

The Federal Reserve and Financial Regulation:

The First Hundred Years

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Abstract: This paper surveys the role of the Federal Reserve within the financial regulatory system, with particular attention to the interaction of the Fed's role as both a supervisor and a lender-of-last-resort (LOLR). The institutional design of the Federal Reserve System was aimed at preventing banking panics, primarily due to the permanent presence of the discount window. This new system was successful at preventing a panic in the early 1920s, after which the Fed began to discourage the use of the discount window and intentionally create "stigma" for window borrowing – policies that contributed to the panics of the Great Depression. The legislation of the New Deal era centralized Fed power in the Board of Governors, and over the next 75 years the Fed expanded its role as a supervisor of the largest banks. Nevertheless, prior to the recent crisis the Fed had large gaps in its authority as a supervisor and as LOLR, with the latter role weakened further by stigma. The Fed was unable to prevent the recent crisis, during which its LOLR function expanded significantly. As the Fed begins its second century, there are still great challenges to fulfilling its original intention of panic prevention.

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I. Introduction

Interactions between agents in the financial system are rife with information asymmetry and externalities. These market failures motivate the government regulation of financial institutions and markets, with this regulation falling into two broad categories. The first category deals with asymmetric information between buyers and sellers of financial products and securities, with rules for investor protection, consumer financial protection, and disclosure. In the United States, these rules have primarily been enforced by securities regulators, the Federal Trade Commission, and state authorities. The second category deals with the externalities of liquidity demand, with potential negative outcomes of credit cycles, bank runs, and financial crises. This category has been the main focus of the Federal Reserve since its founding.

The negative externalities of liquidity demand are driven by a fundamental mismatch of any industrial economy: long-term investment is required for growth, but such investment is by its nature uncertain and costly to evaluate; at the same time, the ultimate suppliers of investment capital are subject to liquidity shocks. The maturity and information mismatch between the long-term investments and short-term liquidity needs are intermediated by the financial system through the creation of liquid “money-like” assets. The negative externalities of liquidity demand are manifested in a crisis when investors race to be the first to withdraw from the limited pool of these liquid assets; the negative externalities in “normal times” occur when each additional liquid claim does not fully price its contribution to the risk of such a crisis.

To mitigate the risk of a liquidity-driven crisis, the United States has a safety net with two key pillars: the Federal Reserve as a lender-of-last-resort (LOLR) and the Federal Deposit Insurance Corporation (FDIC) as a guarantor of bank deposits. The existence of this safety net alters the incentives of regulated institutions, and motivates close supervision and regulations that limit the scope, risk-taking, and leverage of these institutions. The tension between the provision of a safety net (to prevent crises) and restrictions on the behavior of financial institutions (to prevent abuse of this safety net) is the main theme of the Fed’s regulatory activities. If the safety net is too large, then banks have no incentive to manage risks in a socially optimal way; if the safety net is too small, then failure of a large institution could have major spillovers to the whole financial system; and if only the largest institutions are thus given the most protection, then the private incentive will be for every institution to grow “too big to fail”. This dynamic presents a complex problem for the Fed as the LOLR and regulator of the

largest institutions. This paper traces the Fed's attempts to solve this problem from its founding and early activities in the 1920s, through the bank failures of the Great Depression, and its attempts to prevent similar failures in the recent crisis.

Section II discusses the establishment of the Federal Reserve System and the passage of the Federal Reserve Act (FRA) of 1913. We use quotations from scholars and from contemporary observers to make the point that a main purpose of the Fed was to prevent future banking panics. Section III focuses on the 1920s, where the effectiveness of the LOLR function was gradually eroded through the confusion of multiple objectives for the discount window, which in addition to its LOLR function was called upon to help create a national market for bills and to finance the war deficits of the federal government. Section IV shows how this weakened LOLR function contributed to the banking panics of the Great Depression, and created a stigma around discount borrowing that has hampered its LOLR efforts to the present day.

