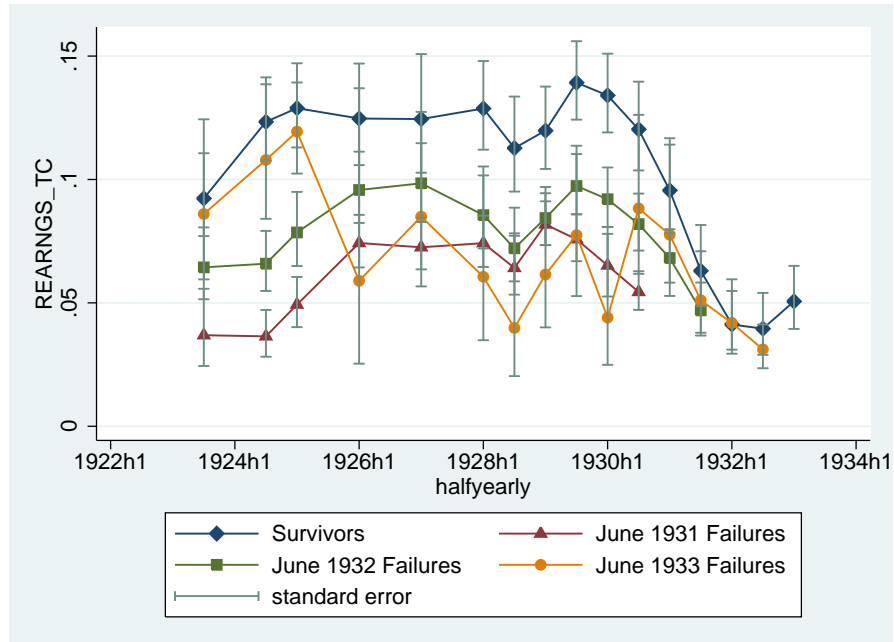


Figure 1.2: Retained earnings to net worth

Source: Statements.

share throughout the period.³¹

³¹The relative insignificance of *other_re* will be explained in more detail in Section 1.5.2.

1.4.2 Deposit losses

This subsection takes a closer look at the liability side of the balance sheet (in particular, deposit losses). Key variables used here are the cumulative rates of decline in deposits³² from June 1929 to December 1930 (just before the first failure cohort drops out), from June 1929 to December 1931 (just before the second failure cohort drops out), and from June 1929 to December 1932 (just before the third one drops out). 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.³³

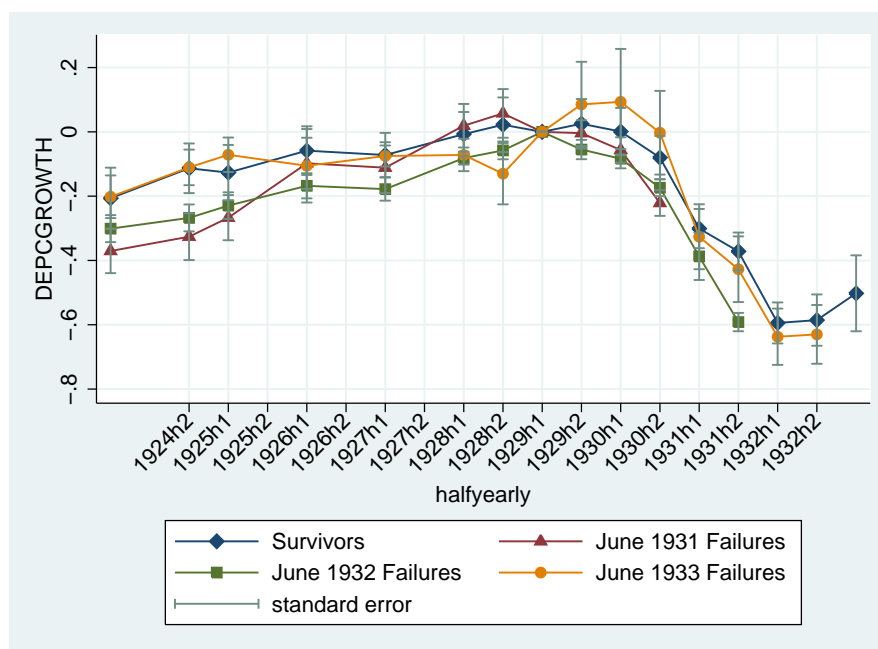


Figure 1.3: Mean cumulative growth rate of total deposits (base time: June 1929)

Source: *Statements*.

Clearly, all banks lost tremendous amounts of deposits. In 1930 the first failure

³²Total deposits include demand deposits, time deposits and due to other banks.

³³A survival model for the liability side is available in Appendix 1.7.7. It confirms the importance of deposit losses in predicting failure, while rejecting any significant role for capital.

cohort lost on average 22 percent of deposits, and from 1930 to 1931 the second, third and survivor cohorts lost respectively 59 percent, 43 percent and 37 percent. Figure 1.3 shows the cumulative growth rate of total deposits, and Table 1.5 shows each cohort mean as well as tests of differences between them. In this table, 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, the magnitude of the second failure cohort's withdrawals significantly differs from survivors'.³⁴ Yet even in this case deposit losses were very large for survivors (around 37 percent compared to 59 percent for June 1932 failures). By June 1932, survivors themselves had lost an outstanding 60 percent of total deposits.³⁵ Together these results suggest that while mortgages remain essential to explain Chicago bank failures, the role of mass deposit withdrawals cannot be disregarded.

Now, the causes of these large withdrawals in preceding non-panic windows are open to debate. Tentative answers may be found in the literature on bank runs. According to Diamond & Dybvig (1983), bank runs are undesirable equilibria in which borrowers observe random shocks (sunspots) and withdraw their deposits, thus causing even "healthy" banks to fail. Others, such as Calomiris & Gorton (1991) and Calomiris & Kahn (1991), have stressed the role of signal extraction in the context of asymmetric information between depositors and bank managers. In this view, depositors observe a specific shock to banks' assets, but do not know which banks have been most hit. They therefore run on all banks, which causes only the weaker banks to fail. Bank runs thus act as a form of monitoring: unable to costlessly value banks' assets, borrowers use runs to reveal the unhealthy banks.

In Chicago, depositors in theory could know which banks had the highest amounts

³⁴Note that these figures differ slightly from Calomiris & Mason (1997)'s as their sample included national banks as well. Their survivor category also includes my June 1933 Failures cohort.

³⁵Note that some central-reserve city banks in the Loop, most of which ended up surviving, benefited from an inflow of deposits in the summer 1931 crisis as outlying banks closed and some of the money was redeposited in the Loop banks (see, in particular, Mitchener & Richardson (2013) and U.S. Congress (1934b, part 2, p. 1062)). Despite such inflows their total cumulative deposit losses were very large, as Figure 1.3 suggests.

Table 1.5: Tests of differences between mean deposit growth rates

	Survivors			June 1931	June 1932		June 1933		
	(1)	(2)	(3)	(1)	(1)	(2)	(1)	(2)	(3)
Mean	-.08 (.07)	-.37 (.06)	-.59 (.08)	-.22 (.04)	-.17 (.03)	-.59 (.03)	-.00 (.13)	-.43 (.10)	-.63 (.09)
June 1931 (t-stat)	1.806*								
June 1932 (t-stat)	1.298	3.380***		-.995					
June 1933 (t-stat)	-.527	.472	.366	-1.606	-1.288	-1.550			
Observations	35			46	36		14		

Notes: * significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, *** significant at $\alpha = 0.10$.

(1) June 1929 - Dec 1930 cumulative deposit losses;

(2) June 1929 - Dec 1931 cumulative deposit losses;

(3) June 1929 - Dec 1932 cumulative deposit losses.

First row gives the mean deposit growth rates (standard errors in parentheses). Next rows give t-statistics of differences between two means. *Source: Statements.*

of mortgages thanks to official publications of balance sheet summaries every six months. This suggests that the initial cause of withdrawals is indeed still to be found. Nevertheless, the fact that differences in withdrawals did widen to some extent after June 1931 may be explained by a learning effect on the part of creditors. As creditors witnessed withdrawals and the failure of banks with the largest amounts of mortgages in the first episode, they withdrew more from banks with larger amounts of such assets subsequently. However this information effect cannot entirely explain, for instance, why survivors themselves ended up losing nearly 60 percent of their deposits.

So why did mortgages matter so much in practice, given large deposit withdrawals? Did banks fail simply because they had a particularly large share of illiquid mortgages, or because of the particularly low quality (in terms of underlying values) of these mortgages? It is to this question that I now turn.

1.5 The role of mortgages

The aim of this section is to explain the importance of mortgages as a determinant of bank failure. It will start by giving some background information on the Chicago building boom of the 1920s, which explains the large share of mortgages on banks' portfolios. It will then move on to an exposition of the reasons why mortgages' illiquidity came to be more problematic than their low quality.

1.5.1 Unit banking and the Chicago building boom

Already in August 1929, an article published in the *Chicago Tribune* entitled "Claim Illinois is Overloaded with Banks" expressed concern that too many banks were in operation for too small a number of people (Chicago Tribune, n.d.). And, according to James, "[these banks'] soundness was intimately related to the building boom" (James, 1938, p. 953).

The boom itself was the result of circumstances created by World War I. On the one hand, a near wartime embargo on building material and labour created a housing shortage which realtors were eager to compensate for after the war (U.S. Congress, 1921). On the other hand, the war led to a substantial boom in agricultural goods and land, which quickly gave way to a deep recession in farming areas when the war came to an end. As a flourishing business centre lying next to the vast but weakened agricultural lands of the Midwest, Chicago profited from this situation perhaps more than any other city in the U.S.

The excitement that the progress in economic activity and the near-constant arrival of new dwellers in search of higher wages brought to the city led to an extremely fast development of credit (James, 1938, p. 939). Eichengreen & Mitchener (2003) stress the interaction between the structure of the financial sector and the business boom. While the rapid growth of installment credit first started with nonbank institutions,³⁶

³⁶For example, in 1919 General Motors established the General Motors Acceptance Corporation

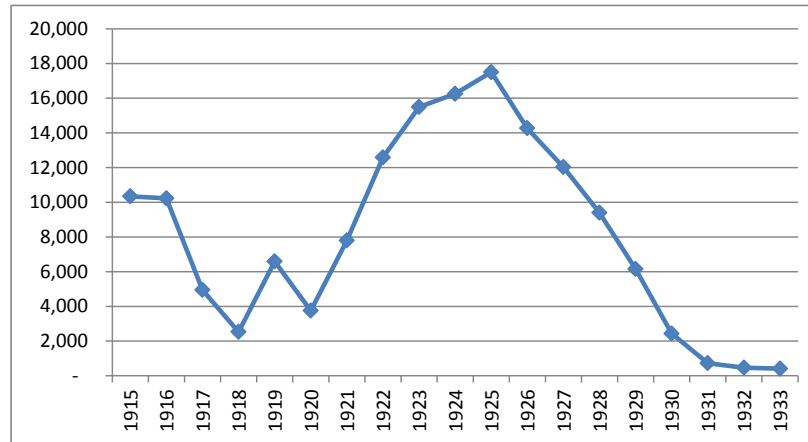


Figure 1.4: Annual amount of new buildings in Chicago

Source: Hoyt (1933, p.475).

very quickly many sorts of financial institutions ended up competing for consumers' credit.

One of the consequences of this credit expansion in Chicago was the boom in construction activity.³⁷ The Chicago real estate boom was excessive in the sense that it reflected predictions of population increase 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 grow to 18 million by 1974 (Hoyt, 1933, p. 403).³⁸ While from 1918 to 1926 the population of Chicago increased by 35 percent, the number of lots subdivided in the Chicago Metropolitan Region increased by 3,000 percent (ibid., p. 237).³⁹ But a population slowdown occurred in 1928, just before the start of the Depression. Figure 1.4 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 percent of all banks in the city (University of Illinois Bulletin, 1929). There were few national banks; however these banks were large. Indeed at the time they reported close to 40 percent of the aggregate resources of 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).⁴⁰ 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.”

These small banks were usually unable to branch, due to state banking laws in Illinois which prevented them from doing so. Such restrictions likely created incentives for unit banks to make the most of local profit-making opportunities, such as real estate lending. Had they been allowed to branch, they would have likely been able to better diversify their assets and prepare for a sudden backlash (Carlson, 2001; Calomiris & Mason, 2003; Mitchener, 2005). See Appendix 1.7.4 for a more complete discussion of

(GMAC) to finance the development of its mass market in motor vehicles.

³⁷White (2009) studies the question for the country as a whole but does not disaggregate into the various regions and cities of the U.S.. For journalistic accounts see Allen (1931) and Sakolski (1966).

³⁸Hoyt humorously depicts “distinguished scholars”’ assessments of the situation, which were often quite surprising (Hoyt, 1933, p. 388).

³⁹In 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.

⁴⁰Indeed, together they were responsible “for about half of the banking business transacted in the city” (*ibid.*).

the role of unit banking in the Chicago boom.

1.5.2 The impact of mortgage illiquidity

Despite the excessive proportions of the real estate boom, evidence suggests that the role of mortgages' quality in causing banks' failure was minor. Indeed, what really mattered was their inherent lack of liquidity, for three reasons.

First, mortgages at the time only had a 50 percent loan-to-value ratio (LTV), which is particularly low compared to today's standards.⁴¹ This has been emphasized both by Field (2013) and White (2009).⁴² Given that land values in Chicago never fell by more than 50 percent until 1933, and that most Chicago banks failed before then (see Table 1.2), they could not have made any substantial losses on these loans, even after foreclosure. The fall in land values is documented by Hoyt (1933, p. 399), who shows that Chicago land values fell by 5 percent in 1929, 20 percent in 1930, 38 percent in 1931, 50 percent in 1932 and 60 percent in 1933.⁴³

Further, I use Hoyt (1933, pp. 259, 267)'s sectoral data on land values to test the hypothesis that differences in land values were uncorrelated with bank failure rates. Although Hoyt's land value variable is categorical, his maps are detailed enough to allow efficient matching with my balance sheet data, using banks' contemporary addresses in Chicago. I thus generated a new categorical variable, *valuefall*, which includes three categories of cumulative fall in residential land values per front foot from

⁴¹In Chicago specifically, a survey conducted in 1925 indicates that the average LTV on residential properties varied from 41.3 percent to 50.5 percent. First mortgages on apartments encumbered by a second mortgage (which constituted the majority of cases for apartments) had an average LTV of 54.7 percent. In other cases (especially when apartments were not encumbered by a second mortgage) LTVs could go up to 59.9 percent. Interest rates on average reached around 6 percent (Bayless & Bodfish, 1928).

⁴²This low average LTV is in fact one of the main arguments put forward by Field and by White against any possible causation link between mortgage holdings and bank failures. As this section will go on to suggest, low LTVs partly explain why the quality of mortgages did not matter, but do not preclude mortgages' lack of liquidity from having a detrimental impact on bank survival.

⁴³These land values are mainly based on sales and real estate brokers' opinions rather than assessments for tax purposes. Note also that very few banks failed after March 1933, but that one cannot know whether most of the "1933" decline occurred before the national bank holiday in March 1933 or after. On p. 172 Hoyt asserts that "the decline in the value of improved properties from 1928 to 1933 was 50 per cent," not 60 per cent (Hoyt, 1933).

Table 1.6: Percentage of banks by cohort falling into one of the three categories of cumulative value decline from 1926 to 1931 (lowest to highest)

Fall in land values	June 1931 Failures	June 1932 Failures	June 1933 Failures	Survivors
0	36.96	28.57	30.77	45.45
1	58.70	68.57	38.46	48.48
2	4.35	2.86	30.77	6.06
Total	100	100	100	100

Source: Hoyt (1933, pp. 259, 267) and Statements.

1926 to 1931 (from lowest to highest) in each bank's sector.⁴⁴ As mentioned earlier, banks were numerous and spread out around the city, which makes it reasonable to assume that they catered mainly to their own neighbourhoods,⁴⁵ so that land values in their own sector would likely have had the highest impact on their health. Although 1931 is the latest available year, it was chosen by Hoyt to illustrate the geographical pattern of falls in land values in the city as this was when the first sharp decline in values occurred (*ibid.*, p. 266). It is reasonable to assume that subsequent falls in land values followed the initial geographical pattern in terms of differences in intensity.⁴⁶

Table 1.6 shows the percent of banks in each cohort by category of value decline. There are few differences within the three failing cohorts, so that falls in land values do not point to any possible correlation between falls in land values between 1926 and 1931 and those cohorts' timing of failure. In addition, although survivors seem to have experienced less of a decline in values than all other cohorts together, many survivors were very large banks from the Loop, where land values were more stable throughout the period. Controlling for size may therefore be important when assessing the role of land value falls. More generally, should there be any relationship between land values

⁴⁴This variable was generated using the two maps shown in Figures 42 and 47 in Hoyt (1933, pp. 259, 267). For these maps he used sales data from Olcott's *Land Values Blue Book of Chicago* and land assessment data from Jacob (1931). These maps are divided into grids, and a bank's sector is one of the 219 squares on each grid. Each square's size is about 2.5 squared kilometers.

⁴⁵This is confirmed by James (1938).

⁴⁶Indeed, while it is likely that a particular section of Chicago saw further declines in land values after 1931, the assumption that the geographical pattern of differences in intensity between regions remained stable seems reasonable.

and bank failures, it may not be a directly causal one: sectors experiencing a larger fall in land values may also be sectors in which banks simply made larger amounts of mortgages in the 1920s, which may lead land values to be related to bank failures only indirectly and not through loan losses. Controlling for other financial ratios may therefore also be important. Table 1.7 reports estimates of the same ordered logistic model as before, only with 1929 balance sheet variables on the right-hand side and the added *valuefall* variable. This variable remains insignificant regardless of whether mortgages are included or not.

Interestingly, a simple t-test reveals that deposit losses among all cohorts are uncorrelated with falls in land values. This holds for deposit losses up to December 1930 ($Prob > F = 0.701$) as well as for deposit losses up to December 1931 ($Prob > F = 0.080$).

The fact that banks' losses did not have a large impact on bank failure can also be seen in the low predictive power of capital ratios throughout the period (see Table 1.4). As Figure 1.5 suggests, June 1931 failures had the highest ratio of capital to total assets through most of the 1920s, despite being the first cohort to fail.⁴⁷

Finally, although mortgages' contract maturity was usually only three to five years, their *de facto* maturity in the 1920s was much longer. Precisely because these loans were relatively short-term (and perhaps for other reasons), it was customary for banks to renew them. As Saulnier made clear in his 1956 study of 1920s mortgage lending in the U.S., "the much lauded feature of full repayment by maturity has been won at the price of extended maturities" (see Morton (1956, p. 8) and Chapman & Willis (1934, p. 602)). This created entrenched renewal expectations on the part of borrowers, who after three or five years, having only made the initial down payments and interest

⁴⁷There are unfortunately no good statistics on the rate of foreclosure for commercial banks in Chicago. Most of the numbers are provided by Hoyt (1933, p. 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." It is thus not possible to describe banks' precise losses in real estate. In any case, as will be shown later, foreclosures only mattered for banks insofar as it took more than eighteen months to foreclose in Illinois, which greatly impeded banks' liquidity during crises.

Table 1.7: Ordered logistic model of bank failure (odds ratios), (dependent variable: *failure_type*; explanatory variables: June 1929 balance sheet items and *valuefall*)

	(1)	(2)
<i>size</i>	1.190 (.27)	1.220 (.27)
<i>capital</i>	1.011 (.03)	1.005 (.04)
<i>reserve_dep</i>	1.009 (.02)	1.024 (.02)
<i>gvtbds</i>	1.149** (.07)	1.167*** (.06)
<i>secloans</i>	1.028 (.02)	1.053*** (.02)
<i>other_re</i>	.797 (.19)	.779 (.18)
<i>othloans</i>	.985 (.02)	1.006 (.02)
<i>bankhouse</i>	1.003 (.06)	.978 (.06)
<i>rearngs</i>	1.055** (.03)	1.044* (.03)
<i>age</i>	1.262 (.54)	1.161 (.48)
<i>mortgages</i>	.927*** (.03)	
<i>valuefall</i>	1.069 (.35)	1.093 (.36)
n	126	126
<i>Prob > chi²</i>	.000	.000
Likelihood	-136.83	-140.87

Notes: The variable *valuefall* is a categorical variable consisting in three categories of intensity in cumulative falls in land values from 1926 to 1931 based on Hoyt (1933), from lowest to highest (see text for further details on the computation of this variable). *** significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, * significant at $\alpha = 0.10$. Odds ratios with standard errors based on the original coefficients in parentheses. An odds ratio above one increases the likelihood of survival, whereas an odds ratio below one decreases it. Each ratio variable has been multiplied by 100 so that a one unit increase can be interpreted as a one percentage increase in the ratio. *Source: Statements.*

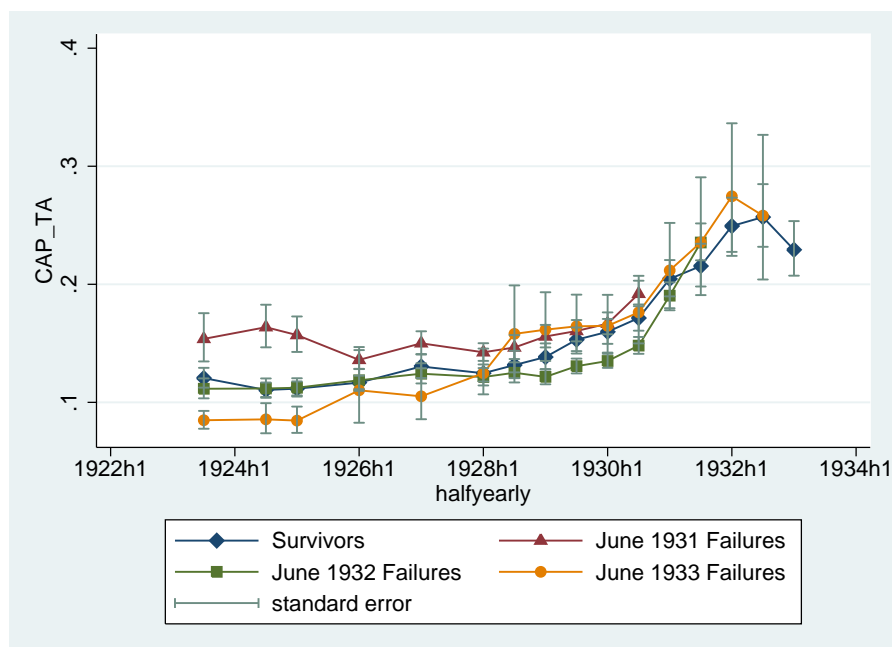


Figure 1.5: Capital to total assets

Source: Statements.

payments – loans were unamortized –, expected to be given another three to five years to make the final “balloon” payment. This is illustrated in the following quote:

“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 Bank Board, 1952, pp. 2-5).

As a consequence, while most loans were made in the boom years of 1925 to 1927 (see Figure 1.6), those maturing between 1929 and 1930 were likely renewed and

would not actually come due before 1932-35.⁴⁸ In addition, loans maturing for the first time during the Depression would come up for (expected) renewal, with banks under liquidity pressure pressing unprepared borrowers to pay back their loans.⁴⁹ In such cases foreclosure would not entail any loss (due to the 50 percent LTV),⁵⁰ but it would create a clear liquidity issue as the foreclosure process in Illinois lasted more than eighteen months on average (Child, 1925; Gries & Ford, 1932; Hoppe, 1926; Johnson, 1923).⁵¹

Mortgages' sheer lack of liquidity thus posed a tremendous challenge to banks. In the interwar period mortgages could neither be sold in the secondary market nor

⁴⁸This is confirmed by Morton (1956), who derived figures on contract maturity from a National Bureau of Economic Research survey of urban mortgage lending, whose absolute precision may be taken with care. The survey was made in 1947 on a sample of 170 surviving commercial banks of all sizes, "representing about one-third of the commercial banks total nonfarm mortgage portfolio as of mid-1945" (ibid., p. 71). 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 (ibid., p. 174). 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 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 in the 1925-29 period, the realized maturity was 8.8 years (ibid., p. 119).

⁴⁹As the vice-president of the banking department of the First National Trust and Savings Bank in Chicago put it: "I have heard a lot of talk about foreclosures and that the banks are calling loans and insisting upon repayment and that the borrowers are unable to refund elsewhere, and they are doing this because they are trying to keep their assets liquid" (U.S. Congress, 1932, part 2, p. 269). This is confirmed in Federal Home Loan Bank Board (1934), which mentions "the dangers attendant on the mortgagee's refusal to renew," and in Federal Home Loan Bank Board (1952), which reports: "The time of stress came in 1929-30; the short-term mortgage came to maturity against a situation of tight credit and, in many cases, of no credit (...). All too often the lender (...) did not want to renew the loan to the home-owner no matter how high the premium or rate of interest." Note, in addition, that second mortgage financing made prompt repayment even less likely – see Chapter 2.

⁵⁰After foreclosure either the property could be auctioned off to external buyers or, if there were no buyers, the property was repossessed by the bank at an appraisal price. Such repossessed property then sat on the bank's books as non-performing assets (called "other real estate") until they could be sold again later. Arguably, the foreclosure price could potentially be lower than the current "market" price. Nevertheless, it is important to note that in Depression Chicago transactions were few, foreclosures widespread (Hoyt, 1933, p. 266-272), and sales prices were probably themselves affected by foreclosures in surrounding areas (this theoretical point is made by ?; see also ?). This suggests that gaps between foreclosure and sales prices may not have been very large. Further comments on the meaning and significance of *other real estate* in the dataset under study can be found at the end of this sub-section.

⁵¹This was particularly emphasized by Gries & Ford (1932, p. 39): "One of the greatest hindrances to the availability of mortgage money in some states is the right of redemption from sale under foreclosure. During the period of redemption, foreclosed property is rendered practically unmarketable, may suffer serious damage or depreciation, and presents in a high degree a type of frozen asset." See also Anderson (1927), Hopper (1927), Stalker (1925), and Chapter 2.

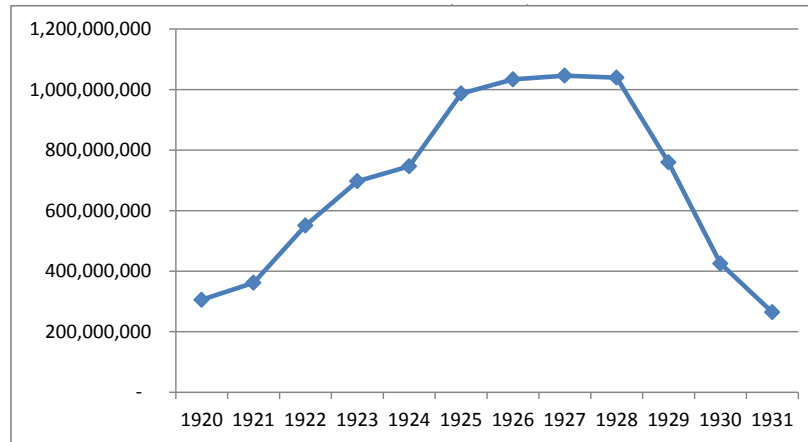


Figure 1.6: New mortgages and trust deeds, Cook County, Illinois (\$)

Note: the source does not specify whether new mortgages include renewed mortgages. *Source: Hoyt (1933, p.475).*

rediscounted at the Federal Reserve.⁵² Figure 1.1 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.⁵³ Other types of loans, on the other hand, were promptly liquidated in this period. Figure 1.7 shows the falling share of loans on collateral security owned by banks,⁵⁴ while Figure 1.8 shows a similar decline in other

⁵²Note that in early 1932 the Reconstruction Finance Corporation proposed to lend against “ineligible” collateral, which could include high quality real estate loans. Nevertheless loans against such assets remained proportionately small as the RFC preferred loans with maturities of less than six months (?) and refused to lend against real estate loans’ book value, likely taking into account their uncertain quality paramount to their long maturity (Wigmore, 1995, p.324). In general the RFC remained very cautious and mainly lent against high-quality and liquid collateral, until 1933 when it switched to preferred stock purchases in financial institutions (??James, 1938; ?). In addition, around the same time the Banking Act of 1932 also allowed the Federal Reserve to widen its accepted collateral for rediscounts. According to Friedman & Schwartz (1963, p. 45), however, such powers were used only to a very limited extent, perhaps for the same reason. See also ? and Wicker (1996, p.85).

⁵³For a graph of total assets see Figure 1.14 in Appendix 1.7.5.

⁵⁴Security loans were mainly call loans, that is, loans repayable at the option of the lender within twenty-four hours’ notice. Funds were lent in this way to individuals who used them to carry securities, for example when dealing with them on margin. The securities themselves were used as collateral for these loans, with the understanding that they were likely to be withdrawn at any time. According to Bogen & Willis (1929, p. 245), “depositors can, and sometimes do, determine the calling of loans by the activity of their own demands.” Other loans were short-term commercial loans, often sought by companies for the seasonal expansion of their inventories. In such cases “the customer of the commercial bank is expected to pay off or “clean up” his obligations to it at certain intervals” (ibid., p. 11). Both types of loans were eligible for rediscount at the Federal Reserve Banks or could be sold in the open market, while mortgages in general were not (Bogen & Willis, 1929; U.S. Congress, 1927).

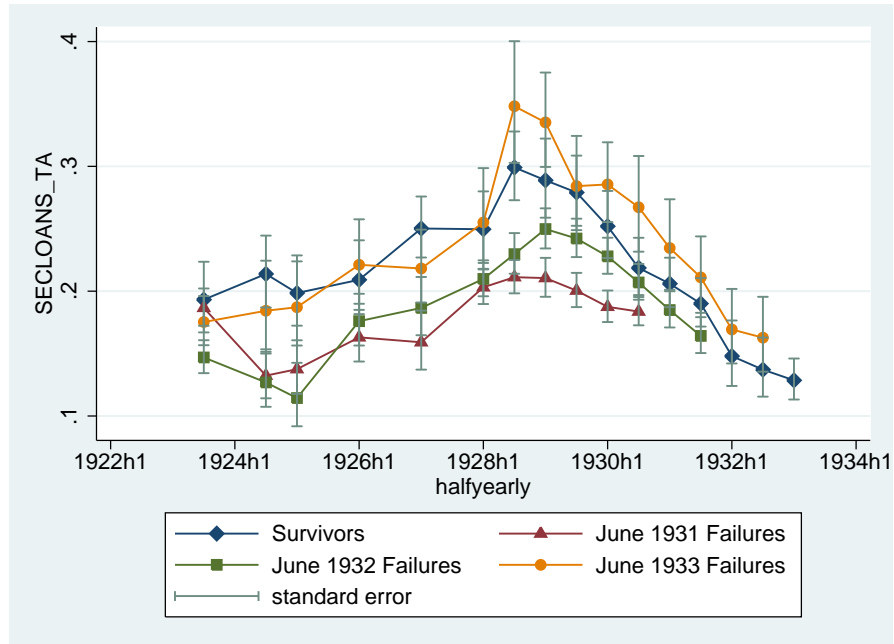


Figure 1.7: Loans on collateral security to total assets

Source: Statements.

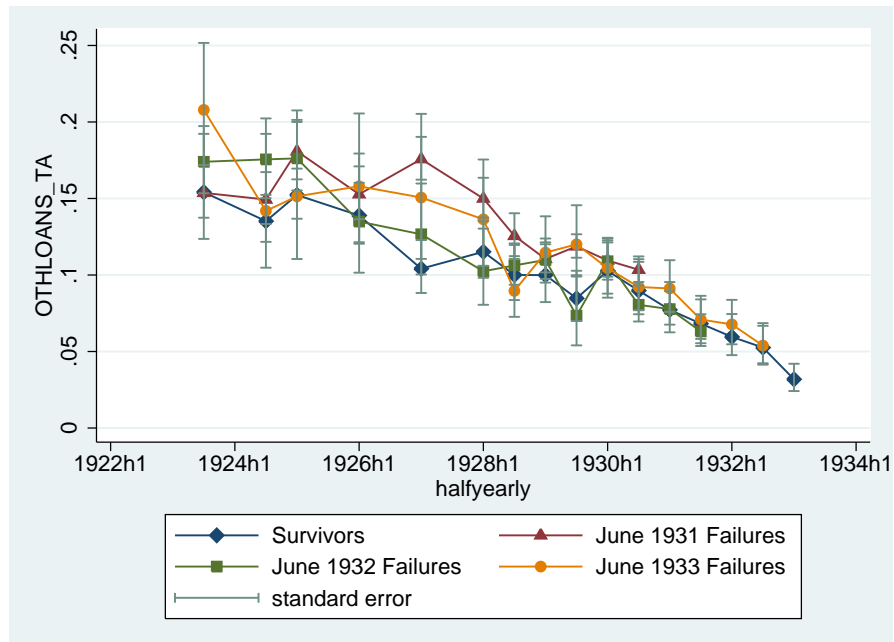


Figure 1.8: Other loans to total assets

Source: Statements.

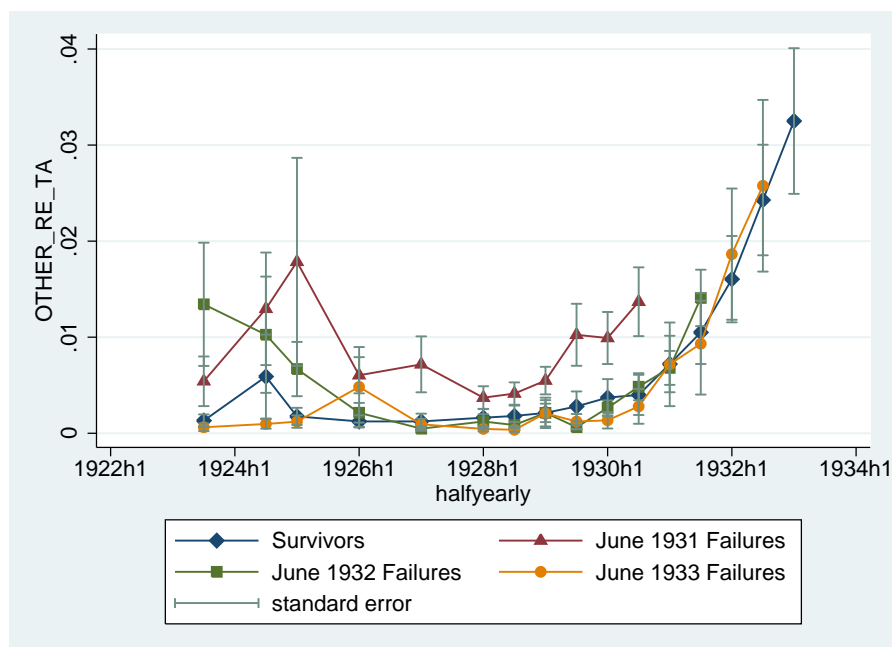


Figure 1.9: Other real estate to total assets

Source: Statements.

loans as a share of total assets. Compared to other assets, therefore, mortgages were notoriously difficult to liquidate.⁵⁵ As all banks engaged in fire sales they became the main constraint on their liquidation process.

As a final note, the variable “other real estate” deserves special attention. Other real estate is an asset consisting of property repossessed by banks after real estate foreclosures and before it can be resold. One might question the importance of this variable in explaining bank failures given the very low percentages shown in Figure 1.9, which never go much beyond 3 percent, and given the low significance of this variable in the ordered logit model. This can be explained, first, by the fact that mortgages’ impact on bank failure could have been strong without any foreclosures taking place. When foreclosures did occur, it is precisely their very lengthy process that would have created liquidity problems for banks. Each cohort’s last data point

⁵⁵Note, perhaps surprisingly, that cash is not a good predictor of failure. This suggests that cash ratios were relatively similar for all four cohorts, and that what really differentiated them were their mortgage holdings. Government bonds were more important than cash, as can be seen in Table 1.4 and Figure 1.11 in Appendix 1.7.2.

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. Thus, the lengthy foreclosure process increases the odds that many of the effects of foreclosure are not visible on this graph (Child, 1925; Hoppe, 1926; Johnson, 1923).⁵⁶

1.6 Conclusion

Looking into the long-term behaviour of Chicago banks in the 1920s yielded new insights into the causes of their failure. I showed that banks' long-term investments in illiquid assets (especially mortgages) severely weakened their position when they came to face large withdrawals on their deposits. Though restricted to Chicago, these results reassert the role that liquidity issues played in the Great Depression, both on the liability and the asset sides of the balance sheet. More specifically, they suggest that a solvent but *ex ante* less liquid bank is not necessarily healthy, and that liquidity risk management is just as important as credit risk management when the occurrence of bank runs cannot be completely excluded.

This paper also reassessed the role that mortgage investments played in the Great Depression via the banking channel. Parallels with the recent crisis may be tentatively drawn, despite major differences in mortgage contracts then and now. In both cases banks suffered tremendous liquidity shocks on the uninsured liability side of their balance sheets, which, regardless of their origin, highlighted once again the impact of maturity mismatches between long-term assets and short-term liabilities (Brunermeier, 2008; Gorton & Metrick, 2012). Securitization can potentially increase the liquidity of mortgages by making them more salable and by distributing different kinds

⁵⁶Further comments on the value of repossessed property after foreclosure are made earlier in this sub-section.

of risks to different types of investors. But in order to do so it has to be undertaken in the right way (see Chapter 3).

Central banks can in theory help during a liquidity crisis by following Bagehot's rule and lending on good (though not perfect) collateral. Although central banks' role during crises is essential, it is always difficult for it to gauge the precise quality (credit risk) of an asset – especially if the asset is a long-term one, thereby creating more uncertainty about its long-term value (Goodhart, 2008, 2010). For this reason, the Federal Reserve's role in the recent crisis has been controversial: by actually lending against such doubtful collateral as mortgage-backed securities it has once again raised the question as to how a central bank can measure asset risk (Bordo & Landon-Lane, 2010; Schleifer & Vishny, 2011; Gorton & Metrick, 2013; Stein, 2013).⁵⁷

Because central bank help will likely never be entirely adequate, it is important for banks to attend to the inherent liquidity of their portfolios. Of course, nowadays assets' liquidity is increasingly intertwined with their quality as markets are formed and disappear in terms of the perceived quality of such assets. Nevertheless, some assets are inherently less liquid than others, and longer-term assets tend to be less liquid either because they are paid back in a long time or because of the uncertainty attached to their long maturity. Conversely, some assets are inherently more liquid than others, such as cash assets and (usually) government bonds.

No bank will ever be perfectly hedged in terms of its maturity profile, but promoting liquidity in a preventive regulatory framework, perhaps through countercyclical cash ratios may be a good start. In this paper, cash did not matter in the sense that differences in mortgage holdings made a larger difference. But it is possible to speculate that had banks holding more mortgages also held more cash, they would not have run into such difficulty in the face of bank runs.⁵⁸ Although Basel I and Basel II had a

⁵⁷And by purchasing such securities outright, it clearly cut across the boundary between monetary and fiscal policy (Reinhart, 2011).

⁵⁸Note that government bonds mattered more than cash, as can be seen in Table 1.4 and Figure 1.11 in Appendix 1.7.2.

clear focus on capital rather than liquidity, Basel III has started to introduce measures to regulate the latter (Basel Committee on Banking Supervision, 2008). Yet it has mainly focused on so-called “liquidity coverage ratios,” which may be inadequate as their vagueness could lead to new forms of risk-shifting. Cash may be a simpler and more transparent way of assessing a bank’s liquidity. And, in turn, increased liquidity in the system may reduce the risk of runs, as runs can partly be triggered by fears of banks’ illiquidity, not just by fears regarding their potential insolvency.⁵⁹

⁵⁹See also Calomiris et al. (2012), Goodhart (2008, 2010) and Shin (2009). Note that Calomiris et al. (2012) also see cash ratios as important buffers against credit risk.

1.7 Appendix

1.7.1 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 1931.⁶⁰ There are no reports for 1930, which is an important year for this research. Focusing on state banks should not be a problem since as pointed out in Section 1.5.1, in December 1929 state banks made up 95.5 percent of all banks in the city (University of Illinois Bulletin, 1929) and 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 & Mason (2003) specify that their data “contain almost seventy different ways a bank can exit the

⁶⁰Details of the available volumes are described in Mason (1998).

Table 1.8: State mergers between June 1929 and June 1933

Bank 1	Bank 2	New merger	First reporting date	Failing?
The Foreman Trust and Savings Bank	State Bank	Foreman-State Trust and Savings Bank	Dec 1929	Yes, June 1931
Roosevelt State Bank	Bankers State Bank	Roosevelt-Bankers State Bank	June 1930	Yes, Aug 1930
Builders and Merchants State Bank	Capital State Savings Bank	Builders and Merchants Bank and Trust Co	Nov 1930	Yes, April 1931
Central Trust Co of Illinois	Chicago Trust Co	Central Republic Bank and Trust Co	July 1931	No

Sources: Statements, and Rand Mc Nally Bankers' Directory.

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 & 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 cohort. Exactly the same applies to pre-June 1929 mergers: only the resulting merger can be part of a cohort and thus only this bank will be tracked down as early as possible in the 1920s. Table 1.8 shows the state 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. In the first and third cases shown in Table 1.8, it was actually possible to divide the merger's balance sheet in two proportional parts and make the two original banks continue until the time the merger itself fails. In the second case, the merger itself fails in August 1930 so could not be part of any cohort. Results are robust to different categorizations.

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, Chicago Trust Co and a national bank, the National Bank of the Republic. As in the previous cases, it was decided that both state banks would be kept "alive" by taking the items on the balance sheet of the new merger and splitting them into parts proportional to each original banks share of the total.⁶¹

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 (as its name indicates, a national bank) "towered over the Chicago money market like giants" (James, 1938, p. 952). Together they were responsible for about half 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

⁶¹But again the results are robust either way. See footnote above in Section 1.3 on the controversial aspect of this rescue. I also thank Joseph Mason for kindly making national bank data available to me.

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 that a strong bank like Continental Illinois sought a national charter, and was granted one.⁶² The bank was thus manually categorised as a survivor.

1.7.2 Additional financial ratios

Figures 1.10, 1.11, 1.12 and 1.13 show the reserve-deposit ratio, U.S. government bonds to total assets, banking house to total assets, and borrowed funds to total assets. The relative importance of government bonds, which was also noted in Table 1.4, can likely be explained by its important role in liquidity maintenance during crises.

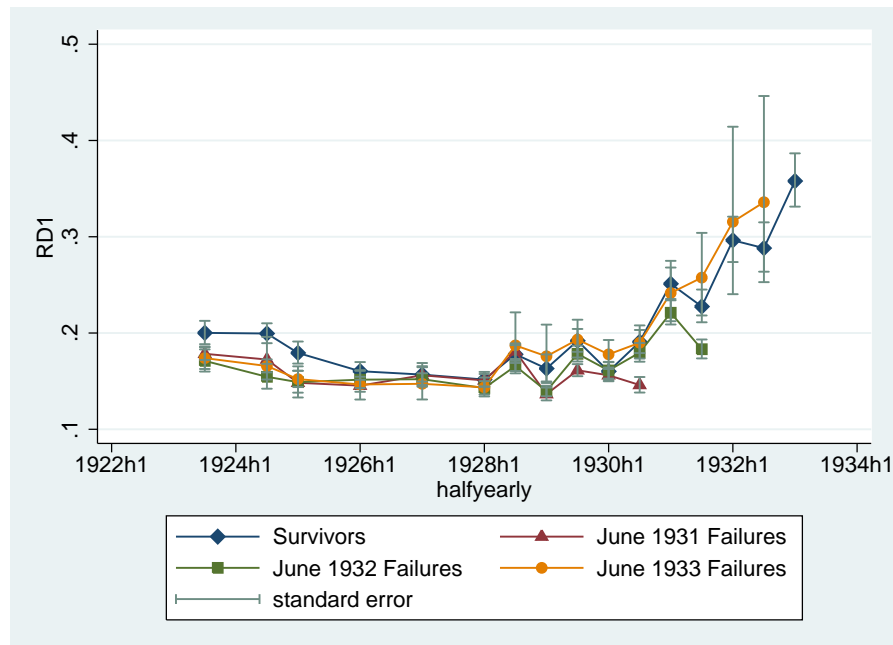


Figure 1.10: Cash reserves to total deposits (includes cash, other cash resources, due from other banks)

Source: Statements.

⁶²The 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.

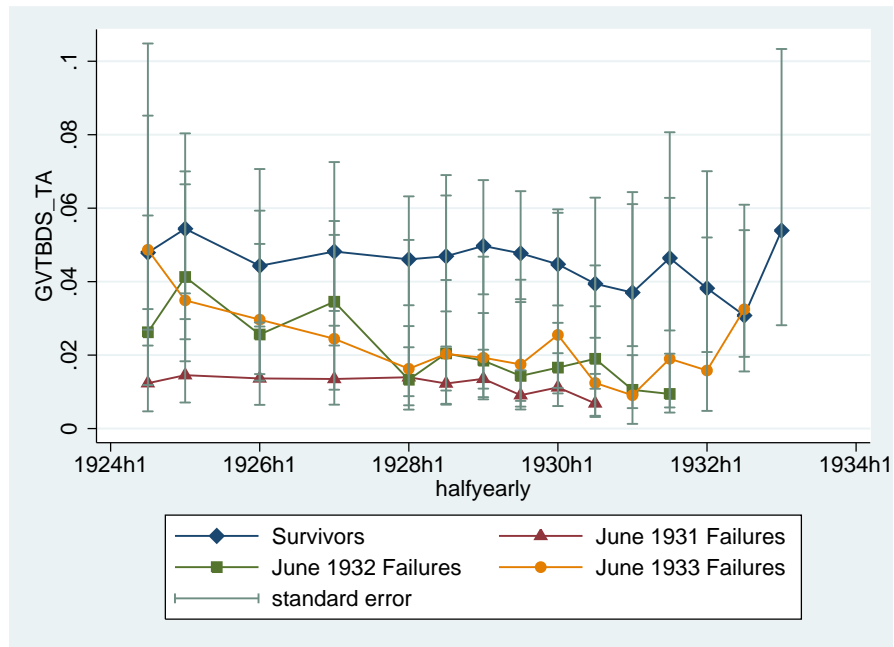


Figure 1.11: U.S. government bonds to total assets

Source: Statements.

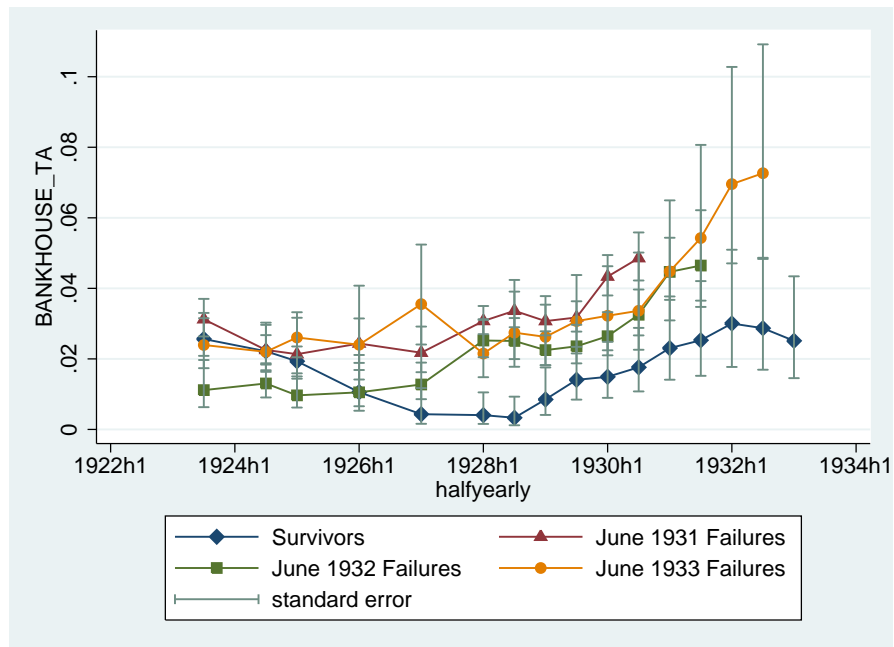


Figure 1.12: Banking house, furniture and fixtures to total assets

Source: Statements.

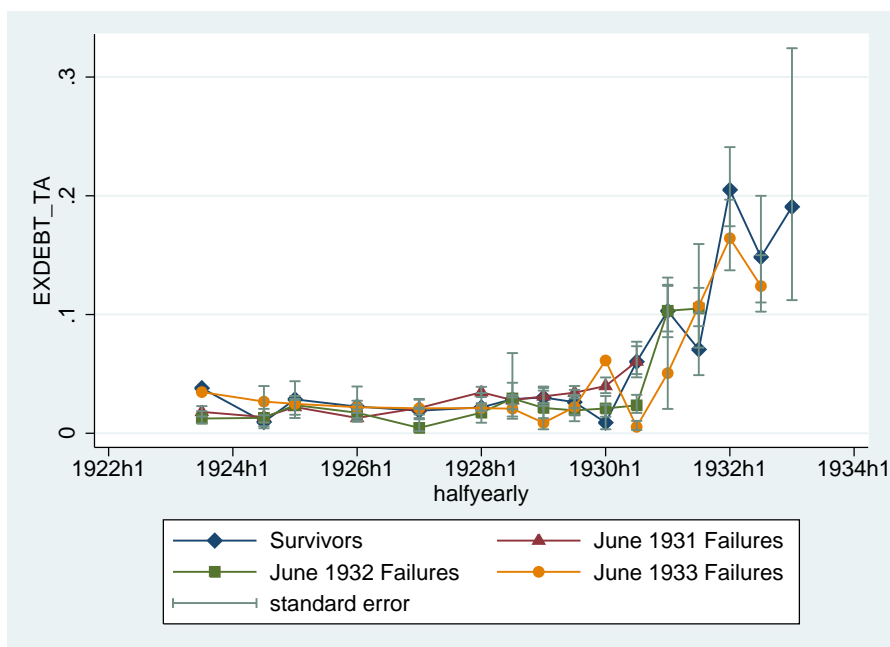


Figure 1.13: Bills payable and rediscounts to total assets

Source: Statements.

Bills payable and rediscounts are a form of long-term, high interest debt, which is a good indicator of bank trouble, as when deposits are withdrawn from risky banks, they are forced to rely on high-cost debt (Calomiris & Mason, 1997). Figure 1.13 thus shows banks' race for liquidity as they started losing deposits. In December 1931, for instance, when survivors lost slightly fewer deposits than the June 1932 Failures, they also secured fewer funds from these sources. Note however that the interpretation of this variable is not straightforward, as it could also reflect creditors' confidence (or lack thereof) in the bank.⁶³

⁶³As 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 during the June 1932 crisis (Calomiris & Mason, 1997).

1.7.3 Discrete-time hazard estimates

Table 1.9 reports estimates of discrete time hazard models. As mentioned above, survival models necessarily take into account within-Depression covariates and therefore cannot test the importance of pre-Depression variables as well as ordered logit can. Adding time dummies with interactions could potentially help, but with this particular dataset the hazard rate is frequently zero in pre-Depression years, so that pre-Depression effects cannot be efficiently estimated (time dummies are automatically omitted).