Section V summarizes the regulatory changes of the New Deal, which by some combination of luck and design contributed to a quiet period of nearly fifty years in the U.S. financial system. The creation of deposit insurance and the establishment of the FDIC in the Banking Acts of 1933 and 1935 were originally done through amendments to the Federal Reserve Act, highlighting the connection of deposit insurance to the panic-prevention function of the Fed.¹ Other crucial elements of New Deal legislation include the vital section 13(3) of the FRA (which became the statutory source of most of the special lending programs during the recent crisis), and the centralization of Fed decision-making power in the Board of Governors. The Fed-Treasury Accord of 1951 was an important step towards freeing the Fed from pressure to finance deficits and restoring the discount window to its main LOLR function, and the Bank Holding Company Act of 1956 greatly expanded the scope of the Fed's supervisory authority. Nevertheless, over the subsequent 50 years, bank supervision was only peripheral to the Fed's priorities, which moved steadily towards a focus on price stability using interest-rate policy as its main instrument, and rarely needed to even think about the LOLR function.

Section VI examines the transformation of the banking sector that began in the late 1970s and has continued to the present day. Under rising interest rates, non-bank financial intermediaries began to compete successfully with regulated banks on both sides of their balance sheets, resulting in the rise of money-market mutual funds (on the liability side) and in

¹ The Federal Deposit Insurance Act of 1950 ultimately separated deposit insurance from the FRA.

commercial paper and high-yield bonds (on the asset side). In response to these new market pressures, Congress passed a series of laws loosening the restrictions on banks and allowing them to compete more effectively. This new era of competition, from both banks and non-banks, eroded the rents that had helped maintain banking stability during the quiet period.

The financial crisis of 2007-2009 shook the slumber from supervision and the LOLR function, and led to a significant shift for the Fed back to its financial-stability roots. Section VII discusses the Fed's efforts in the crisis, which can largely be viewed as attempts to expand the LOLR function beyond its traditional institutions and markets. The Fed's role as supervisor played a key part in the eventual calming of short-term funding markets in the spring of 2009 through the Supervisory Capital Assessment Program (also known as the "stress tests"), which have now become a standard part of the regulatory toolkit.

Section VIII brings the story to the present day with a discussion of the Dodd-Frank Wall Street Reform and Consumer Protection Act (DFA) of 2010. The DFA expanded the Fed's role as a supervisor of large non-bank institutions, but also placed limitations on its ability to act as the LOLR in some instances. With other federal agencies also experiencing great changes in their statutory authority, there are still many unanswered questions about the optimal role of the Fed in the prevention of financial panics. Section IX concludes with a discussion of those questions.

One theme repeated often in Fed history is that "regulatory policy" and "monetary policy" cannot easily be separated. This theme is illustrated by the multiple objectives of the discount window in the early years of the Fed, by the effect of the tight-money policies of the 1970s and 80s on the competitive position of banks (and the endogenous response of Congress to then relax some bank regulations), by debates over the contribution of easy-money policies of the 2000s to the recent crisis and its regulatory aftermath, and by Fed actions during the crisis that clearly mixed the functions of LOLR, bank supervision, and monetary easing. Thus, throughout the paper, many of our discussions about regulatory policy will be framed by contemporaneous developments in monetary policy.

II. The Establishment of the Federal Reserve System

Market economies face banking panics. A banking panic or financial crisis is an event in which the holders of short-term debt issued by intermediaries seek to withdraw cash en masse or refuse to renew their loans. A crisis is a *systemic* event; it involves the banking system, not this or that bank. Such a crisis is an information event.² Holders of short-term debt come to suspect the value of backing collateral—all collateral, since they cannot distinguish good and bad collateral. In such a situation, there is no distinction between “solvent” and “insolvent” banks in a crisis. In a crisis, all banks are insolvent in the sense that they cannot honor their debt contracts without trying to sell assets, the assets of the banking system.