Nevertheless the results are of some interest. Both models are discrete-time proportional odds (logit) models, chosen among other survival frameworks (such as continuous time survival models) due to the frequency of the data, which is halfyearly. If T is survival time and $T = t$ the time of failure, then the discrete hazard for this model is:

$$\lambda(t | x) = P(T = t | T \geq t, x) = \frac{\exp(\beta_t + \gamma X)}{1 + \exp(\beta_t + \gamma X)} \quad (1.2)$$

where β is the baseline hazard, X a vector of explanatory variables and γ a vector of variable-specific parameters.

The first model in Table 1.9 assumes a constant baseline hazard, which may not be wholly adapted to the dataset since the hazard rate greatly increased as the Depression unfolded. For this reason a second model, assuming positive time duration, is estimated in the second column. The time variable is very significant, and the McFadden R-squared much higher, suggesting that this model is a better fit than the previous one. Odds ratios are reported, which in such models can be interpreted as hazard ratios. Hazard ratios between zero and one decrease the probability of failure; hazard ratios above one increase it.

In this model it can be seen that many variables are significant – more so than

Table 1.9: Proportional odds discrete-time survival models, 1923-33 (binary dependent variable equals one at the time of failure), odds ratios

	Constant baseline hazard (1)	Positive duration dependence (2)
<i>log(time)</i>		2477.729*** (2374.94)
<i>size</i>	1.640*** (.26)	.916 (.17)
<i>capital</i>	1.020 (.01)	.945*** (.02)
<i>reserve_dep</i>	1.002 (.00)	1.001 (.00)
<i>gvtbds</i>	.961*** (.01)	.953*** (.01)
<i>secloans</i>	.998 (.02)	1.009 (.01)
<i>mortgages</i>	1.088*** (.02)	1.084*** (.02)
<i>other_re</i>	1.076* (.05)	1.054 (.07)
<i>othloans</i>	1.064*** (.02)	(.02)
<i>bankhouse</i>	1.036 (.02)	1.055** (.03)
<i>rearngs</i>	.942*** (.02)	.950** (.02)
<i>age</i>	.692 (.00)	.638* (.17)
n	1492	1492
<i>Prob > chi</i> ²	.000	.000
McFadden R-squared	.18	.41

Notes: *** significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, * significant at $\alpha = 0.10$. Standard errors in parentheses. Odds ratios can be interpreted here as hazard ratios. Hazard ratios between zero and one decrease the probability of failure; hazard ratios above one increase it. Each variable has been multiplied by 100 so that a one unit increase can be interpreted as a one percentage increase in the ratio. *Source: Statements.*

in the ordered logit models. This could be interpreted as a sign that the Depression exacerbated differences between banks. The most powerful variable, however, remains mortgages to total asset, with a hazard ratio of 1.084.

1.7.4 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. When there is a liquidity shortage at one of the banks in a 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.⁶⁴ Rodkey also pointed out that

⁶⁴Nevertheless, the debate on branch banking has not completely ended. So far, at least four studies

little attention was given to the ability of the borrower to meet his interest payments (ibid., p. 122).

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 potentially serious problems when the Chicago mortgage boom is taken into account.

1.7.5 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. 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 1.10 shows the failure rate per size group, using the whole population of 193 banks (see notes below Table 1.2).

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 percent. Nevertheless, it is still noticeable that banks with less than \$250,000 in capital had 89 percent chances of failing, whereas banks whose capital went beyond \$800,000 “only” had a failure rate of 73

have shown that the branch banking system was detrimental to bank survival during the Depression. While Calomiris & 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 & Mason (2003) confirm the negative effect of branch banking, and so does Carlson (2001). On the other hand, Mitchener (2005) finds a positive effect, while Gambs (1977) finds no effect at all.

Table 1.10: Relationship between bank size and failure rate, June 1929 - 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

Notes: There are 193 banks in total in this table because they include 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. *Source: Statements.*

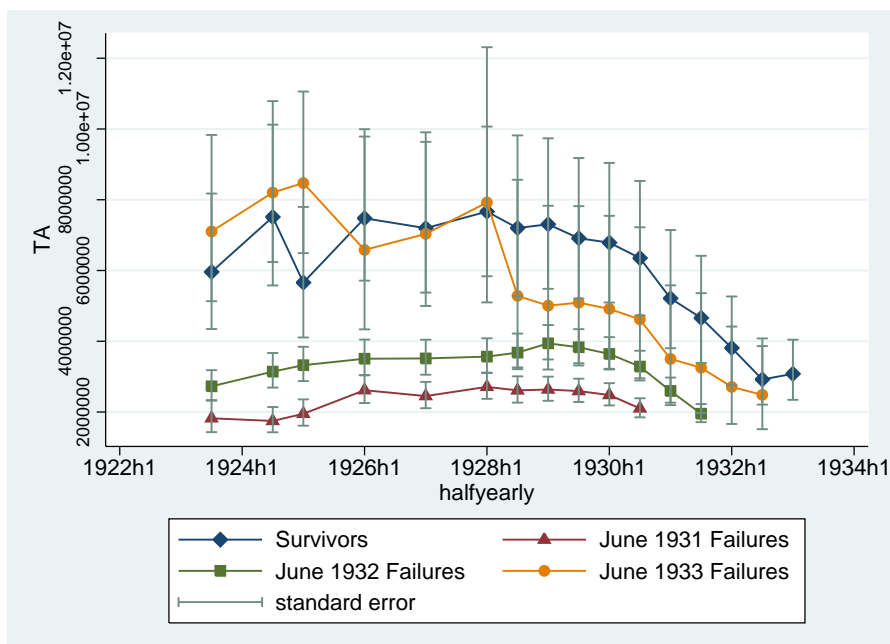


Figure 1.14: Total assets

Source: Statements.

percent. Looking at total assets for the whole period, the differences are even more striking (see Figure 1.14).

1.7.6 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 shown in Section 1.5 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 1.15 and 1.16. Figure 1.15 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).

The graph of the median growth rate of total assets looks similar (see Figure 1.16), 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.

1.7.7 Survival model for the liability side

Table 1.11 provides a discrete-time proportional odds model for the liability side of bank balance sheets. This model was chosen for the same reasons as in Appendix 1.7.3. The focus is on the years 1929-1933. As borrowed funds and deposit losses are highly correlated, they were entered separately in the regression. All items are ratios to total liabilities and equity except for retained earnings to net worth.

Table 1.11: Discrete-time proportional odds estimation, 1929-33 (binary dependent variable equals one at the time of failure), odds ratios

	(1)	(2)
Capital	1.008 (.01)	.982 (.01)
Retained earnings	.939*** (.02)	.941*** (.02)
Borrowed funds	1.043*** (.01)	
Total deposits		.972*** (.01)
n	885	885
$Prob > \chi^2$.000	.000
Likelihood	-284.22	-287.12

Notes: *** significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, * significant at $\alpha = 0.10$. Standard errors in parentheses. Odds ratios can be interpreted here as hazard ratios. Hazard ratios between zero and one decrease the probability of failure; hazard ratios above one increase it. Each variable has been multiplied by 100 so that a one unit increase can be interpreted as a one percentage increase in the ratio. *Source: Statements.*

1.7.8 Determinants of deposit losses

To what extent was the shock to liabilities endogenous to the share of mortgages? While this question is difficult to answer certain pieces of evidence can help to draw a few preliminary conclusions. Table 1.12 provides results of an OLS model with deposit losses as the dependent variable and some of the most important *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).⁶⁵ On the other hand, for the second failure cohort, mortgages predict 1931 deposit losses well (though the R-squared is relatively low), a result consistent with the fact that the magnitude of their withdrawals significantly differed from survivors’.

⁶⁵Note that bank statements were released to the public every six months by the State Auditor.

Table 1.12: OLS Results (dependent variable: deposit losses)

Variable in June 1929	June 1931 F. and Survivors	June 1932 Failures and Survivors		June 1933 Failures and Survivors		
	(1)	(1)	(2)	(1)	(2)	(3)
Cash reserves to total assets	-.032 (.14)	.029 (.19)	.096 (.24)	.053 (.27)	.308 (.25)	.222 (.40)
Gvt bonds	.008 (.01)	.002 (.01)	.018 (.01)	.009 (.02)	.013 (.02)	-.011 (.02)
Mortgages	-.074 (.05)	-.074 (.05)	-.151*** (.05)	-.063 (.06)	-.113* (.07)	-.065 (.05)
Other loans	-.044 (.04)	-.012 (.04)	.011 (.05)	-.057 (.06)	-.005 (.06)	-.096 (.09)
Banking house	.004 (.01)	-.000 (.01)	-.015* (.01)	-.001 (.01)	-.002* (.01)	-.014 (.02)
Retained earnings	.081 (.05)	.015 (.04)	.089 (.07)	.013 (.04)	.070 (.06)	.190* (.10)
Const	-.190 (.37)	-.167 (.50)	-.514 (.57)	-.173 (.68)	-.043 (.61)	-.588 (.99)
n	75	66	66	45	45	45
R^2	.11	.09	.31	.08	.34	.17
$Prob > F$.101	.111	.106	.416	.378	.091

Notes: * significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, *** significant at $\alpha = 0.10$. Standard errors in parentheses. The explanatory variables are taken in June 1929. All variables are log transformed as OLS regressions assume a normal distribution, which as noted earlier does not fit with these ratios. *Source: Statements.*

(1) June 1929 - Dec 1930 cumulative deposit losses;

(2) June 1929 - Dec 1931 cumulative deposit losses;

(3) June 1929 - Dec 1932 cumulative deposit losses.

Yet even in this case deposit losses were very large for survivors (around 37 percent compared to 59 percent 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.

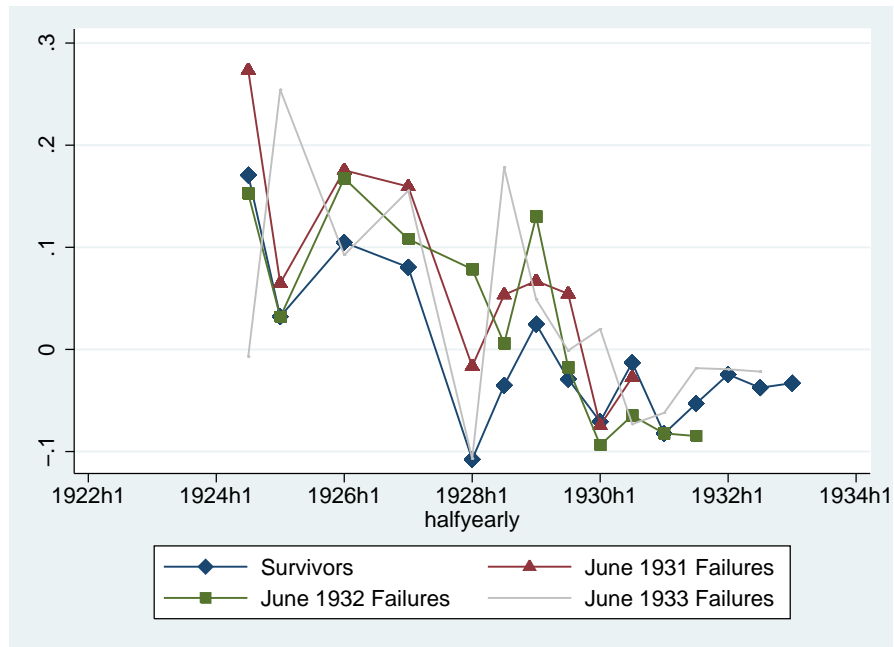


Figure 1.15: Median growth rate of mortgages (six months to six months)

Source: Statements.

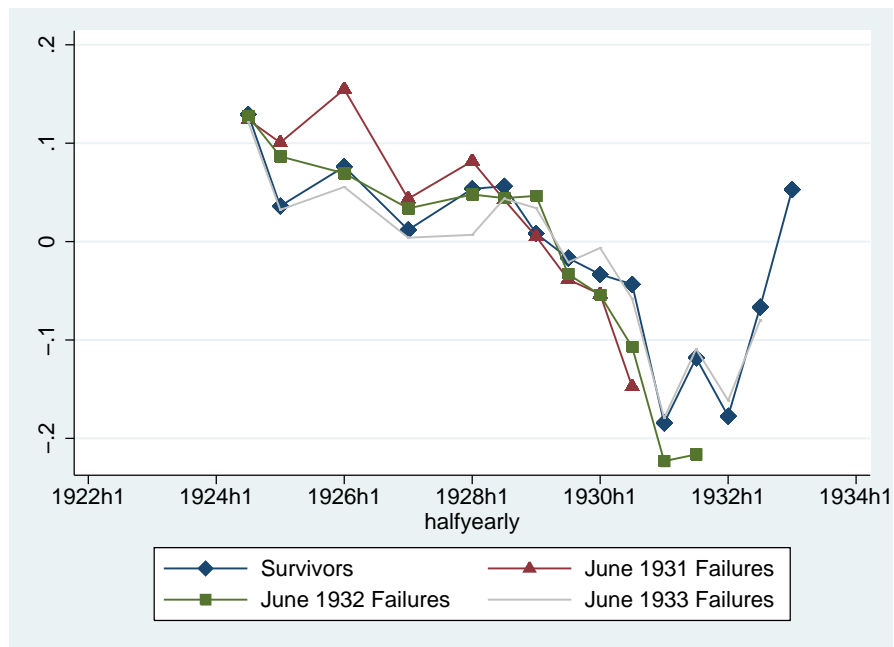


Figure 1.16: Median growth rate of total assets (six months to six months)

Source: Statements.

Chapter 2

Debt Dilution in 1920s America: Lighting the Fuse of a Mortgage Crisis

2.1 Introduction

The recent financial crisis has led economists to draw parallels with the Great Depression, either by focusing on speculation generally or, in the case of the U.S., on the real estate market. While it is clear that a real estate bubble and reckless mortgage dealings can at least partly be blamed for the current U.S. crisis, the causes of the U.S. Great Depression remain far less evident, and indeed no single explanation for it has ever attracted unanimous support. Given the occurrence of a nationwide real estate boom throughout the 1920s, it is tempting for economic historians to see if any useful comparisons may be made between this boom and the more recent one. And as widespread commercial bank failures were a notorious aspect of the Great Depression (Friedman & Schwartz, 1963; Wicker, 1996), commercial bank mortgages made in the 1920s naturally deserve particular attention. Yet recent studies found that there could be no direct link between the 1920s real estate boom and commercial bank failures

(see, in particular Field (2013) and White (2009)). An important argument against a possible causation link has to do with the conservatism of commercial bank real estate loans made at the time: most of them did not exceed a maturity of 3 to 5 years and had a 50 percent loan-to-value ratio (*ibid.*). This would tend to discard any explanation of the Depression based on mortgage lending via the banking channel.

This paper re-examines the alleged safety of the structure of pre-Depression commercial bank mortgages. By inquiring whether borrowers could in practice make 50 percent down payments, it uncovers the extent of the “second mortgage system” (as it was called at the time), one of the most widespread – and yet least well-known – forms of debt dilution in the twentieth century. While the negative effects of debt dilution are well documented in the theoretical economics literature, its prevalence in the 1920s U.S. commercial bank mortgage market is much less so. This is despite contemporaries, such as President Hoover, describing the second mortgage system as “the most backward segment of [the U.S.’s] whole credit system” (Gries & Ford, 1932). As few authors have analysed debt dilution empirically (see Degryse et al. (2011)), this paper thus also provides further empirical support to the idea that debt dilution can be highly detrimental to credit.

While borrowers were urged to “own their own homes” in the early 1920s, banks on the other hand often would not lend more than half the price of the house. As contracts did not contain any covenants against further borrowing, borrowers were tempted to borrow from third parties (such as individuals or small second mortgage institutions) to help them make the high down payment. A second mortgage market flourished, benefiting more than 75 percent of first-mortgage borrowers. In addition to the serious debt dilution problem it created for first mortgage lenders (the commercial banks), the second mortgage system presented other aspects which only aggravated it. Indeed, second mortgage lenders charged exorbitant interest rates, and insisted that their loans be repaid before first mortgages and at more regular intervals. This meant

that while second mortgages were junior before the law, they acquired a certain form of seniority in practice, putting repayments of first mortgages under further threat.

The paper starts with a brief overview of existing models of debt dilution in the economics literature. Particular attention will be drawn to Bizer & DeMarzo (1992)'s model which analyses the negative impact of "sequential banking" (the occurrence of borrowing from different lenders) on the first lender. While Fama & Miller (1972) suggest that sequential banking is not a problem in the presence of seniority rules, Bizer & DeMarzo (1992) effectively demonstrate that extra lending from a second bank creates an externality through the devaluation of prior debt which seniority rules cannot completely eliminate. In equilibrium, as first lenders anticipate the problem, interest rates end up higher on all debt, and so do probabilities of default.

The paper then moves on to provide contemporary evidence on the existence and extent of the second mortgage system (Section 3). Information gathered from the National Association of Real Estate Boards archives in Chicago allows me to establish that around 76 percent of first mortgage borrowers resorted to this system, so that total mortgage debt was not 50 percent of the value of the property but rather around 75 percent, from two different lenders. I document average interest rates for both types of loans in most states, and report on what contemporaries described as the negative effects of the second-mortgage system. In particular, I examine factors which aggravated the debt dilution problem. Higher interest rates, shorter maturities and systematic amortization made second mortgage payments more pressing and acquire some priority in the eyes of the borrower. While separate from the debt dilution problem, this seniority reversal effect certainly made matters worse.

Section 4 examines a newly compiled dataset on commercial bank mortgages made in 22 U.S. cities before the Great Depression started, and provides evidence that low loan-to-value ratios (LTVs) led to higher foreclosure rates in those cities. The data are taken from the *Survey of Urban Housing* published in 1937 by the Department

of Commerce under the supervision of David L. Wickens. While the data do not allow one to analyse each mortgage individually, it exploits variation in average LTVs and foreclosure rates on first mortgages between cities to examine the nature of the relationship between the two variables. The result is a strong negative correlation: the lower the loan-to-value ratio, the higher the probability of foreclosure. This result would be counter-intuitive to observers without a knowledge of the second mortgage system. However, the existence of the second mortgage system explains it perfectly.

Finally, I provide evidence that the foreclosure process was particularly lengthy at the time, often lasting up to eighteen months (Section 5). This meant that although house prices usually did not fall by more than 50 percent in the Great Depression period, implying few losses for commercial banks, the latter would be seriously weakened by an increased default probability. A protracted foreclosure process meant that a house would be difficult to turn quickly into cash - a great impediment in case of a liquidity crisis. As most commercial banks lost tremendous amounts of deposits starting in 1930, higher probabilities of foreclosure no doubt severely weakened their positions at that particular time. In addition, if depositors knew about this problem a liquidity crisis could easily turn into a self-fulfilling prophecy. As Chapter 1 showed, high proportions of mortgages together with deposit losses caused many banks to fail, at least in Chicago.

Section 6 concludes that 1920s commercial bank first mortgage contracts presented significant risks to first mortgage lenders. More generally, the Depression experience serves as an incentive for caution regarding the use of additional loans (such as “piggyback” mortgages) whose debt dilution effects are difficult to mitigate.

2.2 Models of debt dilution

Debt dilution is one of the central topics of contract theory. It is suspected to have played an important role in a number of financial crises, such as the Latin-American

debt crisis of the 1970s, the East-Asian crisis of the late 1990s (Bisin & Guaitoli, 2004; Radelet & Sachs, 1998), and even the recent worldwide financial crisis (see Acharya & Bisin (2010)).

At the core of debt dilution is the idea of contract incompleteness. When a lender enters into a contractual relationship with a borrower, he usually cannot make his contract contingent on all other contracts that the borrower might sign aside from the original contract. This is because such contingent contracts would be very costly to implement, as they would imply intense monitoring of the borrower. As a result, most financial contracts are non-exclusive.

As the borrower takes on one or more additional loans, an externality is created because effort to repay the original loan is reduced proportionately, in a way that was not taken into account when the initial contract was signed. If expectations of straightforward debt dilution are taken into account by the original lender, he will likely react by changing the terms of his original loan, which can lead to higher default rates.

Fama & Miller (1972) initially showed that a simple solution to this problem would be for each lender to be assigned a clear priority level in the bankruptcy process. According to this theory, seniority rules would reduce the first lender's anxiety about possible debt dilution as he would be first in line to recover the borrower's assets in case of default. However since then a great number of authors have warned that seniority rules were no panacea, and that first lenders were still likely to modify their loan terms in equilibrium.

Such changes in terms can include, for example, a rise in interest rates. This is the most common change described in the theoretical literature. In their much-cited model of "sequential banking," for example, Bizer & DeMarzo (1992) begin by showing that in situations where the borrower can only take loans from one bank, additional lending from that same bank imposes an externality on prior lending but the bank

can internalise it by increasing the marginal price (interest rate) of each new loan, which compensates for the devaluation of prior debt. This contrasts with a situation in which the borrower can take an additional loan not from the first bank, but from a second bank. In that case the first bank cannot compensate for the externality that the second loan imposes on its own prior debt by charging a higher rate on that second loan. Instead, in equilibrium, it charges a higher interest rate on its own original debt, which leads to a higher probability of default on that loan, even in the presence of seniority rules. Such a result is also found by Holmström & Tirole (1997) and more recently by Parlour & Rajan (2001).

First lenders can also ration credit, change the maturity of loans and make them shorter, or, in the case especially of sovereign debt, make their loans harder to restructure. The latter is described in a model by Bolton & Jeanne (2009), where sovereign debt is described as excessively difficult to restructure in equilibrium, due to expectations of debt dilution. Shortening maturities is something that lenders to banks, in particular, resort to, according to Brunnermeier & Oehmke (2013). By shortening the maturity of their loans junior lenders can become *de facto* senior; but this in turn leads first lenders to shorten the maturity of their own debt: thus a “maturity rat race” is created.¹ Finally, a number of authors point to credit rationing as a reaction to debt dilution (see, in particular, Bennardo et al. (2013); Degryse et al. (2011); Kahn & Mookherjee (1998)).

Which of these reactions was commonest in the 1920s? We will see that while debt dilution increased the probability of foreclosure, the channels through which this occurred varied. In some cases it is possible to ask simply whether lenders could clearly anticipate that debt dilution would occur, given that second mortgage lending was, according to contemporary sources, a relatively new phenomenon. In others, such as

¹This paper has wider implications than those directly linked to the debt dilution problem. Indeed, it questions the very efficiency of banks’ maturity mismatch, long heralded as a liquidity enhancer and a disciplining device (see Diamond & Dybvig (1983) and Calomiris & Kahn (1991)). It argues that bank debt may in fact be excessively short-term and thus inefficient.

for mortgages made in 1928, it seems that interest rates are too blame. The possibility of credit rationing makes things even more complex, as in the 1920s the very reason for the existence of second mortgages was the small size of the original loans. This means that a negative feedback effect towards smaller and smaller loans cannot be excluded.

2.3 The second mortgage system

This section aims to give a sense of the extent of the second mortgage system. Based on contemporary accounts and newly-discovered archives from the National Association of Real Estate Boards in Chicago, it provides an explanation for its existence and an examination of its most negative consequences. It begins by describing how first mortgages were made by commercial banks and why they would often refuse to lend over 50 percent of the value of the property. It then moves on to describe the most salient features of the resulting second mortgage system, before analysing its consequences for first lenders: debt dilution on the one hand, and seniority reversal on the other. The next section will empirically test the hypothesis that low LTVs led to higher foreclosure rates.

2.3.1 Conservatism of first mortgages

Starting around 1921 commercial banks greatly expanded their holdings of real estate loans. As Figure 2.1 shows, the peak in total U.S. mortgage debt held by commercial banks was reached between 1925 and 1929.² As is well-known in the literature, most of these loans up until 1927 were made by state rather than national banks, as the

²Commercial banks were not the only mortgage lenders. Both building and loan (B&L) associations and mutual savings banks held higher shares. Life insurance companies held almost just as much as commercial banks, and mortgage companies held a much lower share. See Grebler et al. (1956), Tables N-2 and N-3, pp. 468-74. They are not analysed here as the topic of interest is the relationship (if any) between mortgage lending and widespread bank failures. The figures provided here and in Figure 2.1 may take renewals into account.

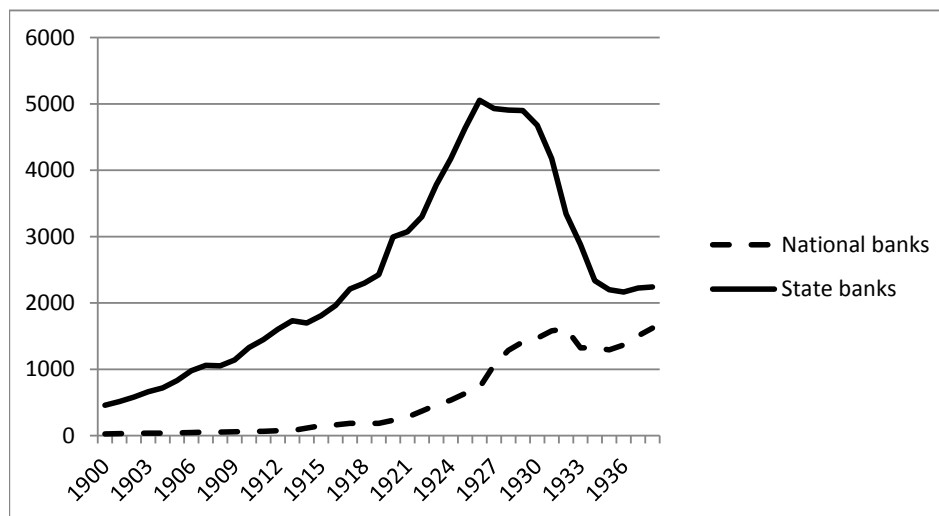


Figure 2.1: Real estate loans by type of bank (all categories), 1900-1938 (\$ million)

Source: Board of Governors of the Federal Reserve System (1956).

latter's real estate lending powers were considerably constrained by law until then.

The literature also rightly insists that the contract maturity of these first mortgage loans rarely exceeded 5 years, and that often it only averaged 3 years. Nor did their loan-to-value ratio often exceed 50 percent, and most only required interest payments, with the principal payable at maturity in a “balloon” payment. The most authoritative source on these figures is Morton (1956, pp. 3-7, 178),³ though numerous contemporary sources confirm this (see for instance Adair (1923) and Gries & Ford (1932, pp. 6, 16, 20)).⁴

An interesting feature of these contracts is that, despite their conservatism, they were not usually implemented for legal reasons in the case of state banks.

National banks were the most constrained type of bank in terms of mortgage

³Since these figures are based on a National Bureau of Economic Research survey of urban mortgage lending, their absolute precision may be taken with care. The survey was made in 1945 on a sample of 170 commercial banks, “representing about one-third of the commercial banks’ total non-farm mortgage portfolio as of mid-1945.” It included “commercial banks of all sizes” (*ibid.*, p. 71).

⁴This contract differed from, say B&L contracts whose mortgages were amortized over 11 years on average. It would be useful to see how this difference in contracts impacted these institutions’ chances of survival during the Depression, but B&L’s are known to have suffered from other structural problems with their share participation system which would make a comparison with commercial banks particularly difficult (see, in particular, Snowden (2010)).

lending. The National Banking Act of 1864, whose aim was partly to bring banks under the control of the federal government and thereby to set standards of good practice (White, 1983), prohibited any type of lending on real estate.⁵ Under the Federal Reserve Act of 1913, conditions were slightly liberalized for country national banks so as to allow them to make farm mortgages for a duration of up to 5 years, which could not exceed 25 percent of capital and surplus or a third of time deposits (United States, 1913, p. 25). In September 1916, this act was amended to allow urban banks to make urban real estate loans of up to one year, though excluding banks located in central reserve cities (Chicago, New York and St Louis) (Federal Reserve Board, 1918, p. 44). It is only after the passage of the McFadden Act in 1927 that all national banks were allowed to loan on real estate for 5 years, to an aggregate amount of 50 percent of their time deposits (Behrens, 1952, p. 18). The legal maximum loan-to-value ratio thus never exceeded 50 percent for national banks (Lloyd, 1994).⁶

However, there is good reason to think that had national banks been allowed to loan more and for longer than the McFadden Act allowed them, they would have rarely done so. Such was the case with state banks, which despite particularly lax legislation would not commonly lend above 50 percent and for longer than 3 to 5 years – on average. The only precise data available on state-chartered bank legislation comes from Welldon (1910), although this source should be a rather conservative one

⁵Except to “prevent losses on debts previously contracted in good faith” (Behrens, 1952, p. 15). In such cases, if necessary, they could acquire title to the property but had to dispose of it within five years (United States, 1864).

⁶Much of this liberalization was due to an effort on the part of the national banking system to compete with state banks. During hearings on the Inquiry into Membership in the Federal Reserve System, Senator Glass insisted that restrictions on real estate were an important reason for the reluctance of state banks to join the system (U.S. Congress, 1926b, p. 13). This may explain the liberalization of national banking laws as all national banks were required to be members of the Federal Reserve System. Senator McFadden openly supported liberalization to achieve this purpose, as can be seen in the 1926 Hearings on the Consolidation of National Banking Associations chaired by him (U.S. Congress, 1926a, p. 25). It is also interesting to note that Mr Bains of the National Bank of Philadelphia remarked that one reason why state banks might still be reluctant to join the system was that they could not rediscount real estate paper at the Federal Reserve Banks: “You take the State banks: the principal loans are on real estate. That may be why so many State banks do not want to go into the national system, because they have no use of the rediscount privileges. They can get rediscount from their correspondent banks, but not from the Federal Reserve bank, because most of their bonds are on real estate; that is, in Pennsylvania” (U.S. Congress, 1926b, p. 644).

as real estate regulation had a tendency to become more lax in the following decades. According to this survey, only Michigan, Minnesota, North Dakota, Ohio, Oregon and Texas limited loan-to-value ratios to 50 percent.

The reasons for such conservatism are of two different kinds. On the one hand, up until the early 1920s commercial banks thought of real estate loans as particularly illiquid. As there was no market for them and they could not be rediscounted at the Federal Reserve, many were aware of the fact that long-term, high-leverage loans would be hard to liquidate in case a bank run occurred.⁷

On the other hand, redemption laws that were particularly favourable to borrowers increased first mortgage lenders' cost of lending and contributed to their contract conservatism. Variation in redemption laws and loan-to-value ratios by state helps to see this. While the average loan-to-value ratio was indeed around 50 percent, this figure tends to conceal some interesting variation among the different U.S. states. Likewise, there was substantial variation between states in terms redemption laws: some state legislations were much more favourable to borrowers than others, as Table 2.1 makes clear. Examining the relationship between the two variables by state, it is possible to notice a modest negative correlation (around .5) between the number of months allowed by a particular state for redemption and this state's mean LTV for commercial banks. In other words, the more generous state laws were towards borrowers, the more likely banks were to reduce their mortgage loan amounts.⁸

⁷Note that some mortgage securitization took place, especially in Chicago (see Chapter 3). At a 1913 congressional hearing, a national banker declared that real estate loans should not be made "out of any money left on deposit or subject to check. If such loans are made upon money subject to check sooner or later you are bound to involve yourself in trouble for two reasons: First, you can not always find a market for these notes. (...) [Second], if you foreclose on your mortgage and want to sell the property there is not always a buyer for it" (U.S. Congress, 1913, p. 180). This attitude was reinforced by the "real bills doctrine," a pervasive ideology at the time according to which commercial banks should only engage in short-term commercial business. Of course many bankers did not in practice follow it, especially with respect to stock investments and loans on securities, but it certainly acted as a constraint once a commercial banker decided to make any mortgage loans at all (see, in particular, U.S. Congress (1913, p. 180)).

⁸The data on redemption laws are taken from Jones (1928). The data on LTVs by state are taken from the same NBER database as Morton (1956) used to derive his averages, mentioned above. As pointed out earlier, these data are to be taken with great care as they come from a survey, made only in 1945, of commercial banks which by definition survived the Great Depression. As Morton

Table 2.1: Redemption laws and urban LTVs by state, 1928 and 1920-1929

State	Redemption period, in months (1928)	Commercial bank urban LTV (1920-1929)
Alabama	24	-
Arizona	6	-
Arkansas	12	-
California	6	44
Colorado	6	-
Connecticut	0	47
Delaware	0	-
Florida	0	38
Georgia	0	55
Idaho	0	50
Illinois	12	44
Indiana	12	48
Iowa	12	-
Kansas	12	46
Kentucky	18	-
Louisiana	0	-
Maine	12	40
Maryland	0	56
Massachusetts	0	57
Michigan	12	46
Minnesota	12	44
Mississippi	0	-
Missouri	12	63
Montana	12	-
Nebraska	9	-
Nevada	6	-
New Hampshire	0	-
New Jersey	0	48
New Mexico	9	-
New York	0	55
North Carolina	0	-
North Dakota	12	-
Ohio	0	50
Oklahoma	-	40
Oregon	4	-
Pennsylvania	0	53
Rhode Island	0	53
South Carolina	0	53
South Dakota	12	-
Tennessee	24	39
Texas	0	50
Utah	6	-
Vermont	12	-
Virginia	0	48
Washington	12	47
West Virginia	0	49
Wisconsin	12	-
Wyoming	6	-

Notes: Data on LTVs are missing for some states, and in general presents quite a few weaknesses (see text).

Sources: See text, and Jones (1928).

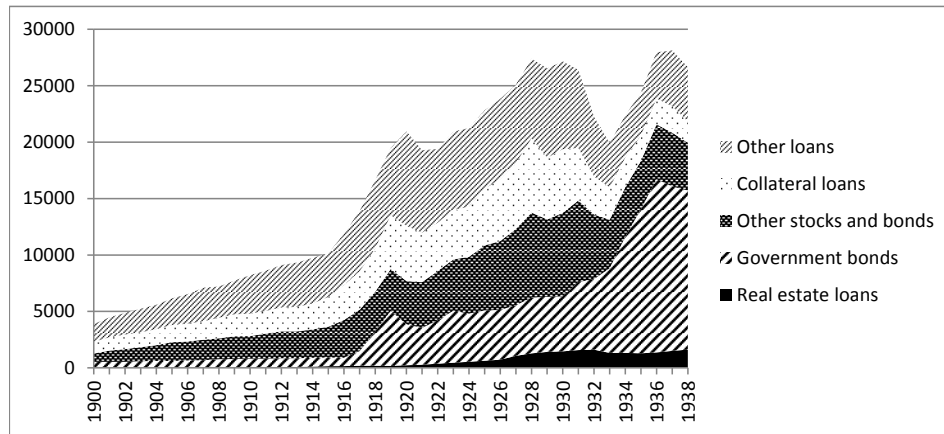


Figure 2.2: Main asset holdings at national banks, 1900-1938 (\$ million, stacked)

Source: Board of Governors of the Federal Reserve System (1956).

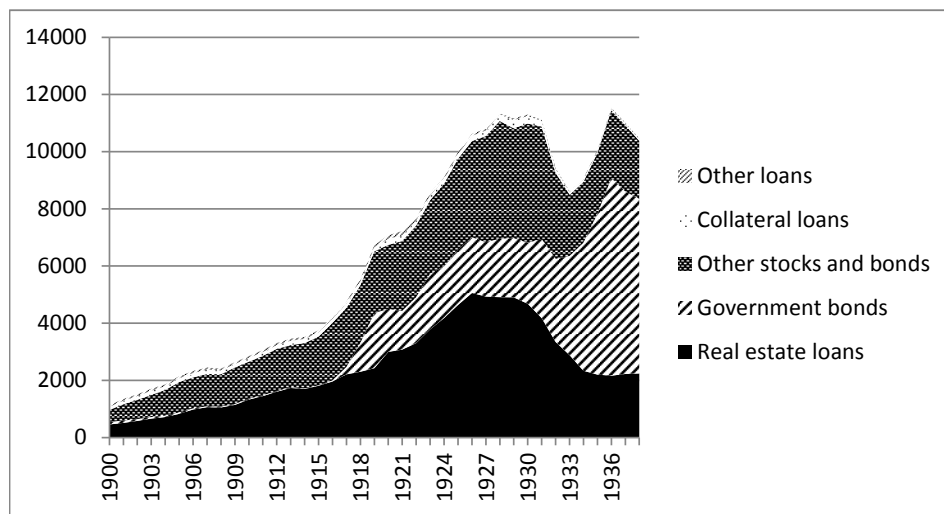


Figure 2.3: Main asset holdings at state banks, 1900-1938 (\$ million, stacked)

Source: Board of Governors of the Federal Reserve System (1956).

Once these self-imposed restrictions were in place, state banks would allow themselves to lend a fair portion of their assets on real estate. Thus mortgages came to account for 16 percent of assets in the portfolios of state banks in 1926 (Board of Governors of the Federal Reserve System, 1956).⁹ Figures 2.2 and 2.3 show the main assets of national and state banks from 1900 to 1938.

2.3.2 The second mortgage system

In the depth of the Depression, President Hoover ordered 25 committees to work for a number of months on the problems facing mortgage borrowers and lenders. The Committee on Finance for the Conference then drew conclusions that two years later would form the basis of the justification for the National Housing Act. One of these conclusions was that the frequent 50 percent limit on first mortgages was based on erroneous principles: “If security is considered, this would seem to be in line with sound public policy. On the other hand, the practice is the principle cause for most second mortgages with their exorbitant rates and frequent failures” (Gries & Ford, 1932, p. ix). As a result the bill for the National Housing Act was specifically designed, among other things, “to eliminate the necessity for costly second-mortgage financing” (U.S. Congress, 1934a, p. 1). The necessity for second mortgages in the 1920s was best described by Reep (1928, p. 1):

“The chief financing problem (...) is that of financing above the first mortgage. (...) In purchasing a property (...) it is assumed, of course, that at least a small down payment is made. The difference between the sum of the first mortgage plus the down payment and the total cost of the property must be financed by junior liens. If the cost of the property is \$10,000, the purchase money mortgage \$5,000, and the down payment \$2,500, then the balance, \$2,500, is the junior lien.”

himself insists, banks were less likely to report accurately on loans made twenty years earlier than on more recent loans (see Morton (1956, p. 133-8)). I thank Andra Ghent for making these data available to me in a processed format. The raw data are available online on the NBER website: <<http://www.nber.org/nberhistory/historicalarchives/archives.html>> .

⁹In the same year national banks' real estate loans only amounted to 5.4 percent of their assets.

But what proportion of borrowers took on a second mortgage in addition to the first? And what was its average loan-to-value ratio? The National Association of Realtors Archives in Chicago contain extensive archival material on the second mortgage system.¹⁰ Aside from numerous contemporary research articles from the Association's *Real Estate Finance* journal and thousands of news items from its *National Real Estate Journal* (from which many of the references cited in this section and the next are drawn), they also store contemporary statistical surveys conducted by the Association itself.

The most extensive such statistical inquiry shows that, in 1923, 76 percent of first residential mortgage borrowers took on a second mortgage (National Association of Real Estate Boards, 1923). This figure is based on questionnaires sent to 200 banks which were members of the Association,¹¹ and is confirmed by other contemporary accounts such as Gries & Ford (1932, p. 21), who say that "two-thirds or more of all home purchase transactions require junior financing."¹² According to the survey, the average loan-to-value ratio for second mortgages was 29.6 percent, so that the total average ratio for first and second mortgages combined was 83.3 percent (National Association of Real Estate Boards, 1923). Other sources put the average LTV lower, at 75 percent (Beach, 1926; Gries & Ford, 1932). Most loans lasted on average one to three years; in other words, they usually matured before the first mortgage (Dunton, 1926; Gries & Ford, 1932).¹³ Also contrasting with first mortgages, second liens were not expected to be renewed, and required monthly amortized payments (see Bayless & Bodfish (1928), Beach (1926), Brigham (1928), Dunton (1926), and Gries & Ford

¹⁰This trade association of realtors still exists but at the time was called the National Association of Real Estate Boards. In the field of mortgage finance their aim was to capture contemporary trends, describe and explain them, and to some extent warn against them if they thought they could be a threat to the business in the long run. They often asked outside observers (businessmen as well as academics) to contribute to their research output. The second mortgage system was one of the chief examples of "bad practice" that many contributors criticized.

¹¹It therefore excludes B&L's.

¹²See also, for example, Adair (1923).

¹³Gries & Ford (1932, p. 20) note that sometimes the first mortgage matured before the second, but they present this fact more as an oddity than common practice.

Table 2.2: First and second mortgage loan characteristics, 1923-1932

Loan characteristics	First mortgage	Second mortgage	Combined
Contract maturity	3-5 years	1-3 years	-
Loan-to-value ratio	50% to 54%	25% to 29%	75% to 83%
Annual interest rate	6%	14% to 16%	-
Renewal expectation	Yes	No	-
Monthly interest payments	Yes	Yes	-
Monthly principal payments	No	Yes	-

Sources: Beach (1926), Gries & Ford (1932, pp. 6, 16, 20-1) and National Association of Real Estate Boards (1923).

(1932, pp. 6, 20)).¹⁴ Table 2.2 summarizes these findings.

The prevalence of very high interest rates and charges - on average 14 to 16 percent for second mortgages on homes - can be explained in part by the underdevelopment of large institutions making second mortgages. As Bayless & Bodfish (1928) put it, “the majority of second mortgage business is carried on by small firms and individuals, which prevents the operation of the insurance principle through the spreading of risk” (ibid.).¹⁵

Yet the most important reason behind these high interest rates was the lack of security backing the second mortgage and the resulting “discounting business.” As liens were junior they were by definition hazardous for the lender - so much so that charging the maximum legal rate would not be enough to cover the risks attendant to second mortgages. As charging a usurious rate would bring disrepute to the firm or individual offering the loan, they would in turn sell it to a third party, at a discount.

¹⁴Brigham (1928) noted, regarding second liens: “one of the commonest sharp tricks is to sell a man a house for more than it is worth with a small down payment and a one-year second mortgage which at the end of the year the seller mortgagee says that he cannot renew in spite of his assurances to the contrary at the time of sale.”

¹⁵Gries & Ford (1932, p. 29) mentioned the existence of “second mortgage companies,” the great majority of which failed to weather the Depression.

This would render the transaction between borrower and investor legal.¹⁶ The third party would then charge an even higher rate to the borrower to compensate for the commission it had to pay the dealer (Beach, 1926; Reep, 1928).¹⁷ In other words, through the discounting business the borrower ended up paying a higher rate than the already usurious rate he would pay without it. Consequently many contemporary observers, including Reep, criticized usury legislation itself and supported higher statutory maximums. Table 2.3 provides information on legal rates (the default interest rate suggested by law) and statutory maximums.

To what extent was this discounting business established? According to Reep (1928, p. 86), the discounting of second mortgage paper was carried out in most U.S. cities for most second mortgages. In this regard it is interesting to note that a small portion of second mortgages were in fact pooled with others and sold to banks and investors as securities. Such securities were the direct obligation of the issuing company. But as Beach (1926, p. 13) made clear, this practice had yet to become more common and better known.¹⁸

¹⁶As ?, p. 19 put it, “instead of financing the borrower direct, the lender will purchase the second mortgage and land contract paper if it has been executed. This procedure is not affected by usury law because any man has the right to sell his mortgage or his contract at any rate of discount (...) provided that the mortgage or contract is not already tainted with usury in the hands of the seller.” Further detail can be found in Reep (1925), where the author insisted that “second mortgages are bought at a discount and are not made directly with the owner of the property,” and the following example is provided: “[t]he seller can take this second mortgage to a second mortgage company and discount it \$500 and thereby realize his \$5,000 cash for the property as follows: \$1,500 cash from the purchaser, \$2,500 in cash from the first mortgage and \$1,000 cash from the discounted \$1,500 second mortgage. In fact, the seller can discount the \$1,500 second mortgage any amount that he wishes or even give it away without any danger of usury.”

¹⁷This was explained by Beach (1926): “The individual investor, fearing that he had more hazard and knowing that he had more trouble demanded a large profit. The dealer wanted a profit too. The borrower paid both - two profits - both large.”

¹⁸Reep also provided an interesting account of what has survived today in the literature on building and loan associations (B&Ls) as the “Philadelphia experiment.” It is often described as a relatively rare form of innovative behaviour on the part of B&Ls, in which some Philadelphia B&Ls started specializing in the second mortgage business in what seemed at first sight an attempt to reap a larger profit (Loucks, 1929; Snowden, 2010). Reep’s account provided additional information in explaining why even first mortgage borrowers who were B&L members also needed access to the second mortgage market. He conceded that B&Ls’ monthly amortization principle allowed them to make first mortgages about 15 percent higher “with equal safety” (ibid., p. 90). However for him, 65 percent LTVs had not solved the junior lien problem as “they have merely limited the problem to a narrower margin of security.” Indeed, many borrowers still could not make a 35 percent down payment and still needed to take out a second mortgage (ibid., p. 92). But Reep was quite pessimistic

Table 2.3: Legal interest rates on mortgages and statutory maximums by state, 1928

State	Legal rate (%)	Statutory maximum (%)
Alabama	8	8
Alaska	6	10
Arizona	6	10
Arkansas	6	10
California	7	12
Colorado	8	no limit
Connecticut	6	12
Delaware	6	6
D.C.	6	10
Florida	8	10
Georgia	7	8
Idaho	7	10
Illinois	5	7
Indiana	6	8
Iowa	6	8
Kansas	6	10
Kentucky	6	6
Louisiana	5	8
Maine	6	no limit
Maryland	6	6
Massachusetts	6	no limit
Michigan	5	7
Minnesota	6	8
Mississippi	6	8
Missouri	6	8
Montana	8	12
Nebraska	7	10
Nevada	7	no limit
New Hampshire	6	no limit
New Jersey	6	6
New Mexico	6	12
New York	6	6
North Carolina	6	6
North Dakota	6	10
Ohio	6	8
Oklahoma	6	10
Oregon	6	10
Pennsylvania	6	6
Rhode Island	6	30
South Carolina	7	8
South Dakota	7	12
Tennessee	6	6
Texas	6	10
Utah	8	12
Vermont	6	6
Virginia	6	6
Washington	6	12
West Virginia	6	6
Wisconsin	6	10
Wyoming	8	12

Sources: Reep (1928, pp. 215-7).

2.3.3 Consequences

Drawing on 1925 data for Chicago, Bayless & Bodfish (1928) described the second mortgage as a rather sound instrument since it only lasted one to three years, there was no intention of renewal, and it required monthly payments.¹⁹ They also asserted that it “has broadened the real estate market and has often been the financial ladder by which the urban tenant climbs to complete ownership.”

However they did recognize a “complete lack of standardization,” emphasizing particularly high interest charges. Indeed, these interest rates were often blamed for borrowers’ inability to pay back their second mortgages. Consequently, most lenders specializing in second mortgages went bankrupt in the Depression. As Fahey pointed out in his 1934 article, the mortality rate of second mortgages was “practically 100 percent” (Federal Home Loan Bank Board, 1934).²⁰

More importantly from the point of view of commercial banks, the second mortgage system also impaired borrowers’ ability to repay first mortgages. Although having a large loan split between two lenders in theory also splits the risk between those two lenders, in reality the risk is not entirely split as first mortgage lenders may suffer.

First, first mortgage lenders suffered due to debt dilution. First mortgage borrowers would have an incentive to conceal the fact that they were taking a second mortgage to make the down payment. This is because they would either fear that first lenders would simply refuse such a deal, or that first lenders would agree to such a contract but would increase interest rates accordingly. If due to asymmetric information first lenders wrongly thought that no second mortgages were taken,²¹ they would suffer

about the future of B&Ls in this business as he thought they would in the end face similar constraints as other second mortgage dealers (ibid., p. 100).

¹⁹According to their survey, based on a small sample of properties in Chicago, about half of homes, and around two thirds of apartments, were encumbered with a second mortgage in 1925 (ibid.).

²⁰See also Cope (1929).

²¹Concealment of second mortgages may have been relatively easy as, on the one hand, they constituted a relatively new phenomenon, and, on the other hand, they were mainly provided by very small institutions and individuals who were not regulated by law.

from straightforward debt dilution (effort to pay back the first loan would be diluted by the existence of second loan) with no compensating reactions. Should first lenders be uncertain about whether a second mortgage would be taken or not, modifications would be brought about, such as interest rate increases, which would also lead to higher default probabilities. While little data remain to ascertain which of these situations was most prevalent, it is clear that in any of these cases debt dilution would be detrimental to first mortgage lenders.²²

Second, differences in contract terms between first and second mortgages would strongly aggravate the situation by creating a seniority reversal effect. Since interest rates on second mortgages were usurious, and since the latter matured in general before the former, the second mortgage acquired some priority in time – what is sometimes called “*de facto* priority” (Brunnermeier & Oehmke, 2013). This seniority reversal effect was reinforced when second mortgages required monthly payments, unlike first mortgages which usually remained unamortized.

The existence of both of these negative effects is confirmed by numerous contemporary accounts. It was best expressed by Schmidt (1930):

“Experience proves that it is better and safer to have one mortgage for seventy percent than to have, say, a fifty percent first mortgage and junior financing above that amount. The expense of the junior financing is very great, and such second and third mortgages, because of heavy amortization and other causes, have been frequently the occasion of leading a first mortgage issue into difficulty.”

Adams (1928) likewise expressed his concern: “[i]t has been our experience that where a corporation is dealing purely in conservative first mortgage paper, it is almost invariably the case that the borrower is not being pressed by his obligation, but that he has incurred other obligations, (...) in the form of a second mortgage (...).” For Beach (1926), while the borrower should not worry about paying the first mortgage as

²²The next section will show that, analysing 22 cities, a rise in interest rates at least for first loans made in 1928 was likely.

it was unamortized and would mature later, “[y]ou reserve a portion of your income each month for the retirement of this second mortgage.”²³

This problem was not confined to urban mortgages. Although second mortgages were of a slightly different character in farm lands than in cities, Wickens (1933) insisted that:

“(…) the man who mortgages his land and later mortgages his crop or other income from the land in effect borrows twice on the same security. Not only does he pledge to another the income on which the first loan was based, but the resulting increase in his total liabilities and burden of payment reduces his capacity to meet all of his obligations.”

It is interesting to note that junior liens were sometimes paid before maturity. For Reep this could be due to two reasons. Either the borrower was a “successful man” and he paid it off “because he does not like the hazard of a junior lien.” Or he was not successful and would need to entirely refinance his first mortgage, which at the time included paying the junior lien (Reep, 1928, p. 37). This would appear to be especially important in times of crisis: it would imply that if the borrower for various reasons could not pay back the second mortgage, he would not be able to refinance his first mortgage, and would be more likely to face foreclosure.

There is also evidence that in some rare cases second mortgages were made by commercial banks themselves. 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 Home Owners’ Loan Corporation (HOLC) loans so may not be entirely representative of 1920s loans. Nevertheless, it is striking to see that in Ohio nearly 20 percent of the amount of second mortgages were provided by bank and trust companies. Individual firms provided around 50 percent, while the rest was mainly provided by building and loans associations and financial and mortgage companies (Federal Home

²³See also U.S. Congress (1934a). It should also be noted that a 25 percent effective down payment meant that borrowers had less equity in their homes, prompting them, as theory predicts, to make less of an effort in times of stress to pay back their mortgages than if the equity was 50 percent as some first mortgage lenders may have believed.

Loan Bank Board, 1936, p. 352).²⁴ This means that in some isolated cases commercial banks were affected by second mortgages not only indirectly through second mortgages' impact on first mortgage risk, but also directly through their exposure to second mortgage risk.