In a bank run holders of banks’ short-term debt come to doubt the collateral backing the debt. These doubts are not irrational. When no central bank is present, banking panics occur around the peak of the business cycle when holders of short-term bank debt receive news shock about a coming recession (see Gorton (1988)).³ The unexpected deterioration in macroeconomic fundamentals causes a shift in expectations.⁴ In the coming recession some banks will fail but it is not known which banks. Depositors respond by choosing to avoid losing their savings in the recession by withdrawing their cash. In the United States such panics happened starting in 1819 with private bank notes, continued until the Civil War, and then during the National Banking Era a series of panics ensued with demand deposits.

The problem in a bank run is that the depositors’ doubts about the backing collateral can only be removed by showing them cash. But, since the banks have lent the cash out, and the assets of the banking system cannot be sold (except possibly at “fire sale” prices), there is no way to do this except through a LOLR, which lends against the impaired bank collateral. But, a LOLR can only prevent panics if it is sufficiently credible such that depositors always believe it can always essentially purchase the assets of the banking system. The Federal Reserve System was established for exactly this purpose.

² In the nomenclature of Dang, Gorton and Holmström (2013), there is a switch from information-insensitive assets to information-sensitive assets. That is, the backing collateral is now viewed as being prone to possible adverse selection when sold.

³ In the modern era with the presence of central banks, the links between financial crises and recessions are similar. For example, Demirgüç-Kunt and Detragiache (1998) examine the period 1980–1994 and “find that low GDP growth, excessively high real interest rates, and high inflation significantly increase the likelihood of systemic problems in our sample” (p. 83).

⁴ Dang, Gorton and Holmström (2013) describe this as a shift from information-insensitive debt to information-sensitive debt.

At the time the Fed was established, the perceived defect of the National Banking System was that currency was not “elastic,” that is, there was no way to obtain more currency to meet depositors’ demand in times of bank runs, or to meet seasonal demands. The private bank clearing houses issued “money” in the form of certified checks and loan certificates in times of panic. But this joint response of the clearing house member banks was only triggered by the panic itself.⁵ William Ridgely, the U.S. Comptroller of the Currency from 1901 to 1908 put the issue this way: “The real need is for something that will prevent panics, not for something that will relieve them; and the only way to attain this is through the agency of a Governmental bank” (1908, p. 173).

In both cases, the institutions –clearing house and Fed—lend against “eligible” collateral, which has been prespecified. Clearing house banks monitored each other because of daily counterparty exposures in the clearing process. The Comptroller of the Currency was the official bank regulator during both the National Banking Era and the era of the Fed. At the onset of a panic and during the panic, the lending, in both cases, is to all (member) banks that want to borrow. The screening and monitoring of banks must happen prior to the panic.

There is an important difference between preventing bank runs and responding to the crisis once it has happened. The difference is that in the latter case the LOLR’s actions come late, only after it is clear that the crisis is a systemic event. Once the event is seen to be systemic, the LOLR acts but these actions take time and the process of exchanging private bank assets for government assets (money or Treasuries) is very costly and painful. This seems clear from the recent crisis.

When the Federal Reserve System was founded, there was no notion of activist open market operations in government securities that would later become the principal operating mechanism. The reports of the National Monetary Commission (established after the Panic of 1907) were focused on the benefits of a “bills market,” that is, a market for bankers’ acceptances. Federal Reserve participation in this market would provide an automatic mechanism for creating an “elastic currency,” following the logic of the Real Bills doctrine. “Rediscounting” would allow banks to exchange private debt for currency.

⁵ On clearing houses see Timberlake (1984), Gorton (1984, 1985), Gorton and Mullineaux (1987), Gorton and Huang (2006).