2.3.4 Aftermath

It is not clear why this highly problematic situation has not been emphasized to a larger extent in the recent literature on the 1920s mortgage boom. Perhaps this is due to the scarcity of second mortgage records due to the unregulated types of second mortgage lenders. Nevertheless, President Hoover said in 1931 that “the finance of home building, and especially for second mortgages, is the most backward segment of our whole credit system” (Gries & Ford, 1932, p. ix). Samuel Reep, a scholar and author of a 1928 book on second mortgages, designated them as “the chief real estate financing problem” (Reep, 1928, p. 1). Finally John Fahey, Chairman of the Federal Home Loan Bank Board and a key actor behind the National Housing Act of 1934, described them as “the outstanding sore spot in the [U.S.’s] home-financing system” and “The Evils of Ultraconservative Lending” (Federal Home Loan Bank Board, 1934, p. 4).

In the 1930s bills were introduced in Congress by the Roosevelt administration not only to relieve distressed homeowners but also to overhaul the real estate lending system. While the Home Owners Loan Act of 1933 already bought mortgages from troubled lenders and restructured them by extending their maturity up to 30 years and amortizing them, it was only designed as an emergency measure (U.S. Congress, 1933, p. 1).

The National Housing Act of 1934, on the other hand, clearly aimed at the long-

²⁴The four other states studied were: New York, New Jersey, Connecticut and West Virginia. The numbers are similar for West Virginia, while for Connecticut bank and trust companies held fewer second mortgages (14 percent). The lowest shares are for New York and New Jersey, which still held around 8 percent of these mortgages (ibid.).

term restructuring of the mortgage financing system as a whole, and to do so primarily by introducing national mortgage insurance. The goal of mortgage insurance was not simply to increase the liquidity of real estate finance. It was in fact the main incentive structure through which the U.S. government hoped to make commercial banks, insurance companies and savings and loan institutions increasingly offer long-term (15 to 20 years), low down payment, monthly amortized and low interest (6 percent) mortgages. Indeed, once the law was enacted, a bank could only insure its mortgages if they conformed to these criteria (U.S. Congress, 1934a). This way the U.S. government hoped to eliminate the second mortgage system, which it successfully managed to do for some time.

2.4 Empirical analysis

In this section I analyse a newly-compiled dataset of commercial bank first mortgages in 22 U.S. cities and establish a strong negative correlation between LTVs and foreclosure rates. While Section 3 made clear that LTVs on such mortgages rarely exceeded 50 or 55 percent, Table 2.1 also showed that there was some geographical variation in LTVs. This variation can be exploited to test the hypothesis that particularly low LTVs led to higher foreclosure rates. The result that there was indeed such a negative correlation would seem counterintuitive at first, but it can readily be explained by the existence of the second mortgage system whose prevalence was described in the preceding section. This section thus provides empirical grounding to the idea that low LTVs, which gave rise to the widespread use of second mortgages, posed a significant threat to first mortgage lenders.

2.4.1 Data description

The data are derived from the *Financial Survey of Urban Housing* published in 1937 by the Department of Commerce under the direction of David L. Wickens.²⁵ To my knowledge this survey provides the most elaborate and detailed data on first mortgages made by commercial banks just before the Great Depression. For 22 “representative” U.S. cities, most of which had a population of over 100,000 souls, information was gathered on January 1st, 1934 on existing owner-occupied residential properties, whether mortgaged by a commercial bank, not mortgaged or undergoing foreclosure.²⁶

For this study the important items of the survey were, in each city: 1) the average cost of properties by year of acquisition (whether acquired through debt or bought outright); 2) the average value of properties acquired in 1926 on January 1st, 1934; 3) the average original amount of existing first mortgages; 4) the average percentage of existing first mortgages undergoing foreclosure; 5) the average amount of existing first mortgages by year loan made or renewed; and 6) the average contract interest rates on existing first mortgages.²⁷

Unfortunately there was no ready-made LTV variable for first mortgages made by commercial banks by year loan made. Instead I had to construct such an average LTV variable by dividing (5) by (1) (and multiplying the result by 100) for each year before the Depression.²⁸ As the foreclosure rates concern only first mortgage loans

²⁵The data in raw form can be accessed online at <<http://catalog.hathitrust.org/Record/001106778>>.

²⁶The cities included are: Portland, Maine; Worcester, Mass.; Providence, R.I.; Syracuse, N.Y.; Trenton, N.J.; Cleveland, Ohio; Indianapolis, Ind.; Peoria, Ill.; Minneapolis, Minn.; Des Moines, Iowa; Wichita, Kans.; Richmond, Va.; Wheeling, W. Va.; Atlanta, Ga.; Birmingham, Ala.; Oklahoma City, Okla.; Dallas, Tex.; Butte, Mont.; Casper, Wyo.; Salt Lake City, Utah; Seattle, Wash.; San Diego, Calif.

²⁷Another potentially useful source is the data collected by the NBER in 1945 mentioned earlier. However, as was pointed out, and as Morton himself insists, the foreclosure data from this source are likely to be fraught with errors since many banks declined to fill out the questionnaire and many others may have been dishonest about their foreclosure experience (see Morton (1956, p. 133-8)). In this respect Wickens's data are more reliable, being closer to the Depression and surveying individual properties instead of individual banks, which avoids the self-selection problem.

²⁸This average is thus a ratio of means rather than a mean of ratios. While this may at first strike as odd, it should be noted that the arithmetic mean of ratios is only superior to the ratio of arithmetic

still existing on January 1st, 1934 - with no breakdown by year loan made - it was important to find out the most likely contracting dates for those existing loans. This would allow the study of relationships between foreclosure rates and LTVs of loans made roughly in the same years. Correlations included in Appendix 2.7.1 show that most existing loans were made in 1927 and 1928, which induces me to focus on those two years (see Figure 2.10). This should not pose too much of a problem as the peak in residential construction was reached in 1926 (see Figure 2.11 in Appendix 2.7.1) and mortgage lending plateaued around 1927 (see again Figure 2.3).²⁹

As the sample contains only 22 observations (and sometimes even fewer where commercial banks were not big lenders), the analysis of simple two-way correlations with fitted regression lines seemed appropriate.³⁰

2.4.2 Results

The results are quite striking. In both 1927 and 1928, average LTVs on first mortgage loans made by commercial banks are strongly and negatively correlated with foreclosure rates on those loans. This is shown in Figures 2.4 and 2.5. In other words, the lower was the LTV on these loans, the higher was the foreclosure rate. To many observers today this would seem counterintuitive, as high LTVs are usually associated with higher risk. But the existence of the second mortgage system offers a powerful explanation for this negative correlation. Although correlation does not necessarily imply causation, it is likely that the lower was the LTV on the first mortgage, the

means if both the numerator and denominator are normally distributed. This assumption, however, can be questioned in the case of many financial variables, which often display lognormal distributions. In such cases, the ratio of arithmetic means in fact approximates the geometric mean of the ratios, which is considered a better estimate than the arithmetic mean of the ratios (see, in particular, Lev & Sunder (1979), Mcleay & Trigueiros (2002), and Tippett (1990)). Geometric means for instance were used in Chapter 1 of this thesis. However in this dataset a few resulting LTVs are unexpectedly high, which may suggest that the presence of some measurement error cannot be definitely excluded.

²⁹Unfortunately no second mortgage data can be used as in 1934 it can be expected that most second mortgages, which had a very short maturity, would have been either paid off or foreclosed long ago.

³⁰Appendix 2.7.2 nevertheless reports results for a tentative simple OLS regression framework.

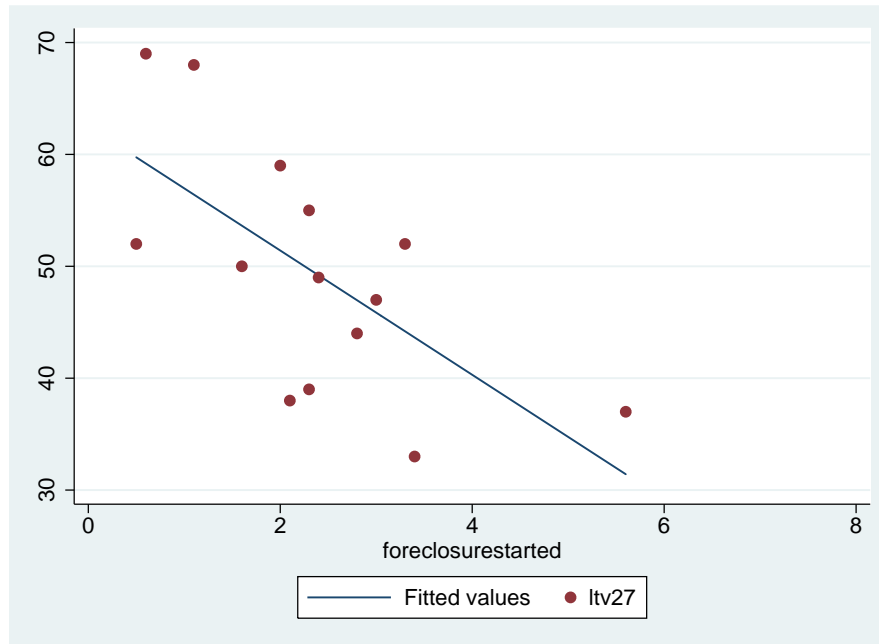


Figure 2.4: Average LTV in 1927 and percentage of foreclosures started on loans existing on January 1st, 1934

Source: Wickens (1937).

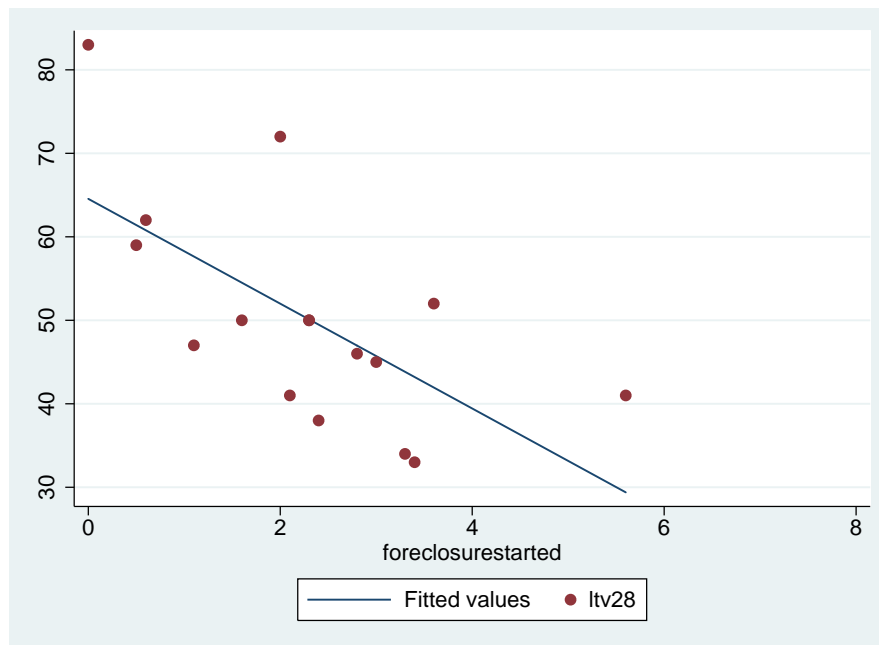


Figure 2.5: Average LTV in 1928 and percentage of foreclosures started on loans existing on January 1st, 1934

Source: Wickens (1937).

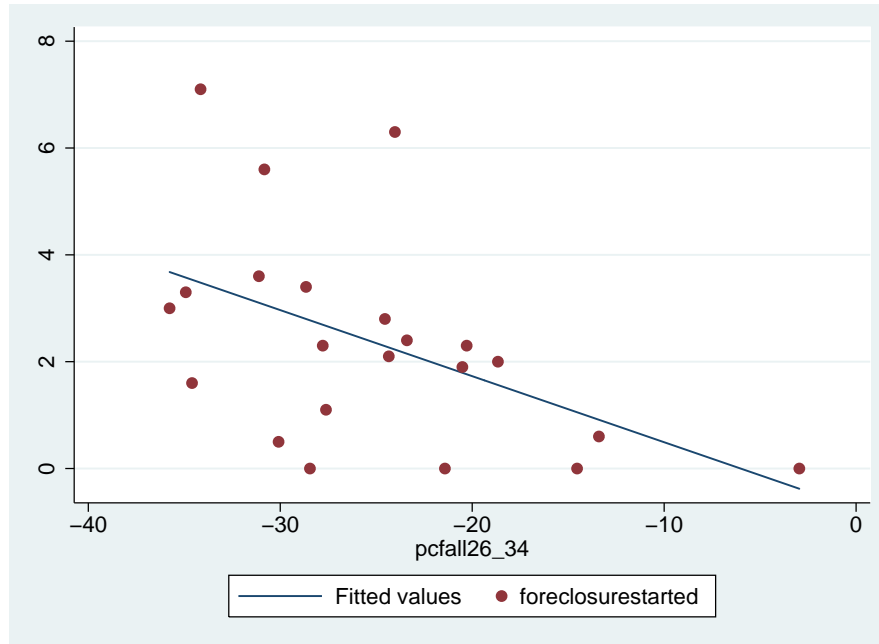


Figure 2.6: Percentage of foreclosures started on loans existing on January 1st, 1934 and average percentage fall in property values between 1926 and January 1st, 1934

Source: Wickens (1937).

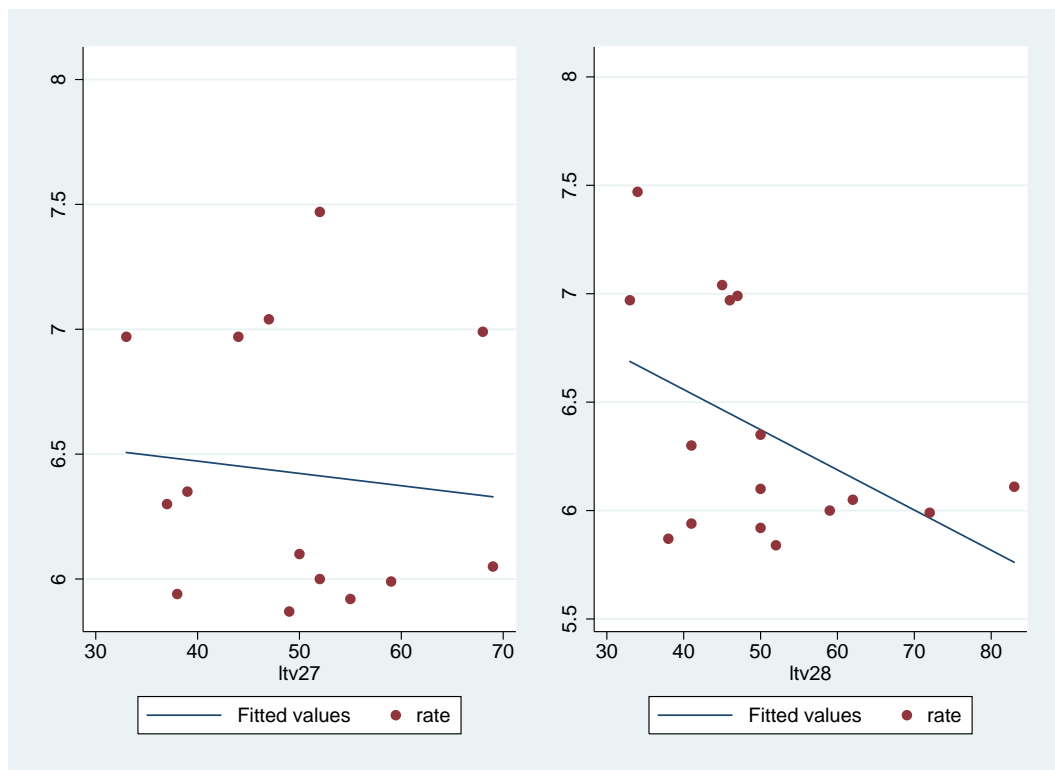


Figure 2.7: Average LTV and average interest rate, 1927 and 1928

Source: Wickens (1937).

larger was the second mortgage loan, and the greater was the debt dilution problem.

Unsurprisingly, foreclosure rates are also associated with falls in property values between 1926 (the peak in construction) and January 1st, 1934. This is shown in Figure 2.6, where the percentage fall in property values, calculated by using variables (1) and (2), often averaged as much as 30 percent.

Now, as was seen previously, the precise channels through which second mortgages could have led to higher foreclosure rates on first mortgages are of various kinds. All that can be said given the available data is that, on average, interest rates were not the obvious problem in 1927, whereas they may have been in 1928. Figure 2.7 helps to see this, plotting average LTVs against average interest rates on first mortgages for both years. In 1928, there is a strong negative correlation between LTVs and interest rates: the lower the LTV, the higher the interest rate. But the correlation is much weaker for 1927, which suggests an unstable relationship between the two. This could mean that foreclosures increased due to other kinds of modifications of the first mortgage loan contracts, or that first mortgage lenders suffered from straightforward debt dilution due to their possible ignorance of the extent of the second mortgage system (and concealment on the part of borrowers).

2.5 The negative impact of foreclosures

As Figures 2.8 and 2.9 show, U.S. foreclosure rates increased dramatically for loans made in 1925, and increased even more for loans made in 1928. Did an increased foreclosure risk on first mortgages matter for banks, given an average 50 percent LTV? Theory predicts that it would, if liquidity needs were pressing. Of course, were they given all the time in the world to foreclose, they would in the end get their security back, unless land values fell by more than 50 percent (which is unlikely).³¹

³¹Section 4 showed that in the 22 cities surveyed the fall in property values from 1926 to 1934 often averaged 30 percent but never exceeded 40 percent.

But problems arose for banks facing large deposit withdrawals. In such cases, banks' liquidity needs were urgent, and should they have to foreclose on some properties, they would often have to wait for at least one year before acquiring title.

Table 2.4 complements Table 2.1 by providing precise information not only on redemption laws but also on court proceedings in each state around 1925. As Ghent (2012) also insists, many states required lenders to go to court in order to acquire title to the property. Therefore while in 26 states the redemption period was 6 months or more, court time (which could vary) often needed to be added. Among these 26 states, 19 had a redemption period of one year or more.³²

That the foreclosure process was particularly lengthy and thus posed a significant threat to banks' health is emphasized by Gries & Ford (1932, p. 39)'s study of mortgage lending:

“One of the greatest hindrances to the availability of mortgage money in some states is the right of redemption from sale under foreclosure. During the period of redemption, foreclosed property is rendered practically unmarketable, may suffer serious damage or depreciation, and presents in a high degree a type of frozen asset.”³³

Numerous accounts of the Depression emphasize the tremendous amounts of deposit losses that commercial banks had to endure during the period. Friedman & Schwartz (1963) and Wicker (1996) provide extensive evidence of this fact, which can be seen in Figure 2.12 in Appendix 2.7.1. Given the relatively large holdings of real estate loans, especially at state commercial banks (see again Figure 2.3), it is clear that large deposit losses combined with high foreclosure rates would have been problematic at best. In addition, if depositors knew about this problem a liquidity crisis could

³²The data used in this table differ slightly from those used in Table 2.1 as information on court time was needed, which can be found in Child (1925). Court time varied according to the case, the location in the state and the state itself. Some estimate it to be around three months (Johnson, 1923).

³³See also Anderson (1927), Hopper (1927), Johnson (1923) and Stalker (1925). Sometimes, in the case of income-producing properties, an “assignment of rents” contract would be signed by borrower and lender to ensure that all rents during the foreclosure period would be collected by the lender, not by the borrower. This would tend to limit the financial damage over the period (Hoppe, 1926).

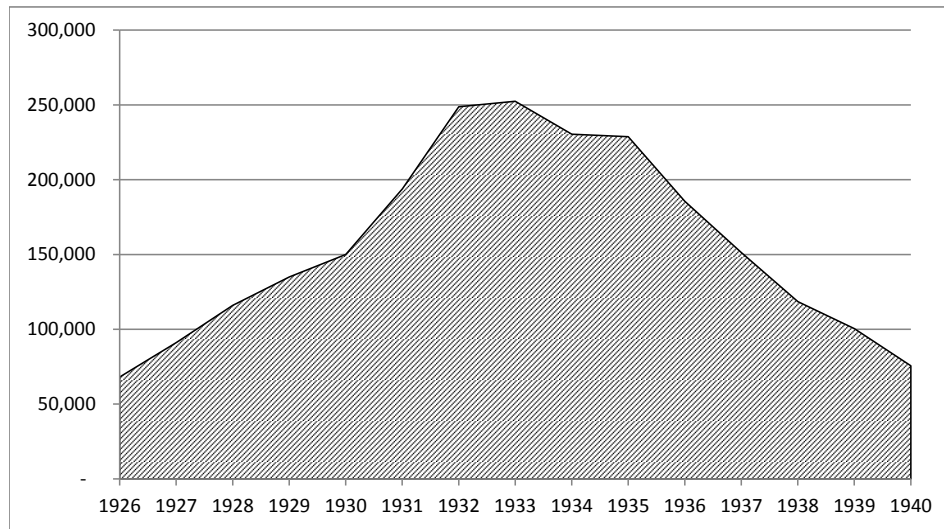


Figure 2.8: Number of nonfarm foreclosures (all lenders), 1926-1940

Source: Fisher (1951, p. 179).



Figure 2.9: Residential foreclosure rates at commercial banks by year loan made, 1920-1935 (%)

Source: Morton (1956, p. 100). Note: in this graph a foreclosure rate in a particular year represents the average foreclosure rate for loans made in this particular year.

Table 2.4: Redemption laws and foreclosure practice by state, 1925

State	Suit in court	Redemption period	Total approximate time to get title
Alabama	No	2 years	psd + 2 years
Arizona	Yes	6 months	court time + 6 months
Arkansas	Yes	1 year w	court time
California	Yes	1 year	court time + 1 year
Colorado	No	9 months	10 months
Connecticut	Yes	-	court time
Delaware	Yes	-	court time
Florida	Yes	-	court time
Georgia	Yes	-	court time
Idaho	Yes	1 year	court time + 1 year
Illinois	Yes	15 months	court time + 15 months
Indiana	Yes	1 year	court time + 1 year
Iowa	Yes	1 year	court time + 1 year
Kansas	Yes	18 months	court time + 18 months
Kentucky	Yes	1 year 2/3av	court time
Louisiana	No	-	50 days
Maine	No	-	1 year
Maryland	No	-	psd + confirmation of sale by court
Massachusetts	No	-	21 days
Michigan	No	1 year	15 months
Minnesota	No	1 year	13.5 months
Mississippi	No	No	21 days
Missouri	No	-	20 days
Montana	Yes	1 year	court time + 1 year
Nebraska	Yes	9 months	court time + 9 months
Nevada	Yes	6 months	court time + 6 months
New Hampshire	No	1 year	1 year
New Jersey	Yes	-	court time
New Mexico	Yes	3 months	court time + 1 year
New York	Yes	-	court time
North Carolina	No	-	psd + 10 days
North Dakota	No	1 year	14.5 months
Ohio	Yes	-	court time
Oklahoma	Yes	6 months	court time + 6 months
Oregon	Yes	1 year	court time + 1 year
Pennsylvania	Yes	1 year w	court time
Rhode Island	No	-	psd
South Carolina	Yes	-	court time
South Dakota	No	1 year	13.5 months
Tennessee	No	2 years w	psd
Texas	No	-	20 days
Utah	Yes	6 months	court time + 6 months
Vermont	Yes	1 year	court time + 1 year
Virginia	No	-	psd
Washington	Yes	1 year	court time + 1 year
West Virginia	No	-	20 days
Wisconsin	Yes	1 year	court time + 1 year
Wyoming	No	9 months	10.5 months

Notes: "psd" - power of sale days; "w" - period may be waived in the mortgage; "2/3av" - redemption allowed only if property does not sell for 2/3 appraised value.

Sources: Child (1925).

easily turn into a self-fulfilling prophecy. As Chapter 1 showed, high proportions of mortgages together with deposit losses caused many banks to fail, at least in Chicago. An explanation of the widespread commercial bank failures that plagued the Depression era (Friedman & Schwartz, 1963; Wicker, 1996) can therefore hardly do without reference to the second mortgage system.

As the vice-president of the banking department of the First National Trust and Savings Bank in Chicago put it:

“As to retaining homes, I have heard a lot of talk about foreclosures and that the banks are calling loans and insisting upon repayment and that the borrowers are unable to refund elsewhere, and they are doing this because they are trying to keep their assets liquid. In our State it takes us, at a minimum, 18 months to foreclose a loan, and it will probably be closer to two years, if not two years and a half, before we acquire title. We are certainly not maintaining our liquid condition by foreclosing loans. We cannot do anything with it after we get it foreclosed” (U.S. Congress, 1932, part 2, p. 269).

2.6 Conclusion

A 50 percent down payment is not easy to make for many borrowers - and indeed, more than two-thirds of them could not make one in the 1920s. Their solution was simple but more burdensome than they probably imagined at first: taking out a second, junior mortgage from another institution or individual, in order to bridge the gap between the down payment they were initially able to make and the mortgage itself. This in effect allowed them to make the required 50 percent down payment, but in reality their equity in the home was only around 25 percent. The interest rate on the second mortgage was usurious, maturities were shorter and more binding than in the first mortgage case, and as such it greatly impaired the borrower's ability to repay even the first mortgage. Should foreclosure occur, the first mortgage lender would indeed receive 50 percent of the value of the property, but at great costs.

This paper presents compelling qualitative and empirical evidence of the extent of the second mortgage system and of its negative consequences for commercial banks during the Depression. In today's world of "piggyback" lending and multi-party over-the-counter trading in derivatives such as credit-default swaps, it is a timely reminder that debt dilution, or "sequential banking" can be highly detrimental to credit. In particular, it is noteworthy that even though first mortgage contracts have changed considerably, the 2000s saw the reemergence of interest-only loans combined with piggybacks (second mortgages).³⁴ Recent research by Mayer et al. (2009) and LaCour-Little et al. (2011) has indeed shown that by 2006-7 the share of Alt-A mortgages that were interest-only rose by 44 percent, the share of those with piggybacks rose to 42 percent, and that the share of subprime mortgages with piggybacks reached 28 percent. Overall, they find that such loans had a significantly higher probability of default – an unsurprising fact in the light of history.

³⁴Interestingly, piggyback loans emerged in the 2000s not as a result of low first mortgage LTVs but as a way for borrowers to bring down first mortgage LTVs to 80 percent or below in order to avoid having to pay for private mortgage insurance.

2.7 Appendix

2.7.1 Additional figures

Figure 2.10 shows that the strongest correlations between the average original amount of existing first mortgage and the average amount of existing loans contracted or renewed in some particular years can be found in 1927 and 1928. This suggests that a focus on LTVS for loans made in those years is recommended, given that the data on foreclosure rates are not broken-up by year loan made but are average foreclosure rates for existing loans. Figure 2.11 shows residential housing starts in the U.S. for the period 1914-1933, pointing out a peak around 1926. Figure 2.12 shows deposits at state and national commercial banks between 1900 and 1938.

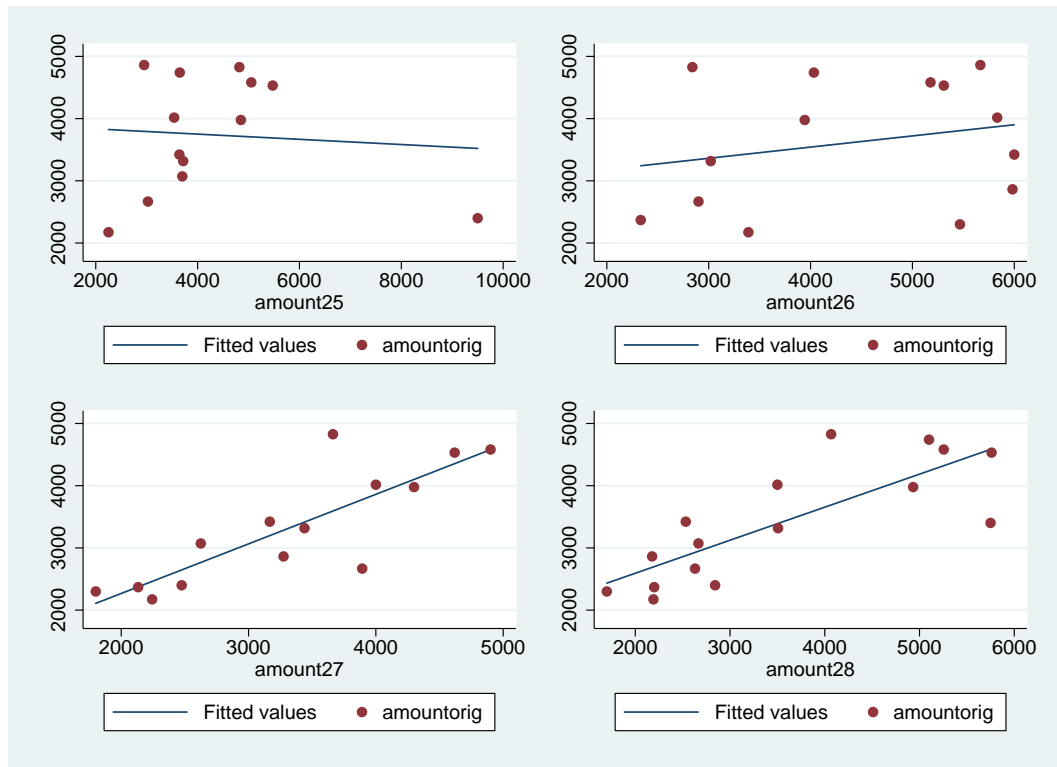


Figure 2.10: Average original amount of existing loan and average amount of existing loan contracted or renewed in 1925-8 (in dollars)

Source: Wickens (1937).

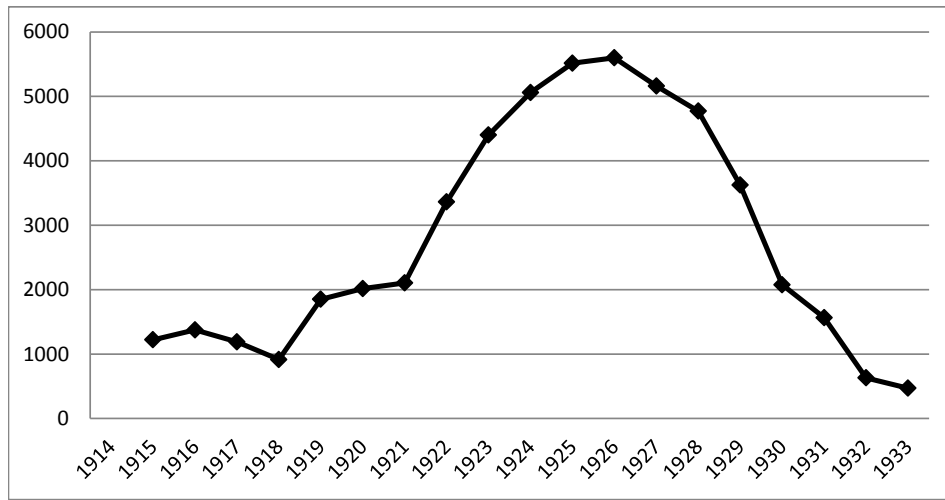


Figure 2.11: U.S. Nonfarm housing starts, 1914-1933

Source: Carter et al. (2006, Series Dc-510).

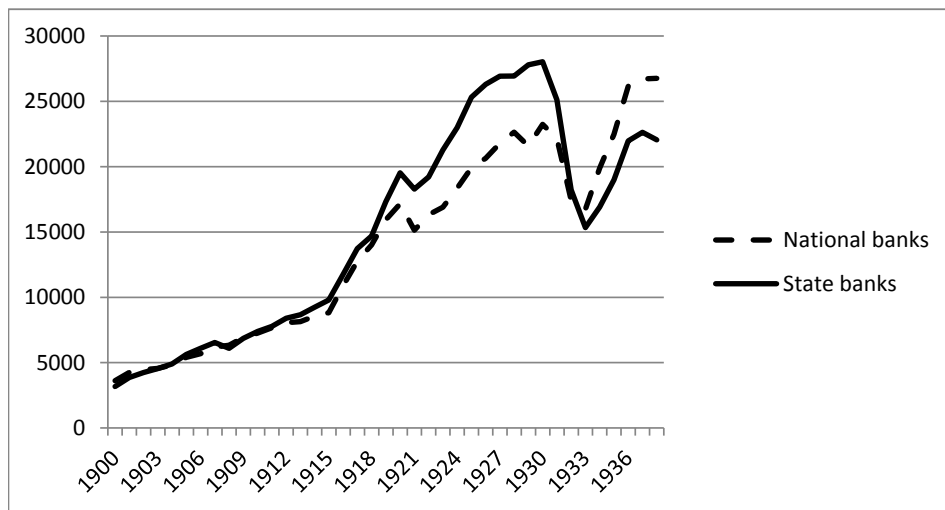


Figure 2.12: Deposits at national and state commercial banks, 1900-1938 (\$ million)

Source: Board of Governors of the Federal Reserve System (1956).

2.7.2 OLS Regression framework for LTVs and foreclosure rates

Table 2.5 reports results for a simple OLS regression framework to test the hypothesis that low LTVs in 1927 and 1928 led to higher foreclosure rates. These results are to be taken with great care as observations are very few, variables are also very few, and the data may suffer from some measurement error. The variables *ltv27* and *ltv28* represent average LTVs for loans contracted or renewed in 1927 and 1928 respectively. The variable *pcfall* is the average percentage fall in property values between 1926 and January 1st, 1934 (which is always negative). Most variables have been entered stepwise because of the high correlation between the two LTV variables.

Table 2.5: OLS regression results (dependent variable: percentage of foreclosures started on loans existing on January 1st, 1934)

	(1)	(2)	(3)	(4)
<i>ltv27</i>	-.078** (.03)			
<i>ltv28</i>		-.067*** (.02)		-.0588** (.03)
<i>pcfall</i>			-.124** (.05)	-.036 (.05)
<i>constant</i>	6.219 (1.30)	5.670 (1.09)	-.744 (1.27)	4.292 (2.34)
n	14	16	22	16
R-squared	.434	.423	.247	.442

Notes: *** significant at $\alpha = 0.01$, ** significant at $\alpha = 0.05$, *significant at $\alpha = 0.10$. Standard errors in parentheses. *Source: see text*

Chapter 3

Out of the Shadows: Commercial Bank Mortgage Securitization in Great Depression Chicago

3.1 Introduction

Contrary to the 1930s Great Depression, the current crisis still affecting the U.S. and most of Europe is said to have fairly identifiable causes. One does not have to look very far to understand that the U.S. housing market bubble in the 2000s was a determinant factor. Scholars still debate, however, what precisely went wrong in the mortgage securitization process leading up to it (Brunnermeier, 2008; Schleifer & Vishny, 2011). In Europe, where mortgage securitization first took shape in the nineteenth century, the process of issuing bonds from real estate loans and selling them to investors had always seemed remarkably safe in comparison. Many point out that an important difference between the modern U.S. process and the old European one is that mortgage bonds were only implicitly (and thus partially) guaranteed in the former case, whereas they were fully covered by the issuer in the latter case (hence the designation “covered bond” – see especially Snowden (1995), and Frederiksen (1894)).

Another important difference is the absence of a formal and regulated exchange for real estate securities in the U.S. (*ibid.*). Yet the precise inefficiencies affecting the U.S. securitization process are still under scrutiny.

Chapter 1 showed that unsecuritized mortgage loans were a significant predictor of failure among Chicago banks in the Great Depression. As real estate loans could not be sold in the open market or rediscounted, they severely impaired banks' liquidity, which as banks came to face large, indiscriminate withdrawals, led to one of the highest urban bank failure rates in history. Then the question arises as to whether the securitization of these loans would have substantially increased their liquidity. While this should in theory be the case, this paper suggests that there were great inefficiencies in the way Chicago bankers experimented with mortgage securitization.

First, using new archival material I show that many banks in the Chicago area did engage in some form of mortgage securitization in the 1920s. While a majority of real estate loans remained unsecuritized, banks often raised money for a mortgage by creating a bond and looking for investors in this bond. The aim was thus not exactly to increase the liquidity of existing loans – rather it was to release new funds for additional mortgage investments, and, in particular, very large ones. The existence of commercial bank mortgage securitization in 1920s Chicago may come as some surprise as it was previously thought to have only truly emerged in the U.S. in the 1970s. Second, I provide evidence that two important conditions for efficient mortgage securitization (based on Snowden (1995)) – the existence of a regulated securities exchange and full legal guarantee on the part of the issuer – were not met, thereby increasing default risk on the bonds. Finally, I emphasize an aggravating factor in the special case of commercial, deposit-taking banks: the fact that many investors in the mortgage bonds were also depositors in the bank, thereby increasing the likelihood of a run on the bank if the bonds went bad.

That the conditions for efficient mortgage securitization were not met is clear.

Mortgage bonds in the Chicago area were sold over the counter to investors, often through an affiliate, with no explicit contractual guarantee – only, in many cases, an implicit one. In addition, the liabilities often did not appear on the parent bank’s balance sheet.¹ Given deep information asymmetries between bankers and investors, the fact that these conditions were not met increased moral hazard and induced the quality of bond issues to deteriorate over time. Default rates rose significantly throughout the Depression. Perhaps for those reasons, no secondary market for these securities ever developed in the 1920s.

The fact that many of the investors were depositors in the bank exacerbated the problem – although some might see it as increasing efficiency in the banking system. As default rates rose, investor-depositors acquired information on their bank unknown to other depositors. They revised down their assessment of the bank’s health, thereby potentially increasing the likelihood of a bank run. As the possibility of a run on the bank rose, the bank found itself in a dilemma. One possibility for the bank was to honor its implicit guarantee and repurchase the bonds customers were bringing back to the bank, thereby maintaining a good reputation – but incurring some potential losses. Another possibility was to renege on its (unbinding) commitments, thus avoiding such losses – but risking potentially larger deposit withdrawals. In other words, commercial banks had to walk a fine line between incurring losses on their bonds and facing deposit withdrawals. In both cases, however, the bank’s health would be further compromised.

These problems are not dissimilar to those affecting U.S. mortgage securitization in the 2000s. Granted, the recent securitization process was much more complex and involved many more players. Nevertheless, in the recent crisis sponsoring banks also had ambiguous commitments regarding mortgage-backed securities (MBS). As commitments were not legally binding and mortgages were written off-balance sheets, banks lacked incentives to monitor their borrowers (Brunnermeier, 2008; Schleifer & Vishny, 2011). In addition, because the creditors of the banks were in many cases

¹This partly resulted from the lack of explicit guarantee.

investors in the banks' MBSs (money market funds),² banks could not simply refuse to take the securities back on their balance sheets, for fear of creating a run on repo, and thus on their own funds (Claessens et al., 2012; Pozsar & Singh, 2011).³

The evidence used in this study comes from two main sources. First, congressional hearings leading up to the Glass-Steagall and Securities Acts of 1933, and to the Trust Indenture Act of 1939, were analyzed in depth in search for evidence of mortgage securitization in the Chicago area. Such deep inquiry into those congressional hearings has never been undertaken, explaining in part the fact that Chicago bank mortgage securitization in the 1920s has remained in the shadows until now. Second, I examined a newly uncovered 1934 Masters Thesis from the University of Chicago entitled "First Mortgage Bond Financing as Conducted by a Small State Bank" to shed further light on the phenomenon. The bank chosen for this study was not named, but several clues tend to suggest that it was located in East Chicago, Indiana, a town with a 1930 population of 55,000 today situated in the Chicago Metropolitan Area. Archival material from the Holman D. Pettibone Papers at the Chicago History Museum as well as the National Association of Real Estate Boards in Chicago were also scrutinized.

The rest of the paper is organized as follows. Section 3.2 puts Chicago mortgage securitization into the broader context of the rise of investment banking activities carried out by commercial banks – often through an affiliate – in 1920s America. Section 3.3 presents the newly uncovered evidence of mortgage securitization in the Chicago area and provides an explanation for its development. Section 3.4 then demonstrates the inherent inefficiency of the securitization process as conducted by these banks. While no formal testing of this hypothesis is possible due to quantitative data constraints, it is shown that the qualitative evidence in this regard is highly suggestive. It

²Money market funds (MMFs) invested in MBS indirectly through their investments in asset-backed commercial paper (Kacperczyk & Schabl, 2010).

³It is important to note, however, that the run on repo by MMFs occurred because individual investors ran on the MMFs in the first place. These investors saw the connection between their MMF and the bank and worried about their MMF's investment in the banks' MBSs. They thus ran on their MMF, which in turn ran on the bank.

should be noted that the lack of quantitative data is a direct result of mortgage bonds being written off-balance sheets. Section 3.5 concludes.

3.2 The rise of investment banking in the 1920s

This section aims to retrace the origins of the significant transformation in banking that constitutes the appearance and increase of investment banking activities, in order to better understand the rise of commercial bank mortgage securitization in Chicago as part of this broader phenomenon.⁴

3.2.1 Banks' security affiliates

In the 1920s, many commercial banks which until recently had remained simple investors in securities also became underwriters. In the 1910s and especially in the 1920s, demand for short-term commercial loans from banks, which were meant to be almost self-liquidating, started to dwindle. This resulted from an increasing desire on the part of borrowing corporations to be “free from all debt” (Peach, 1941, p. 26). Commercial banks therefore naturally turned to securities operations in a wide move to offset the decline in commercial loans.⁵ There was good reason to think that they would succeed, given their economies of scale advantage. Indeed, theoretical and empirical research has shown that it is easier for existing banks than for arms' length lenders to retrieve information on firms, given their accumulated experience in business lending (Calomiris & Hubbard, 1990; Diamond, 1991; Ramirez, 1999).⁶

⁴It is important to note, however, that so far no evidence of commercial bank mortgage securitization in regions outside the Chicago vicinity and Michigan has been found.

⁵As Steiner (1934) put it: “The advantage to the bank in conducting an investment business lies in the fact that securities may be sold to the bank's clientele at but moderate additional expense - an important factor in the decade of the twenties, when commercial loans declined to a low figure.”

⁶For the same reasons commercial banks also greatly increased their loans on collateral security, which helped investors increase their securities purchases (Bogen & Willis, 1929). Both the rise in securities operations and the expansion in security loans were seen by Congress as important causes of the speculative stock market boom in the 1920s (see in particular U.S. Congress (1931)).

Yet important restrictions existed on banks' security dealings aside from war bonds. The National Banking Act of 1864 only allowed national banks to buy securities by investing their surplus funds. Moreover, until the McFadden Act of 1927 buying bonds and reselling them to investors at a higher price remained *ultra vires*. The McFadden Act finally gave them legal authority to perform such operations on bonds through a bond department, but only for the equivalent of 25 percent of capital and surplus. Stock operations continued to be prohibited (see Peach (1941, p. 40) and White (1986)). Such restrictive legislation induced national banks to create affiliates which, being incorporated under state laws, allowed them to "get into almost any type of financial intermediation" (White, 1986).

While it appears that state laws were generally more liberal than national ones in this regard, a number of state banks seem to have opened affiliates for similar purposes – in particular, to bypass certain capital requirements. In New York, for instance, state banks were not allowed to lend a single borrower more than 10 percent of its capital paid in and surplus (25 percent in boroughs of 1.8 million or over). In Illinois, this ratio was 15 percent, and in Michigan banks were not allowed to lend more than 50 percent of their capital on real estate (Welldon, 1910). Should they want to lend more (on a large office building via a large mortgage bond for instance), setting up an affiliate would have allowed them to carry on this sort of operation.⁷ In addition, banks usually supplied funds to their affiliate in the form of loans (Peach, 1941, p. 51). This meant that capital regulations of the above type would also put restrictions on how much a parent bank could lend to its affiliate. To circumvent this requirement, some parent banks, such as Bank of United States, created a large number of additional affiliates.

There is strong evidence that state commercial banks opened affiliates in large numbers. While most of the postwar literature has focused on national banks, congressional hearings leading up to the Glass-Steagall Act are clear on the fact that

⁷As Steiner (1934) emphasizes: "The affiliate possesses certain marked advantages - absence of legal restrictions to which a bond department is subject, ability to establish branches, and some simplification of technical operation."

many state banks were also involved in the process. Notorious examples include the two largest banks failing at the onset of the Depression, Caldwell and Company from Nashville, Tennessee, and Bank of United States from New York City, each of them having over 50 affiliates (see U.S. Congress (1931, p. 1068) and Wilmarth (2005)).⁸ Peach (1941, pp. 26,83) emphasizes that “the affiliates of state banks followed the same general pattern as the affiliates of national banks,” and provides figures on state security affiliates in particular. These figures may not tell the whole story, however, given that many affiliates were not “security affiliates” *per se*. Indeed, Peach himself stresses that there were at least 18 other types of affiliates.⁹ The question as to whether a mortgage bond affiliate would qualify as a “security affiliate” remains open to consideration, especially as contemporaries admitted that they lacked a clear description of such an entity.¹⁰

3.2.2 The rise of mortgage securitization in the U.S.

Mortgage securitization as carried out by Chicago commercial banks should be seen as part of this broader investment banking and affiliates creation phenomenon.

Granted, a large part of the mortgage securitization undertaken in the U.S. at the time resulted from the involvement of firms other than commercial banks (Goetzmann & Newman, 2010; Snowden, 1995; White, 2009). Large, autonomous real estate bond houses for instance, including such notorious ones as W. Straus & Co., American Bond & Mortgage Co. and Miller & Co., issued bonds backed by a single, large property.

⁸In the case of Bank of United States, most of the affiliates were used to lend on real estate (see, in particular, Lucia (1985), Peach (1941, p. 53) and Temin (1976)).

⁹These include: “realty companies, holding companies, bank building companies, safe deposit companies, mortgage companies, liquidating companies, agricultural loans companies, personal or small loan companies, investment trusts, building and loan associations, insurance agencies, finance and acceptance corporations, title and mortgage guarantee companies, foreign banks, joint stock land banks, title and mortgage companies, investment houses, and life or casualty companies” (Peach, 1941, p. 18).

¹⁰See Peach (1941, p. 83). Bogen (1934)’s definition includes the following: “wholesalers of security issues, retailers of securities, holding and finance companies, investment trusts, asset realization companies, mediums for supporting the market for the bank’s own stocks, and real estate holding companies.”

Guaranty companies issued so-called guaranteed mortgage participation certificates or GMPCs, which were less common but more complex as they were backed by geographically diversified pools of mortgages.¹¹ The size of this real estate securities market was quantified by Goetzmann & Newman (2010) relying on Johnson (1936): total issuance between 1919 and 1931 in this category exceeded \$4.1 billion.¹² Remarkably, representing around 23 percent of corporate debt issuance at the 1925 peak, it surpassed total railroad bond issuance in 1924, 1925 and 1928. New York City commercial and residential buildings backed 46.2 percent of the issuance, representing the largest proportion, with Chicago buildings coming second at 25.9 percent.¹³ At the 1925 and 1928 peaks White (2009) shows that such real estate bonds accounted for almost a third of all mortgage debt in the U.S. As Goetzmann & Newman (2010) show, the breakdown in the price of these real estate securities preceded the 1929 crash, beginning in late 1928, and was followed by a near complete drop in issuance.

The recent literature only rarely mentions commercial banks as mortgage bond issuers (see Snowden (1995, p. 287) and White (2009)). This can mainly be explained by the fact that most recent studies have examined bond issues listed in Moody's *Manuals* and the *Commercial and Financial Chronicle* (Goetzmann & Newman, 2010; White, 2009). Such listings indeed pointed to large bond houses and guaranty companies as the main issuers, most of which were located in New York City.

However, a fair share of real estate issues remained unlisted at the time, and – as will be seen with respect to Chicago – most of these unlisted bonds were issued by commercial banks. As Fisher emphasized, “fairly accurate records of large issues are available, but about 1925 a large number of banks and their affiliates and real estate concerns and mortgage bankers began to float small issues. No compilation of these exists” (Fisher, 1951, pp. 29-30). White (2009) confirms this by noting that “the

¹¹GMPCs will be referred to in more detail in Section 3.4.

¹²Johnson's data come from monthly summaries of capital flotations in the *Commercial and Financial Chronicle* and Poor's *Manual* (Johnson, 1936).

¹³These figures represent issues of one million dollars or over.

aggregate figures for mortgage debt and real estate bonds omit many small issues that began to flood the market in 1925, which in itself was an indicator of the boom.” It is therefore likely that no good record exists of mortgage bond issues made by small commercial banks.¹⁴

3.3 Evidence of mortgage securitization in Chicago

Though perhaps not the only one, Chicago was certainly the main city at the time with commercial banks engaging to some extent in mortgage securitization. As James (1938, p. 966) put it, “in regard to real estate bonds, (...) no other city in the country challenged Chicago’s preeminence in this field.” A casual perusal of the general literature on banking panics in the Great Depression already suggests Chicago’s “idiosyncrasies.” Witness Wicker’s description of the first serious banking panic in the area, in the summer of 1931, where he clearly identifies the Foreman group of banks – about half a dozen of which were located in the outlying regions of Chicago – as causing trouble due to its real estate bond sales and repurchase agreements (Wicker, 1996, p. 70).¹⁵

A close look at some contemporary sources is also suggestive. In a 1931 study of investment banking in Chicago, the Bureau of Business Research at the University of Illinois indicated that the “cornerstone” of securities underwriting was “the commercial banks of the city,” that in June 1930 there were 174 (banking or other) houses in a position to issue securities, and that of these 49 made a “specialty” of real estate bonds

¹⁴Fisher (1951, p. 30) pointed out in a footnote that a Chicago firm, Nelson, Hunt and Company, estimated unlisted issues as well, but he did not appear to consider it an entirely reliable estimation.

¹⁵Michigan is another state where real estate bonds are known to have played an important role in the interwar period. According to Rodkey (1935), the author of the most extensive study of mortgage bonds in this state, real estate bonds there were in fact mainly to blame for state banks’ failure during the Great Depression. There is also evidence of commercial bank mortgage securitization in Indiana (U.S. Congress, 1931, part 2, p. 393). In New York City only a few small banks issued real estate bonds – Bank of United States, whose failure made the headlines in December 1930, being one notorious exception (U.S. Congress, 1931, part 1, p. 116).

(University of Illinois Bulletin, 1931, pp. 20-1).¹⁶ It provides tabular comparisons of *listed* security issues offered by Chicago banks, represented in Figure 3.1. These statistics are necessarily incomplete for real estate, as mentioned above, but some preliminary conclusions can be drawn.¹⁷ Although public utilities made up the largest proportion of issues for most of the decade, listed real estate bonds, which made up only 5 percent of the total in 1921, rose to 37.3 percent in 1925, surpassing all other types of issuance. Their share remained fairly large until 1928, and while in 1930 public utility issuance was still substantial, real estate issuance dropped dramatically to a mere .2 percent of the total.¹⁸

The method of financing real estate by bond issues grew significantly in Chicago in the fifteen years preceding the Great Depression. As Culberston (1923) pointed out already in 1923: “Following the Liberty Bond sales of the war, there developed in every community a new largely increasing number of investors who bought bonds of some kind, and they naturally, most of them, turned to real estate bonds as the form of security with which they were most familiar and on which they looked with most favor (...).”¹⁹ In 1920s Chicago bonds could often be found in denominations as low as \$100, which contributed to the attractiveness of this type of investment to the general public. As Hoyt (1933, p. 385) put it: “In the last boom that culminated in 1929, a vast supply fund for building projects was tapped by the sale of real estate bonds (...)