Congressmen repeatedly stressed that the new discounting authority of the Federal Reserve Banks would prevent the occurrence of banking panics. Representative Carter Glass, who sponsored the Federal Reserve Act in the House of Representatives, wrote that the most important accomplishments of the legislation were to remove “seasonals” in interest rates and to prevent panics (1927, p. 387). Senator Robert Owen, sponsor of the bill in the Senate said that the Federal Reserve Act “. . . gives assurance to the business men of the country that they never need fear a currency famine. It assures them absolutely against the danger of financial panic ...” (Owen (1919), p. 99). Senator Claude Swanson argued that the legislation made “impossible another panic in this country.” Congressman Michael Phelan of Massachusetts, chairman of the House Committee on Banking and Currency, argued that “In times of stress, when a bank needs cash, it can obtain it by a simple process of rediscounting paper with the Federal reserve [sic] banks. Many a bank will thus be enabled to get relief in time of serious need.”⁶

Businessmen and regulators agreed. Magnus Alexander, the president of the National Industrial Conference Board announced that “there is no reason why there should be any more panics” (quoted in Angly (1931, p. 12)). The Comptroller of the Currency announced in 1914 that, with the new Federal Reserve Act, “financial and commercial crises, or ‘panics,’ ... with their attendant misfortunes and prostrations, seem to be mathematically impossible” (Comptroller of the Currency, 1914, p. 10). Finally, in the Federal Reserve System’s first Annual Report it states that “its duty is not to await emergencies but by anticipation to do what it can to prevent them” (1914, p. 17).

So, the intention was not (just) to establish a LOLR that would act during a crisis. Private bank clearinghouses were capable of playing this role. Since being established in New York City in 1854 clearing houses had spread across the country and had become increasingly sophisticated in their responses to crises. A panic would trigger clearing house members to act as one large bank, issuing liabilities – clearing house loan certificates – which they were responsible for jointly. At the outset of the crisis the clearing house would prohibit the publication of bank-specific information, which was required during non-crisis times. The amounts of clearing house loan certificates issued to individual member banks were kept secret.⁷

⁶ Quoted in Hackley (1973, p. 10).

⁷ See references in footnote 5 above.

Following the Panic of 1907 Congress passed the Aldrich-Vreeland Act providing a system for national banks to issue emergency currency in a panic. The Act also established the National Monetary Commission to study the problem of panics; it ultimately recommended the Federal Reserve Act of 1913. Aldrich-Vreeland money was issued in the Panic of 1914. Clearing House loan certificates were also issued in 1914 (see Jacobson and Tallman (2012)). Friedman and Schwartz (1963, p. 196) and Silber (2007) suggest that the emergency currency did stabilize financial markets.

But the ability of the clearing houses to issue loan certificates and Aldrich-Vreeland emergency currency did not prevent panics, and associated real effects. Thus, the idea behind the establishment of the Federal Reserve System was that it could do something that the clearing houses and the Aldrich-Vreeland Act could not do. It could establish a credible emergency mechanism *in advance* so that it was always present. Moreover, being a (quasi-) government entity the Federal Reserve System could be expected to be solvent.

Depositors' expectations that the Federal Reserve would always be able to lend to banks would make bank runs unnecessary. This was fundamentally different than private bank clearing houses. The private coalitions of clearing house banks might not be solvent, so expectations that the clearing house would act did not deter panics. Indeed, currency premia (on certified checks which were joint clearing house liabilities) were positive during crisis periods, reflecting uncertainty about clearing house solvency. Under Aldrich-Vreeland, emergency currency was issued with bank loans as collateral not U.S. Treasury bonds. In both cases, there was uncertainty about the outcomes.

III. The 1920s

The establishment of the Federal Reserve System did change depositors' expectations about systemic banking crises.⁸ Gorton (1988) shows that the panics of the U.S. National Banking Era occurred when news in the form the unexpected component of a leading indicator of recession exceeded a threshold. During the National Banking Era no panic occurred without this threshold being exceeded, and there are no cases where it was exceeded without a panic. Examining this news shock for period after 1914 shows that there would have been a panic in

⁸ There is also some evidence that seasonals in short-term interest rates were eliminated. For evidence that the Fed did eliminate seasonals see, e.g., Miron (1986), and Mankiw, Miron and Weil (1987). For the other point of view, see, e.g., Shiller (1980), Clark (1986), Fische and Raymond (1990), and Fische (1991).