¹⁶Its findings are mainly drawn from the 1930 edition of *Security Dealers of North America*, and unfortunately it is not clear just how many of the 200 commercial banks existing in 1929 did make real estate bonds in one way or another, especially as small real estate securities were usually neither reported in standard manuals nor in banks’ statements, as mentioned above. Koester (1939), who specifically studied real estate bonds in Chicago, said in relation to securities issued by banks that “complete data could be obtained for only the few listed securities (...).” Note also that by June 1930 real estate bond issuance had already fallen considerably – see end of paragraph.

¹⁷Regarding the incompleteness of their data, which come from the usual *Commercial and Financial Chronicle* as well as *American Underwriting Houses and their Issues*, the authors note that “because a large number of real estate issues are relatively small in amount it is likely that more of the securities of this class are omitted from the sources from which the material of the analysis is drawn than of other kinds of issues.”

¹⁸The rise in importance in public utility issues in Chicago can most probably be attributed to the growth of the public utility giant Insull, which also had negative consequences for banks during the Depression (for more detail see Calomiris & Mason (1997) and Vickers (2011)).

¹⁹Bennett believed that the very first real estate bond originated in Chicago (Bennett, 1928, p. 29).

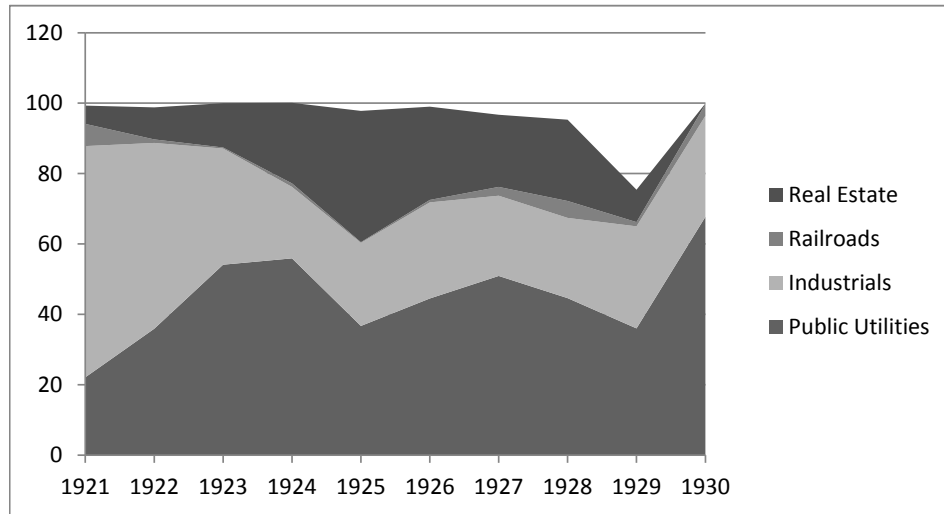


Figure 3.1: Percentages of the volume of various groups of listed security issues to the aggregate volume of listed issues offered by Chicago investment bankers, 1921-1930

Source: University of Illinois Bulletin (1931, p.41).

because the splitting of a large mortgage into bonds of denominations as low as \$100 vastly widened the market.” Bennett (1928, p. 31) corroborated:

“Formerly, real estate mortgage bonds were for \$2,000, \$1,000 and \$500, which would cut the moderate man from the picture; consequently there was a reduction from \$100 to \$500 in the denominations of which could be bought in installments, either monthly payment plan or subscription [sic]. The reduction in the denominations increased bond sales (...).”

The maturity of these bonds averaged 10 to 15 years with interest rates around 6 percent (*ibid.*, p. 5).

A large portion of real estate bonds sold by banks were secured by a mortgage on a very large building (Bennett, 1928, p. 11). The aim of this type of bond issue was to raise money from various investors for a particularly large project – the construction of a skyscraper for instance. However there are many cases in which bonds were backed by a relatively small mortgage – less than \$100,000. As Johnson (1923) pointed out: “Some of our outlying banks, that can sell a bond issue without going outside, but sell it to the people who come into the bank, will make bond issue loans as low as

fifteen to twenty thousand dollars. They can do it. It is good business, and they want it.” Mr Sabath of the Sabath Committee also emphasized in 1937 that “(...) there are tremendous numbers of small issues on buildings that cost \$4,000 to \$50,000. Those bonds, those issues, are purchased mostly by the little fellow, small fellow, in the neighborhood (...)” (U.S. Congress, 1937, p. 317).²⁰

Importantly, the aim of securitization was not to directly increase the liquidity of existing real estate loans. Real estate loans remaining on banks’ balance sheets could neither be sold nor re-discounted at the Federal Reserve. Mortgage bonds were usually issued by the bank affiliate, and, to the best of my knowledge, did not appear on banks’ official balance sheets (see, in particular, U.S. Congress (1934b, p. 3095) and Illinois Auditor of Public Accounts (n.d.)).²¹ An important factor behind this securitization process was bank managers’ will to release additional funds for new loans. Cody (1922) indeed emphasized that “state banks (...) must depend upon the sale of loans on hand for the funds with which to make additional loans.” Boysen (1927) also stressed the importance of “the releasing of [the bank’s] funds for additional loans.” In addition, mortgage bonds were sold “to secure an outlet for the constantly increasing savings deposits which were being drawn from this bank by the promise of increased interest rates offered by other banks in the community,” and “to make a handsome commission for the services of bringing the mortgagor and investor together” (Fruehling, 1934).

So what types of banks in Chicago became involved in the mortgage securitization process? Chapter 1 described the Chicago banking landscape as being made up of mainly two kinds of banks. On the one hand, the large state and national banks of the Loop were few but responsible for close to half the business transacted in the city. On the other hand, a very large number of small state banks catered to the outlying regions of the city, which together “handled a considerable proportion of the

²⁰The Sabath Committee was tasked with the investigation of mortgage bondholders’ reorganization committees in the 1930s. More on this Committee will be said below.

²¹The reasons why banks preferred to issue securities through an affiliate were summarized in Section 3.2. This also explains why it is not possible to exactly quantify the size of each investments per bank.

city's business" (James, 1938, p. 952). It was also noted that the very large banks did not on average invest massively in real estate loans, unlike numerous small outlying state banks (many of whom failed for this reason). Quite interestingly, contemporary archival sources reveal roughly the same pattern with respect to mortgage bonds.

The Sabbath Committee investigation is perhaps one of the most enlightening sources on the subject. Tasked with the investigation of fraudulent practices in real estate bondholders reorganization committees, its members held hearings as of 1934, mainly in Chicago, which eventually led to the Trust Indenture Act of 1939.²² At one of the hearings Seymour Schiff testified as chairman of the Schiff Bondholders' Committee and former officer of the Schiff Mortgage Investment Co., an affiliate of the Schiff Trust and Savings Bank, a small outlying state bank which failed in 1931. Questioned about the purpose of his Schiff Mortgage Investment Co., he replied: "It was the custom in those days for banks to have a subsidiary corporation to make and underwrite real-estate loans and other issues. They in turn sold them back to the bank, who sold them to the bondholders" (U.S. Congress, 1934b, p. 3095). Asked by the chairman whether this was a general practice "with all of the banks," he answered affirmatively: "Practically all of the banks had that" (*ibid.*). Most of the banks cited by the committee were indeed small outlying commercial banks,²³ which is confirmed by the following quote from Melvin Traylor, President of the First National Bank:

"The real estate operations in the Chicago area are financed largely by the so-called outlying banks and not for their own account. They practically sell all the loans they could make largely over the counter" (U.S. Congress, 1931, p. 406).²⁴

²²This Act regulated for the first time the formation of bondholders' committees after default on a bond. It required the appointment of an independent trustee to act for the benefit of the bondholders, and was administered by the Securities and Exchange Commission created in 1934.

²³See U.S. Congress (1934b, part 19, p. 816) as well as Tables 3.1 and 3.2.

²⁴Note that for both quotes the witness may have an incentive to overstate the situation; in the first case to show that he is not alone, and in the second to lay the blame on the outlying banks. However, the way the question is framed in the first case signals that the chairman is already aware of the phenomenon and is simply asking rhetorical questions. The second case is confirmed, as already noted, by the Sabbath committee.

Most of the large Loop banks seem to have preferred handling the securities of Insull's public utility empire (Vickers, 2011). Indeed, as James (1938, p. 966) pointed out, while the great Chicago-based real estate bond house S.W. Straus and Company was an outstanding originator of mortgage bonds, "at the other end of the scale, most of the outlying banks engaged in the distribution of such securities and supplemented this activity by the sale to investors of mortgages on local properties" (ibid.). Nevertheless, it is important to note that some large Loop banks did have an interest in mortgage bonds. Continental Illinois, for instance, created in 1927 the Continental National Mortgage Company, and there is evidence that the First Union Trust and Savings Bank engaged in mortgage securitization (ibid., pp. 962, 996).²⁵

The situation was nicely summarized by Boysen (1929):

"Real estate loan departments are found in most of the large banks in cities of the West and Middle West. This is particularly true in Chicago, where practically every large bank has such a department and where nearly every small bank handles real estate loans through its managing officer and considers them one of its principal sources of revenue. A real estate loan made by a bank serves two customers, the applicant who borrows the money and gives a mortgage on his real estate as collateral, and the investor who buys the mortgage from the bank."

Bringing together the most complete extant sources mentioning Chicago banks involved in the mortgage securitization process, it is possible to draw up a list of those banks known to have issued real estate bonds. This is done in Tables 3.1 and 3.2, combining information from Hemingway (1923), James (1938), the *Security Dealers of North America*, the Sabbath Committee hearings, and the *Chicago Tribune*. It clearly shows that at least 59 commercial banks issued such bonds - about a quarter of all existing banks in 1929. Among these banks, 51 stand out as being small outlying banks serving local communities.

James provided a detailed account of the way in which the Foreman-State Trust

²⁵The fact that Continental Illinois issued mortgage bonds is confirmed p. 996 in the context of the June 1931 crisis.

Table 3.1: Known commercial banks' bond departments or affiliates issuing mortgage bonds in Chicago, 1923-1933

Name of bank	Loop?	Year of failure	Source
Adams State Bank	n.a	n.a	U.S. Congress (1934b, part 19, p. 816)
Alliance National Bank	n.a	n.a	U.S. Congress (1934b, part 19, p. 816)
American Bond & Mortgage Co	No	1931	Hemingway (1923)
Armitage State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Brainerd State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Bryn Mawr State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Capital State Savings Bank	No	1932	Herbert Seibert & Co. (1929)
Central Trust Co of Illinois	Yes	-	Herbert Seibert & Co. (1929) and Hemingway (1923)
Chatham State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Chicago City Bank & Trust Co	No	-	U.S. Congress (1934b, part 19, p. 816)
Chicago Lawn State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Chicago Trust Co	Yes	-	Hemingway (1923)
City State Bank	No	1932	Herbert Seibert & Co. (1929)
Community State Bank	No	1932	Herbert Seibert & Co. (1929)
Congress Trust & Savings Bank	No	1932	Herbert Seibert & Co. (1929)
Continental Illinois Company	Yes	-	Herbert Seibert & Co. (1929) and James (1938, p. 996)
Cosmopolitan State Bank	No	1933	Herbert Seibert & Co. (1929) and Hemingway (1923)
Elston State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Equitable Bond & Mortgage Co	No	1932	Herbert Seibert & Co. (1929)
Fidelity Trust & Savings Bank	No	1932	Herbert Seibert & Co. (1929)
First Union Trust & Savings Bank	Yes	1933	James (1938, p. 996)
Foreman State Trust & Savings	Yes	1931	James (1938, p. 996)
(6) Foreman satellites	No	1931	James (1938, p. 996)
Franklin Trust & Savings Bank	No	1931	Hemingway (1923)
Garfield State Bank	No	1931	U.S. Congress (1934b, part 19, p. 816)
Harris Trust & Savings Bank	Yes	-	Herbert Seibert & Co. (1929)

Table 3.2: Known commercial banks' bond departments or affiliates issuing mortgage bonds in Chicago, 1923-1933 (continued)

Name of bank	Loop?	Year of failure	Source
Home Bank & Trust Co	No	1932	Herbert Seibert & Co. (1929)
Humboldt State Bank	No	1931	U.S. Congress (1934b, part 19, p. 816)
Independence State Bank	No	1932	Herbert Seibert & Co. (1929)
Lake Shore Trust & Savings Bank	No	-	Herbert Seibert & Co. (1929)
Lake View State Bank	No	1932	Hemingway (1923)
Lawndale State Bank	No	-	Hemingway (1923)
Madison-Kedzie Bank	No	1933	U.S. Congress (1934b, part 19, p. 816)
Metropolitan State Bank	No	-	U.S. Congress (1934b, part 19, p. 816)
Noel State Bank	No	1931	Herbert Seibert & Co. (1929) and Hemingway (1923)
People's Securities Co	Yes	-	Herbert Seibert & Co. (1929)
People's Stockyards State Bank	No	1929	Hemingway (1923)
The Northern Trust Company	Yes	-	Herbert Seibert & Co. (1929)
Old Dearborn State Bank	No	1932	Herbert Seibert & Co. (1929)
Reliance Bank & Trust Co	No	1932	Herbert Seibert & Co. (1929)
Ridge State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Second Security Bank	No	-	Hemingway (1923)
Schiff Trust & Savings Bank	No	1931	U.S. Congress (1934b, part 19, p. 816)
State Bank of Chicago	No	1933	Herbert Seibert & Co. (1929)
Stony Island State Savings Banks	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Union Bank of Chicago	No	1932	Herbert Seibert & Co. (1929)
Union Trust Co	No	1928	Hemingway (1923)
United State Bank of Chicago	No	1932	Hemingway (1923)
West Englewood Trust & Savings	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Western State Bank of Cicero	n.a	n.a	Hemingway (1923)
West Highland State Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
West Lawn Trust & Savings Bank	No	1931	Chicago Tribune (n.d.) "Bain mortgage"
Woodlawn Trust & Savings Bank	No	1932	Hemingway (1923)

and Savings Bank and its outlying satellites contributed to the June 1931 crisis. This large bank had indeed formed a group of about six outlying banks, each of which were engaged in the mortgage bond business.²⁶ There is also evidence that the Bain chain of outlying banks, which failed during the same crisis amid allegations of fraud, was heavily involved in mortgage securitization.²⁷

3.4 Inefficiencies in the mortgage securitization process

The previous section showed that most Chicago area banks (predominantly outlying banks) engaged in some form of mortgage securitization. The aim of this fourth section is to describe this securitization process and to analyse the inherent inefficiencies that characterized it. First, it will be seen that two important conditions for efficiency (based on Snowden (1995)) were not met. Second, the investor-depositor problem will be identified as an aggravating factor.

It is remarkable that the market for mortgage securities shrank tremendously in 1929 and had almost vanished by 1930. While there was no secondary market from the start (see below), banks simply stopped issuing new real estate bonds around that time. This can be seen simply by taking a quick look at Figure 3.1. In this figure it is clear that while mortgage issues made up the largest portion of listed issues in Chicago in 1925, they also saw the largest fall from 1928 to 1930. Now, perhaps there was still a market in unlisted issues. But this is not corroborated by contemporary sources. Indeed, contemporaries observed as early as April 1929 that investors were shifting away from the real estate bond market into the stock market. As Emery

²⁶More detail on this crisis will be provided on Section 3.4.

²⁷On November 6, 1931, the Chicago Tribune headlined: “BAIN MORTGAGE DEALS, DRAIN ON CASH REVEALED” (Chicago Tribune, n.d.). In this article it is said that “the banks had sold second mortgage notes to their customers as first mortgages, (...) labeled “First Mortgage Gold Notes.”

(1929) emphasized, “it is because of the lack of this confidence that money which might normally be used for real estate investment has gone instead into the stock market.”²⁸ Later on, in January 1930, Bowen (1930) simply stated: “the market for real estate is gone,” and in 1931 he was told in a letter from a banker of a “bad odor around real estate securities,” emphasizing that “the real estate market is in a well-nigh hopeless condition” (Bowen, 1931). In the same year, a report from the Investment Bankers Association of America noted that “the real estate bond situation is one of the blackest spots in our present financial outlook” (Investment Bankers Association of America, 1931). In 1937, the Sabbath Committee final report estimated that of the \$10 billion real estate bonds outstanding in the U.S., upward of \$8 billion were in default, directly affecting some four million and indirectly upward of 20 million people (U.S. Congress, 1937, p. 321).

3.4.1 No exchange, no explicit guarantee

In his comparative history of U.S. and European mortgage securitization, Snowden (1995) examines what made the old European system so much more robust than its counterpart. The European system is seen as robust because it survived for over a century without any major changes or crises among its mortgage banks. In the U.S., by contrast, mortgage securitization developed in spurts in the 1870s, 1880s and again in the 1920s, each time ending with a major crisis. Snowden’s focus is on mortgage banks and real estate bond houses rather than commercial banks.²⁹ Yet his comparative study allows him to single out two main conditions for what he sees as efficient mortgage securitization in general (*ibid.*, p. 279).³⁰

The first condition for efficiency is that real estate securities should be secured by

²⁸See also Bingham (1930).

²⁹Note that mortgage banks, contrary to commercial banks, do not take deposits.

³⁰Snowden regards both of these conditions as necessary given the deep information asymmetries between borrower and lender. In a mortgage bond sale, the lender must isolate the cash flow from that underlying risk in order to satisfy investors.

high-quality loans. This in effect means that there is a need for a public authority to regulate the quality of the loans backing up the securities. The easiest way in which this could be achieved is through a regulated exchange having the authority to accept or dismiss the securities offered for sale. The admission criteria could be of various kinds. The authority could ensure that the mortgages underlying the security are all first liens on real estate (as opposed to second or third liens). It could also, as was done in France and Germany, put limitations on inflated appraisals by setting the valuation of an income-producing property as a multiple of the owner's income as stated in its most recent tax form. In addition, the owners of private mortgage banks could be asked to issue securities only up to a multiple of their paid-in capital, and to make mandatory contributions to a reserve fund proportional to the volume of securities issued.³¹ Finally, the underlying mortgages could be required to be amortized over a long period of time. In the end, Snowden insists that in Europe restrictions were imposed on almost every phase of the mortgage-making process (*ibid.*, p. 273).

This first requirement was clearly not fulfilled by Chicago area commercial banks in the 1920s, (nor was it met by other institutions issuing real estate bonds (Snowden, 1995)). Mortgage bonds were sold over the counter to investors and did not benefit from any form of regulation (see U.S. Congress (1931, part 2, p. 406) and U.S. Congress (1934b, part 2, pp. 901-2, 1067, 1080)). As Miller (1930) put it: "there was no organized body, in which the public had confidence, to give approval to such certificates before they were sold."³² Houses issuing mortgage bonds were not required "to report to any governmental agency," and few of them made any public financial statements

³¹In analysing the reasons for the failure of guaranty mortgage companies during the Depression, Snowden points out that although the law stipulated that they should maintain a reserve fund, the size of the fund required was proportional not to the volume of securities but to their capital and surplus.

³²Note there was an attempt to regulate mortgage bonds through so-called "Blue Sky Laws." But such laws were dismissed as insufficient and badly implemented. See for instance Middleton (1930), who points out that "the "blue-sky" departments (...) have contributed nothing at all in so far as concerns the protection of the interests of the investor." See also Smith (1927), who says: "Every state in the Union, except three, has a Blue Sky Law. But that is not necessarily any genuine protection."

(Smith, 1927). This can explain the absence of any official balance sheet data for such bonds.³³ The circulars handed out to potential investors often lacked crucial information on the underlying property, as emphasized by Culberston (1923): “there is the growing tendency in bond issue loans not to state in the circular, either in the heading or in the body of the circular, what the building is worth, or what the building is to cost.”³⁴ Such circulars could be downright misleading, for instance when they stated that the bond was a “general” one, which most investors did not know stood for “second mortgage bond” (U.S. Congress, 1934b, part 19, p. 598). An attempt to create a national real estate exchange in New York City failed in 1929 (Miller, 1929), and it is only in May 1930, when authorities in Chicago realized the extent of the problem and sought to “rehabilitate the financial structure of distressed real estate projects,” that the Chicago Curb Exchange required the public listing of all real estate securities (Farr, 1930). Finally, while there was some general legislation regarding how much banks could lend to one borrower as a percentage of their capital, many banks created an affiliate to get around the law. Indeed, the affiliate system allowed these banks to lend a particularly large amount on a single building through a series of bonds.³⁵

The second condition for efficiency given by Snowden is that mortgage banks’ owners or members of a borrowers’ association need to be directly liable for the bonds they offer for sale. In other words, they should provide an explicit contractual guarantee for the bond even in case of default on the underlying mortgage.³⁶ Note that this

³³For instance Mr Bain, who owned the Bain chain of banks, controlled a bond affiliate called Drexel Western whose only auditor, Mr O’Neal, was appointed by Mr Bain himself (U.S. Congress, 1934b, part 2, p. 900). See also U.S. Congress (1931, part 1, p. 39, 117) and U.S. Congress (1937, p. 342).

³⁴This is one reason why insurance companies were reluctant to invest in mortgage bonds. As Smith (1925) put it, “The issuing houses do not furnish sufficient data on the properties to satisfy the insurance commissioner that we are obeying the mortgage law by which no loan can exceed fifty percent of the value of the property.”

³⁵Mr Schiff, the congressional witness referred to above, clearly stated that such was the case (U.S. Congress, 1934b, p. 3095).

³⁶This implies also, in the case where several mortgages back up one bond, that all loans have to be on one particular institution’s balance sheet and cannot be spread across various institutions.

condition cannot be efficiently met without the first one being fulfilled as well, as the guaranteed certificates of participation debacle in the Depression demonstrated. Indeed, while guarantees were explicit in this case, the regulatory reserve fund for the institutions providing such certificates was insufficient as it was based only on a multiple of capital as opposed to the volume of issues sold. Moreover, the mortgage-making process was practically unregulated (Snowden, 1995).

Here again, the evidence dismisses the existence of any kind of contractual guarantee on the part of Chicago commercial banks in the 1920s. Banks often made an implicit commitment to repurchase the bonds in case investors so desired. As James (1938, p. 993) made clear: “The banks (...) had sold mortgages and mortgage bonds to the general public, and all of them, as a selling argument, had adopted the custom of repurchasing such securities from dissatisfied customers.” The agreement was not that the bonds would be repurchased at full value: “[investors would invest in] 6 percent mortgages and banks would agree to buy them back at a discount of one point” (U.S. Congress, 1931).³⁷ But these commitments were not binding. In the following quote James indeed implied that banks had a choice to renege: “Dangerous as the repurchase of real-estate bonds and mortgages was, none of the outlying banks dared to abandon the custom (...)” (ibid., p. 996).³⁸ And as will be seen later, banks often did seize the opportunity to renege on their commitments.

The reasons for these repurchase agreements seem to have been several, together forming a good “selling argument,” according to James. One direct reason for offering to repurchase bonds is that it offers investors a form of insurance against losses in case bonds go bad. In Snowden’s terminology, this separates the cash flow from the underlying risk arising from informational asymmetries between investors and borrowers. This is especially significant when investors lack a developed secondary

³⁷This is corroborated by Holman D. Pettibone, president of the Chicago Title and Trust Company at the time: “(...) they would furnish a market for the mortgages they sold them, and a number of them do furnish that market at some discount” (Pettibone, 1962).

³⁸See also Pettibone’s account in the following paragraph.

market in which to sell those bonds whenever desired. This seems to have been the case in 1920s Chicago, as the following quote demonstrates: “(...) the habit of protecting the interest and sinking funds on those mortgages grew up, and the practice continued, namely, that in the attempt to find a market for the mortgages it resulted in the purchasers bringing them back to the bank” (U.S. Congress, 1931). Miller (1930) also emphasized that:

“there was no market in which to sell [the mortgage bonds]. The only course the holder had was to hold them until maturity and to return them to the issuing house with the request that the house buy them (...). This lack of market had the effect of locking up many millions of dollars invested in such securities and rendering them frozen.”³⁹

Holman D. Pettibone, president of the Chicago Title and Trust Company, corroborated: “[Banks] not committing themselves in writing did have a general understanding with their [customers] that they would furnish a *market* for the mortgages they sold them (...) [emphasis added]” (Pettibone, 1962).⁴⁰ Indirectly, such repurchase offers should have an impact on the issuer’s general reputation, which may affect other lines of the bank’s business. As will be seen below, this reputational effect becomes important when investors are depositors in the bank. Nevertheless, it is clear that many banks stopped repurchasing bonds starting around 1929, as Middleton (1930) emphasizes:

“Buyers of real estate bonds have been educated in the belief they can demand the repurchase of bonds, at any time and under any conditions, at par, less a very small commission charge of one or possibly two percent. The bond houses are directly responsible for that education, but the experience we are now in the midst of undoubtedly means the discontinuance of that practice. It should be regarded as a relic of bygone days.”

³⁹This is also confirmed by Goggin (1930): “In the past one of the drawbacks to real estate securities has been the lack of market for such securities in the event of re-sale. Unless the house of issue, or the syndicate members made a market, real estate bonds usually have slumped off from the issue price.”

⁴⁰Pettibone actually points out that *some* repurchase agreements were written contracts. But this seems to have been rather rare. Halliburton insists that implicit repurchase agreements were common among specialist real estate bond houses in order to create an active secondary market for its bonds (see Halliburton (1939) and Snowden (1995, p. 287)).