June 1920 (and another panic in December 1929).⁹ This is consistent with the views of contemporary observers. For example, Henry Parker Willis (1923) wrote that “The conclusion of the year 1920 found the country at large practically on the verge of panic. . . Nothing was more positively and loudly declared at the inauguration of the system than the effect of its operation would be able to prevent panic and to insure industrial stability.”¹⁰ The Fed itself took the same view:

Other nations, such as Great Britain and France, with their great central banking institutions, have always had their years of prosperity and their periods of depression, although they have been free from the money panics which we formerly had in this country as a result of our inadequate banking system and which we would, no doubt, have had in the most aggravated degree a year or so ago but for the efficiency and stabilizing influence of the Federal Reserve System. Federal Reserve Annual Report 1921, p. 99.

The NBER business cycle peak is January 1920 and the trough is July 1921. Banks started to fail in 1920; 505 banks failed in 1921, and the number of failures continued to rise, averaging 680 per year from 1923 to 1929. The peak was 950 in 1926 (Alston, Grove and Wheelock (1994)). Hamilton (1985) observes that the failed banks were overwhelmingly small banks in small rural communities. Sixty-three percent of the failed banks had loans and investments of less than \$250,000 and 63 percent were capitalized with \$50,000 or less. Thirty-nine percent were in communities of no greater than 500 people, and 79 percent were in towns of 2,500 or smaller. Hamilton notes that: “National banks were only 13 percent of the failures and only 17 percent were members of the Federal Reserve System” (p. 585). In other words, for the most part the banks that failed did not have access to the discount window.

Though many small banks failed, there was no panic. Depositors did not run on banks. Many contemporary commentators have noted the absence of a panic in this period. Henry Parker Willis (1923):

⁹ These panics would have followed the business cycle timing pattern of the panics during the National Banking Era. The June 1920 spike comes shortly after the business cycle peak of January 1920. The December 1929 spike follows the August 1929 peak. See Gorton (1988).

¹⁰ P. 1405. Henry Parker Willis (1874-1937) received a PhD in economics from the University of Chicago and was later the first Secretary of the Federal Reserve System.

In previous panics or periods of stringency, difficulty had grown out of the fact that doubts arose concerning the ability of given institutions to meet their obligations, owing to the fact that their loans were frozen or that public confidence had resulted in withdrawing an undue amount of cash from them. On such occasions relief was obtained by the banks banding together for the purpose of supporting any of their number which had sound assets. In the depression of 1920-1921, the federal reserve system [sic] was in the position of a clearing house association, *already organized in advance* and able to assist the community. . . (p. 1406; emphasis added.)

If depositors did not run because they expected banks to have access to the discount window, then it might not be necessary for banks to have actually borrowed from the discount window. But, in fact, National Banks did use the discount window. Figure 1 shows that the discount window was used. Tallman (2010, p. 104) also notes this use of the discount window over the period years 1914-27. Shull (1971) notes that in the 1920s the major proportion of reserves came from member bank borrowings. In 1921 discounts and advances as a proportion of Federal Reserve credit was at its peak of 82 percent with about 60 percent of member banks borrowing. “It was not uncommon, evidently, for hundreds of banks to be continuously borrowing amounts in excess of their capital and surplus” (Shull (1971, p. 37). The proportion of bank borrowing peaked in 1921 and that peak is not reached again until 1933 (Shull, p. 37).

During this period the discount rate was below market rates. During World War I the Fed felt that low discount rates were important. “The Board did not believe, during the war period, that marked advances in rates would be advisable in view of the obvious necessity of avoiding any policy likely to disturb the financial operations of the Treasury” (Harding (1925), p. 147). Furthermore, “The Federal Reserve authorities had, wisely I think, undertaken the task of creating a market for acceptances, but in the effort to do so had felt it necessary to take acceptances at an artificially low rate” Leffingwell (1921, p. 35). This put the Fed in a difficult position. Assistant Secretary of the Treasury Leffingwell (1921) wrote: “The effort to eliminate the differentials . . . which had much to commend it from a theoretical point of view, placed the federal reserve system in a dilemma between subsidizing inflation by maintaining a rate much below the market on commercial paper, or, on the other hand, creating a disaster in the market for government securities” (p. 33).

With the discount rate below market rates it is not surprising that banks borrowed so much. The fact that the proportion of banks borrowing peaked in 1921 is also consistent with the

notion that National Banks were preparing for bank runs. Notably, there is no evidence of stigma. Whatever the reasons, banks did borrow from the discount window. And this may have been fortuitous: “. . . by permitting rates to remain below the open market rates and credit to be expanded during the period of deflation of prices, it has prevented the present business depression from degenerating into an old-fashioned panic” (Leffingwell (1925), p. 35).

But then, unbeknownst to the wider world, Fed policy was fundamentally altered. Shull (1993) explains:

In the early 1920's, monetary policy was transformed from the provision of credit at the discount window, on the demand of banks having short-term commercial paper eligible for discount, to recurrent pressure on bank reserves implemented through open market operations. This transformation required new constraints on borrowing at the discount window. A set of non-price rationing rules, limiting use of the discount window to short-term borrowing for unanticipated outflows of funds, were developed; banks were encouraged to be "reluctant to borrow;" i.e., the Fed "turned to 'gadgets' and conventions...without any overt alteration of the law" (Keynes, 1930, pp. 239-40). (p. 20)

Why was policy changed? First, the Fed came to take a dim view of the extensive use of the discount window use, at least for extended period of time. Shull (1971):

It was found that as of August 31, 1925, 588 member banks had been borrowing for a year or more from Federal Reserve Banks. Of the 588 continuous borrowers, 239 had been borrowing since 1920; and 122 had begun borrowing before that. It was also found that about 150 of the continuous borrowers were then in an "overextended" position. In a review of these data, it was noted that 259 national member banks had failed since 1920, and a guess was made that at least 80 per cent had been habitual borrowers prior to their failure. (p. 35)

The Fed viewed this extended borrowing as an abuse of the discount window. Extended discount window borrowing was viewed as inconsistent with the Fed's mandate. In the Federal Reserve Annual Report of 1926 the issue was taken up:

Though there are circumstances that may explain and justify continuous borrowing by a member bank over a considerable period of time, particularly if the need for borrowing arises from general economic conditions in the borrowing bank's locality, the funds of the Federal Reserve banks are ordinarily intended to be used in meeting temporary requirements of members, and continuous

borrowing by a member bank as a general practice would not be consistent with the intent of the Federal Reserve Act. (p. 4)

The Fed also perceived another problem. It was very concerned with the purpose of the borrowing, trying to distinguish between “speculative security loans” and loans for “legitimate business.” The System was concerned with the relationship between discount window credit and the stock market. Anderson (1966): “The controversy over direct pressure intensified in the latter part of the twenties as an increasing flow of bank credit went into the stock market” (p. 6). “Direct pressure” refers to the Fed policy of pressuring banks not to borrow from the window. At the same time there was high growth in real estate prices, labeled a bubble by some (see White, 2009).

The Fed sought to restrain credit growth through moral suasion—“direct pressure”—that would deter member banks from borrowing for speculative purposes, while at the same time trying to maintain a preferential discount rate for “legitimate” borrowing (Friedman and Schwartz, 1963, p. 225-226). But, in the end the Fed concluded that attempting to influence the economy by selective discount policies for different types of collateral was not going to work. Chandler (1967):

In short, the whole attempt was a failure. Loans on securities continued to rise up to the eve of the crash and the restrictive efforts were not selective; credit of all kinds to all kinds of users was restricted. Governor Harrison later claimed that this whole “moral suasion” effort aimed at borrowing member made banks less willing to borrow at the Fed in the early 1930’s. Whether or not this is true, it is plausible. (p. 4).