The fact that neither conditions were met means that the cash flow was no longer isolated from the underlying risk. Had they been met, mortgage defaults would likely have been inconsequential for investors as the bank would have had the ability to stand behind the mortgages at no great cost. In addition, the absence of regulation in the bond-making process directly led to a relaxation in the bank's lending standards. And the implicit – rather than explicit – guarantee in turn led to an increase in moral hazard, in the form of reduced lending standards as well as reduced screening and monitoring incentives for banks.

3.4.2 Lending standards, screening and monitoring

There is indeed evidence of lax lending standards and reduced monitoring in 1920s Chicago. First, it was often pointed out by contemporary observers that prices of bonds issued for the financing of rented properties were either unduly inflated or based on a full-rental assumption. For instance, Stabler (1926) already warned of potential issues in 1926:

“ (...) many of these issues were anything but conservative and a large proportion unsound. The values given for the property were greatly inflated both as to land and buildings and loans stated to be 60 to 85 percent of appraised values, were in reality frequently ninety to one hundred percent of real values. Because of these excessive loans builders with small capital to put into an operation have been encouraged to produce more space of all kinds than was needed. (...) The bond issues above mentioned are based on the buildings being fully rented and at high rents. If space becomes more plentiful than can be readily absorbed, prices are sure to sag, vacancies are sure to come and defaults will certainly occur.”⁴¹

In addition, in a section titled “Shoestring financing swells the number of new structures,” Hoyt described how several Loop office buildings were erected without any capital invested by the promoter. The promoter would get a one-hundred-year

⁴¹See also, for instance, Jackson (1929), More (1929) and Smith (1927).

ground lease and, based on this sole security, he would float a bond issue. As Hoyt (1933, p. 387) put it:

“When such financing methods prevailed, it is little wonder that there was such a rush to erect new buildings, regardless of the cost of the land, labor, or materials, for the promoter who engineered the affair did not risk much of his own wealth.”

Observing the real estate situation in 1927, Boysen (1927) confirmed:

“The ease of financing top-heavy loans has (...) brought a number of concerns into the field which without adequate capital, experience, or foresight do not hesitate to float real estate securities where loans are not only for full value, but exceed the entire cost, thus permitting a profit over and above the total financing. (...) There is no question (...) that we are now overbuilt with office buildings, stores and apartments of the better type.”

In 1930 some observers from the field became particularly concerned. Such was the case, for example, of Robert Bingham, who worried in 1929 that an increasing number of investors were participating in stock market speculation, withdrawing their funds from real estate securities:

“Unfortunately, unscrupulous operators and bankers have loaded upon the public in years past unsound real estate securities. Heavy financial losses have prejudiced many against investments arising out of land projects. This condition must be frankly faced and conquered. The day of selling the public a first mortgage for one hundred and ten percent of the value of a real estate project is past” (Bingham, 1930).

The National Association of Real Estate Board’s judgment in this matter was also a negative one: “(...) It became apparent to the directors of the National Association that the quality of safety (...) was being sacrificed by many banking houses in the desire to secure a steady stream of issues for public offering. (...) The past three years have seen many mortgage bond issues come into distress” (Schmidt, 1930). This was also the judgment of the Sabath Committee, which stated in its final report that

“with the oncoming of the Depression defaults began rapidly to occur, primarily due to the improper methods used by bankers and investment houses in selling to the public, securities based on inflated values and fictitious incomes (...). Most real estate and industrial securities now in default owe their present condition to the false and inflated values which were honestly set up as security for the obligation ” (U.S. Congress, 1937, p. 342).

More precise evidence of lax lending standards and low monitoring comes from the study of one particular bank. In a newly discovered 1934 University of Chicago Masters Thesis entitled “First Mortgage Bond Financing as Conducted by a Small State Bank,” Fruehling (1934) analyses mortgage securitization at a “typical” small state bank most certainly located in East Chicago, Indiana.⁴² The “X Bank” was examined from November 1924 to November 1933 – almost two years after its failure – from observations based on the bank’s records and interviews with the bank’s officers and directors as well as delinquent mortgage borrowers. The bank issued 80 percent of its bonds on 1-to-2- family homes, very few of which exceeded 5,000 dollars. The usual denominations of the bonds were \$1,000, \$500, and \$100, the latter being the investors’ favourite. Bonds based on a single mortgage were generally held by any number of bondholders ranging from one to about ten.⁴³ Like most other banks it guaranteed its real estate bonds only implicitly and sold them over the counter.

Table 3.3 shows delinquency rates by type of mortgage at the X Bank in November 1933 (nearly two years after the X Bank’s failure in January 1932). It is apparent that all types of properties except farms suffered delinquency rates above 50 percent, with the “dwelling and business” type suffering the highest rate at 70 percent. The average delinquency rate across all types was just under 53 percent. Fruehling clearly attributed these delinquencies at least partly to lax lending and monitoring standards

⁴²Although the bank is designated anonymously as “the X Bank,” it is said to be located in Lake County, Indiana, in a 60,000 population town. In 1930 only two Lake County towns had a population around 60,000: Hammond, and East Chicago. But only one of these two had the “industrial” character Fruehling describes: East Chicago, which was then known for its steel mills. This town is now located in the Chicago Metropolitan Area.

⁴³Sometimes the entire issue was indeed bought by a single investor.

Table 3.3: Delinquency rates by type of mortgaged property at the X Bank, November 1933

Type of property	Number of mortgages issued	Number of mortgages delinquent	Delinquency rate (%)
Dwelling	572	288	50.3
Dwelling and business	10	7	70.0
Apartment	8	5	62.5
Business	62	37	60.0
Farm land	7	3	42.9
Unimproved	56	38	68.0
Total	715	378	52.9

Notes: The category “dwelling” includes one-to-two family homes, “dwelling and business” includes buildings inhabited by one or two families only with part of the building used as a store or shop, “apartment” refers to multi-family housing, “business” refers to buildings used exclusively for business purposes, and “unimproved” designates either residential or business unimproved properties. *Source: Fruehling (1934, p. 35).*

– not just to the Depression.

Regarding lending standards, Fruehling noted that in 13 percent of cases loans were attributed to contractors seeking to finance a building programme, so that the bank would provide one-half of the loan when the roof was on the structure, and the other half when the building was ready for occupancy. This meant that the amount of the loan was based on the appraised land value and the estimated building costs rather than on the completed building. Moreover, Fruehling insisted that “the appraisal of land was made in a haphazard way.”⁴⁴ Yet even in the case of completed dwellings and apartments a value was obtained through a rental multiplier technique, with corrections made for type of floors, design, number of rooms, age, etc. “in a very haphazard manner” (Fruehling, 1934, p.7). Moreover, when the borrower could not pay the commission up front in a loan renewal case, the bank simply wrote an extra note and allowed him to pay later, which “resulted in some very lax methods, which

⁴⁴This observation was drawn “from answers received to questions given the appraisers” (Fruehling, 1934, p. 6).

later made it necessary for the bank to charge off many of these amounts (...)” (ibid., p. 8).

Fruehling was also interested in monitoring issues. To him, low monitoring levels were a significant factor leading up to delinquencies and foreclosures. He emphasised that “until the delinquencies occurred at a cumulative rate the bank made no yearly effort to check on the delinquencies in taxes, assessments, water rent, and maintenance” (Fruehling, 1934, p. 29). This behaviour was so pervasive that in many cases the bank learned about delinquencies “through chance” or “because the property was advertised for tax sale in the columns of the newspapers” (ibid., p. 30). In Indiana a property would only be advertised for tax sale after taxes had been delinquent for two years.⁴⁵ As the sale of mortgage bonds was largely dependent upon the reputation of the bank, bondholders rarely checked the security underlying their bond. In his concluding remarks Fruehling therefore called for much closer supervision of borrowers (ibid., p. 49).⁴⁶

3.4.3 The investor-depositor problem

Various sources point to the fact that many investors in the bank’s mortgage bonds were also depositors in that bank. According to James (1938, p. 996), “[m]any bondholders were customers of the banks from which they had bought securities and, in their indignation at the refusal of those institutions to repurchase the bonds, they often withdrew their deposits.” Pettibone (1962) insisted that banks’ “depositors” were “at the same time their mortgage customers.”⁴⁷ Fruehling (1934, p. 38) also emphasized

⁴⁵Remarkably, such tax or assessment delinquencies (as compared to interest or principal delinquencies) could still lead to a foreclosure suit according to the bank’s own mortgage contracts (ibid., p. 11).

⁴⁶He added the following: “Some mortgagors had kept their interest paid but had failed to pay any taxes for years. Others had allowed the property to deteriorate. When the delinquencies were finally discovered by the mortgagee, some cases had gone too far and the mortgagor took the attitude that he would get all he could out of the property and then give it up” (ibid.).

⁴⁷The context makes it clear that “mortgage customers” refers to mortgage bond investors. Banks had “a general understanding with their depositors, who were at the same time their mortgage customers, that they would furnish a market for the mortgages they sold them (...).”

that “[m]any of the bondholders were also customers of the bank (...).” Finally, at a congressional hearing mentioned earlier, a congressman rhetorically asked Mr Schiff, a former banker, whether real estate bonds were sold “mostly to depositors” (U.S. Congress, 1934b, p. 3095).⁴⁸

The fact that many investors were also depositors in the bank was problematic in case some of the borrowers started defaulting on their mortgages. The main problem for the bank was that these investors would get a signal about the bank’s health more quickly than other depositors who would have to rely on more aggregate information. This means that they would revise their assessment of the bank’s health more easily, which in turn could trigger withdrawals from the bank more quickly than would have otherwise been the case.

Calomiris & Kahn (1991) suggest that a run serves as an incentive mechanism whereby the first depositors to run are rewarded for their bank monitoring efforts by being able to withdraw their entire deposits, while those that are late in the run bear the costs of their lack of monitoring. The investor-depositor problem introduces a distortion in that the investors holding bonds are likely to get first-hand information on these bonds – itself a signal on the bank’s health. They are likely to receive this information without any effort on their part, so that running on the bank would not in effect reward them for anything. Nevertheless, the investor-depositor problem can be seen as increasing the overall efficiency of the banking system, in that asymmetric information between banks and investor-depositors are reduced, which allows them to better discipline bank management.

Facing an increased risk of withdrawals, a bank could respond by making advances on delinquent bonds – that is to say, to honor its implicit guarantee on the bonds. However, this could force the bank to incur potential losses. Thus, in the investor-depositor case, either the bank decides to renege on its commitments while running

⁴⁸Mr Schiff here replied that this was not exactly true as there were other types of customers coming to the bank.

the risk of a potential deposit withdrawals, or the bank honors its commitments while taking in some losses. In both cases, the bank's health is further compromised.

The main source of evidence from the point of view of a single bank is again Fruehling (1934). He showed that the representative small state bank, the X Bank, had an interest in making advances on the real estate bonds when they were delinquent. The main reason was that confidence in the mortgage bond market "seemed necessary to keep the confidence of the customers in the bank itself." He elaborated:

"The two were linked together. The reason for this is quite clear. The first mortgage bond business was carried on under the same roof, under the same management, and with the funds of the bank. Many of the bondholders were also customers of the bank and if they had known for one minute that a default existed in one of the mortgage issues in which they held the bonds their confidence in the bank itself would have been shattered and the closing of that institution would have occurred much earlier than it did." (*ibid.*, p. 37-8).

Often the repurchases were done through bondholders' reorganization committees organized by the issuing house itself (wrongly so according to the Sabath Committee). Bondholders were offered the possibility to "deposit" their bonds with the committee, which often paid fees to a trust company (more often than not, the Chicago Title and Trust Company) which was to take care of the bonds. It should be noted that a number of banks abused bondholders' committees and misled bondholders quite significantly in the process.⁴⁹

⁴⁹These abuses are documented at length by the Sabath Committee. For instance some banks repurchased some bonds which they knew were better than the bondholders thought they were, or than they made bondholders think they were, at a low price, in order to make a profit – a form of insider trading (U.S. Congress, 1934b, part 2, p. 1117). Mr Husek, a bondholder at the Kaspar State Bank, angrily stated after having discovered he had been misled in such a way: "I asked the clerk, "Why must we deposit bonds?" They told me it was to have the bonds in their hands always; that we would not get nothing out of it; and that if the bondholders' committee is going to have the bonds, they will take charge of the earnings; (...) and that people who will not deposit their bonds, they will be wiped out, they will not get 5 cents on the dollar" (U.S. Congress, 1934b, part 8, p. 3121). Mr Sabath himself humourously depicted the situation in the following way: "No one else but the houses of issue had the lists of these bondholders. (...) But the individual bondholders themselves could not communicate with each other(...). But the houses of issue had these lists, and the protective committees used them to send out letters to bondholders, something like this: "My Dear Mrs So and So: In your interest and for your protection, this splendid committee has been appointed to safeguard

It is important to note that there are also some macroeconomic factors at work. First, it would seem that if all banks are repurchasing bonds the cost for one particular bank of reneging will be greater. Conversely, it will be smaller if other banks have already started reneging. In addition, if all banks have stopped reneging and one particular bank is still honoring its commitments, this may induce withdrawals anyway as it may send a signal regarding the lengths to which the bank is willing to go in order to avoid them, and therefore the fact that it would be difficult for it to withstand them.

The macro-level mechanisms are readily seen in James's description of some of the runs occurring during the June 1931 crisis in Chicago:

“Dangerous as the repurchase of real-estate bonds and mortgages was, none of the outlying banks had dared to abandon the custom lest the decision should be seized upon by the public as an evidence of weakness, and precipitate a run. The Loop banks had to break the precedent and, in the spring of 1931, the First Union Trust and Savings Bank announced that it would repurchase no more of the bonds that it had sold.

Primarily, this step was taken to protect the First Union Trust itself, but the officers of that institution realized that their decision would make it easier for other banks to adopt a similar policy. The Continental did so immediately, as did many of the outlying banks, but the Foreman banks hesitated. (...)

The real reason for the reluctance of the Foreman State group was soon to become apparent. Many bondholders were customers of the banks from which they had bought securities and, in their indignation at the refusal of those institutions to repurchase bonds, they often withdrew deposits. The Foreman banks, being in no condition to stand a run, hoped that a policy of leniency to owners of bonds and mortgages would prevent a drain of deposits. Their attempt did not succeed. (...) By June, (...) runs on both the parent institution and its satellites became more severe” (James, 1938, pp. 996-7).

Thus, both at the micro and at the macro level, commercial banks in Chicago ran significant additional risks by choosing to sell mortgage bonds to their depositors, given their implicit guarantee.

your investment. You are advised to send your bonds in here and we will look after them after your interests. If you do not do so you may lose almost all” (U.S. Congress, 1937, p. 312).

3.5 Conclusion

Real estate loans can be particularly difficult for a commercial bank to liquidate due to their long-term maturity, a problem made more severe when they are not easily marketable or rediscountable at a central bank. Creating a market for them is a difficult task, and maintaining one is even more demanding. To ensure a minimum amount of defaults on the underlying mortgages, a regulated exchange and contractual guarantees are necessary. The Chicago area experience was an early demonstration that the absence of such conditions can be particularly damaging. Indeed, this paper showed that some form of mortgage securitization was undertaken in this location during the Great Depression, but that its development was unsuccessful.

These inefficiencies have been recognized in some places in the literature on the current crisis, but the preceding analysis suggests that they deserve particular attention. In the current crisis, mortgage-backed securities were sold over the counter, and usually did not remain explicitly on banks' balance sheets. Banks provided only implicit guarantees for such securities, which reassured investors at the time of purchase but ended up misleading during the crisis (Brunnermeier, 2008; Schleifer & Vishny, 2011). During the crisis, some banks took their conduits back on their balance sheets while others did not, which created confusion about banks' health and exacerbated existing informational asymmetries (Kacperczyk & Schabl, 2010). More fundamentally, lack of explicit guarantees during the boom led banks to become lenient towards the screening and monitoring of their borrowers, which likely led to moral hazard and higher default rates (Brunnermeier, 2008). In addition, investors in mortgage-backed securities sold by banks and their conduits were also creditors of the banks, which increased the likelihood of haircuts once the quality of such investments became better known.⁵⁰ It may be that had the Chicago case been examined more closely some of

⁵⁰Many of the investors in asset-backed commercial paper were money market funds that held reverse-repos from the banks. When defaults on the underlying mortgages started to rise, a run on

the problematic features of the recent mortgage securitization system could have been avoided.

In part this paper relates to Chapter 1 by suggesting a possible cause of mass deposit withdrawals in Chicago during the Great Depression, although the lack of balance sheet evidence in this regard makes it difficult to draw definite conclusions. It is also likely that many banks incurred losses on real estate bonds, although here again extant data are too scarce to draw any formal relationship between such losses and bank failure rates. Nevertheless, this paper suggests that there were great inefficiencies in the way Chicago bankers experimented with mortgage securitization. The securitization process never led to the development of a deep secondary market for mortgage bonds, even before the start of the Depression.

repo was thus more easily triggered (it was in fact triggered by the investors in the money-market funds themselves, when the latter “broke the buck”) (Kacperczyk & Schabl, 2010).

Conclusion

By looking into the causes of bank failures in Chicago during the Great Depression, and uncovering the importance of illiquid asset holdings as a determinant risk factor, this thesis serves to reassert the importance of liquidity risk management on the part of banks. While liquidity risk was considered an important aspect of bank management in the late nineteenth century and early twentieth century, it was then replaced with a greater focus on credit risk and capital holdings. This dissertation suggests that both aspects of bank management are equally important: while capital is essential, assets' inherent liquidity should not be disregarded.

A bank usually transforms liquid claims into more illiquid assets such as long-term loans and investments. Indeed, maturity transformation is an essential feature of modern banking. Nevertheless, given the funding illiquidity risks that persist throughout the world despite the establishment of deposit insurance, a balance needs to be struck between long-term lending and liquidity maintenance. The introduction of deposit insurance after the Great Depression has tended to shift the latter to the background, and this dissertation is a timely reminder that it should be brought back into the foreground.

The first chapter analyzed balance sheet ratios from 1923 to 1933, and using a new methodological framework, found that mortgages were the best predictor of failure and of timing of failure. At the same time, it found that all banks faced tremendous deposit losses, suggesting that mortgages' inherent lack of liquidity may have been the source of the problem. This was confirmed by the fact that banks could not have

made any substantial losses on these loans given the 50 percent LTV, low correlations between bank failure rates and falls in land values, and the unsalability of mortgage loans. Capital was not the main determinant of failure in this depression.

The second chapter zoomed in on the nature mortgage contracts in the 1920s. It found that default rates on first mortgages made by commercial banks were linked to the fact that most borrowers could not make a 50 percent down payment, and had to take on a second mortgage from a different lender, which led to a debt dilution problem. While this did not induce any mortgage losses for first mortgage lenders (banks) – given the 50 percent LTV – it increased the illiquidity of such loans as the foreclosure process in Illinois took over eighteen months on average. This would not have been problematic in the absence of bank runs, but given their widespread occurrence, it did increase the risk of bank failure.

The third paper asked whether mortgage securitization would have increased the liquidity of mortgages in 1920s Chicago, and uncovered the fact that many banks did indeed engage in some form of securitization. While mortgages on banks' books usually remained unsecuritized, it was found that banks often issued mortgage bonds off-balance sheets. While securitization can in theory increase the liquidity of long-term assets, this was not the case then due to a lack of transparency on those bonds and the fact that banks did not explicitly guarantee them, which led to moral hazard. Other types of issues such as covered bonds would have probably been more efficient.

Securitization can have positive effects by releasing new funds for additional lending, increasing the salability (and thus the liquidity) of underlying loans, and tailoring investment risk to different types of investors. In the recent crisis, however, the mortgage securitization process suffered from inefficiencies similar to those found in Chicago.

Today, banks securitize mortgages by pooling them and dividing them into securities with different credit risks attached to them. This process is usually undertaken

not by the bank itself but by a special purpose vehicle or conduit, which packages the mortgages into securities and issues asset-backed commercial paper to fund them. The securities and the commercial paper appear off the balance sheet of the original bank, but the original bank's risk is not completely separated from the conduit's risk as it usually provides implicit guarantees or "liquidity puts" to the conduit. This means that the sponsoring bank is indirectly subject to liquidity risk through the maturity mismatch between the conduit's long-term assets underlying mortgage-backed securities and its very short-term liabilities – asset-backed commercial paper – which need to be rolled over overnight (Claessens et al., 2012).

Moreover, the original bank usually purchases some of its own mortgage-backed securities from one of its special purpose vehicles, which end up on the asset side of its balance sheet. It funds these securities through repos (which stands for "repurchase agreements"), which are short-term liabilities collateralized by them and, like asset-backed commercial paper, also need to be rolled over, often overnight.⁵¹ This means that the bank itself is directly subject to liquidity risk through its maturity mismatch between the long-term assets underlying the mortgage-backed securities it bought and its short-term funding through repos, which are uninsured liabilities (ibid.).

The fact that securitization does not eliminate liquidity risk has been recently emphasized by a number of authors. As Brunnermeier (2008) puts it: "leading up to the crisis, commercial and investment banks were heavily exposed to maturity mismatch both through granting liquidity backstops to their off-balance sheet vehicles and through their increased reliance on repo financing. Any reduction in funding liquidity could thus lead to significant stress for the financial system (...)" (see also, for instance, Calvo (2013), Shin (2009) and Stein (2013)).

While it does not eliminate it, it can reduce it, but only if it is done in the right way. One of the main problems in the recent crisis was that banks faced only the "pipeline" risk of holding mortgages for a few months until they were passed on to another

⁵¹A repo transaction is actually over-collateralized.

entity (Brunnermeier, 2008). Their liquidity puts to conduits were only implicit, and when they did take back these entities on their balance sheets during the crisis for reputational reasons, they were inadequately prepared to take on those new risks (Reinhart, 2011; Schleifer & Vishny, 2011).

Despite major differences in the complexity of the securitization process, Chicago mortgage bonds in the 1920s suffered from similar inefficiencies. Moral hazard was greatly increased by the fact that banks only provided implicit guarantees to investors in such bonds. When the liquidity crisis manifested itself, for reputational reasons banks often did take back some of those securities, while being in fact unprepared to take on such new risks.

In order for banks to increase the liquidity of mortgages through securitization, therefore, they need to be liable for the credit risk associated with them. Covered bonds are more transparent and constitute claims not only on the underlying assets but on the actual cash flow of the institution that issues them (Calomiris, 2008). This can significantly reduce moral hazard while still increasing the salability of loans and their risk distribution to different types of investors.

More fundamentally, banks still need to be aware of liquidity risk. Central banks can in theory help during a liquidity crisis by following Bagehot's rule and lending on good (though not perfect) collateral. Although central banks' role during crises is essential, it is always difficult for it to gauge the precise quality (credit risk) of an asset, especially if the asset is a long-term one, creating more uncertainty about its long-term value (Goodhart, 1999, 2010). For this reason, the Federal Reserve's role in the recent crisis has been controversial: by actually lending against such doubtful collateral as mortgage-backed securities it has once again raised the question as to how a central bank can measure asset risk.⁵²

Because central bank help will likely never be entirely adequate, it is important

⁵²And by purchasing such securities outright, it clearly cut across the boundary between monetary and fiscal policy.

for banks to attend to the inherent liquidity of their portfolios. Of course, nowadays assets' liquidity is increasingly intertwined with their quality as markets are formed and disappear in terms of the perceived quality of such assets. Nevertheless, some assets are inherently less liquid than others, and longer-term assets tend to be less liquid either because they are paid back in a long time or because of the uncertainty attached to their longer maturity. Conversely, some assets are inherently more liquid than others, such as cash assets and (usually) government bonds.

No bank will ever be perfectly hedged in terms of its maturity profile, but promoting liquidity through countercyclical cash ratios may be a good start. In this thesis, cash did not matter in the sense that differences in mortgage holdings made a larger difference. But it is possible to speculate that had banks holding more mortgages also held more cash, they would not have run into such difficulty in the face of bank runs.⁵³ Although Basel I and Basel II had a clear focus on capital rather than liquidity, Basel III has started to introduce measures to regulate the latter (Basel Committee on Banking Supervision, 2008). Yet it has mainly focused on so-called "liquidity coverage ratios," which may be inadequate as their vagueness could lead to new forms of risk-shifting. Cash may be a simpler and more transparent way of assessing a bank's liquidity. And, in turn, increased liquidity in the system may reduce the risk of runs, as runs can also partly be triggered by fears of banks' illiquidity, not just by fears regarding their potential insolvency (Calomiris et al., 2012; Shin, 2009).⁵⁴

One more radical solution to the liquidity problem would be insure all bank debt (Gorton & Metrick, 2012), to completely eliminate the risk of runs. There is a practical problem with this solution, and a more fundamental one. The practical problem is that, as the recent crisis has demonstrated, banks find new ways of funding themselves which regulators are not always aware of. The more fundamental issue is that deposit insurance removes an essential tool for disciplining bank management: the possibility

⁵³Note that governments bonds mattered more than cash, as can be seen in Table 1.4.

⁵⁴Note that Calomiris et al. (2012) also see cash ratios as important buffers against credit risk.

of bank runs. Deposit insurance creates important moral hazard issues which may induce banks to take on both more credit and liquidity risk.

The impact of deposit insurance on developed financial systems needs to be better researched. Studies have already been conducted in this area (Demirgüç-Kunt & Detragiache, 2000; Demirgüç & Laeven, 2008), but their authors acknowledge that much more systematic work needs to be carried out. In particular, future work will need to include the recent crisis as an important data point. There is significant variation in the deposit insurance schemes adopted by various countries to be exploited, and dependent variables should not only include banking crises but also, for instance, leverage. Of course, deposit insurance usually comes with a package of regulations, which makes it difficult to dissociate the effects of deposit insurance *per se* from other effects. Nevertheless, these difficulties, which can be mitigated through the use of appropriate controls, should not deter us from undertaking research, which, at this particular time, seems especially pressing.

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