The original purpose of the discount window changed. It would no longer serve as effectively to provide an “elastic currency”. This change in policy came about because the Federal Reserve was not able to distinguish the counterfactual state of the world in which there would have been a panic in 1920 but for discount window borrowing from normal states of the world in which banks’ borrowing should be limited. The Fed chose to always treat the world as being in the normal state, despite the original intention of the window. While contemporary observers noted that there had been no panic in the 1920s, there appears to have been no understanding of the details of how panics were avoided. This led to the change in discount window policy. The Fed’s policy of creating a “reluctance to borrow” based on nonpecuniary

measures meant that a bank that did borrow must be in trouble. This was the creation of “stigma,” which has complicated LOLR policy ever since.

IV. The Great Depression

Explaining the timing and causes of the banking panics of the Great Depression has been difficult and many researchers have offered explanations.¹¹ There is a reason that researchers have found this confusing: at the time, depositors too were confused. They had been told over and over again that banking panics would not occur under the Federal Reserve System. There were no panics in the 1920’s, and depositors did not observe the amount of discount window borrowing then. Depositors were unaware of the shift in Fed policy with regard to the discount window, so it seems reasonable that depositors assumed that banks would again avail themselves of the discount window if needed, so there was no reason to run. But after the 1920’s banks had been repeatedly told not to use the discount window and so they did not. They feared the stigma the new Fed policy had created.

Gorton’s (1988) counterfactual has a bank run starting in December 1929. But, there was no run at that time. Similarly, Wicker (1980) notes that: “Historically, banking panics in the United States usually developed shortly after a downturn in economic activity. The banking crisis in November-December 1930, however, was unlike previous banking collapses: there was little or no discernible impact on the central money market, and the panic lagged the downturn by eighteen months” (p. 573). The runs did not happen until there was visible evidence later that banks are not going to the discount window and were failing.

Richardson (2007) notes that: “Before October 1930, the pattern of [bank] failures resembled the pattern that prevailed during the 1920s. Small, rural banks with large loan losses failed at a steady rate. In November 1930, the collapse of correspondent networks triggered banking panics. Runs rose in number and severity after prominent financial conglomerates in New York and Los Angeles closed amid scandals covered prominently in the national press” (p. 40). The first runs occurred in November and December of 1930 following the mid-November failure of Caldwell and Company of Tennessee. Wicker (1980, 1996) cites the collapse of Caldwell and Company as the trigger of the panic. Caldwell was large; it controlled a large

¹¹ This literature is very large and we do not survey it here. See, e.g., Friedman and Schwartz (1963), Wicker (1996) and Meltzer (2003). Richardson (2007) relates this literature to new archival data on bank failures and suspensions (which are not the same thing).

chain of banks in the South. Then on Dec. 11, 1930 there was the failure of the Bank of United States. Friedman and Schwartz (1963) argue that this failure was especially important because of the bank's name¹²

The second wave of runs began in March 1931. There were runs, for example, on Chicago-area banks that were followed by a 40 percent increase in postal savings deposits (Wicker, 1996, p. 85).¹³ Finally, there was the Panic of 1933, in the last quarter of 1932 and early 1933, which led to President Roosevelt declaring the Bank Holiday in March 1933. Friedman and Schwartz (1963, p. 331): "Fears concerning the safety of the banking system were heightened not only by the campaign talk, but also by the January 1933 disclosure . . . of names of banks which the RFC had made loans before August 1932 . . . " The Reconstruction Finance Corporation had started lending to banks in February 1932. The RFC was necessary because the Fed took no "positive action to intervene directly to keep open troubled banks. No direct assistance was offered other than to discount eligible paper of the [Federal Reserve] member banks" (Wicker, 1996, p. 85).¹⁴ Borrowing from the RFC was significant. There were 17,000 banks in existence just prior to the Banking Holiday. Only 12,000 survived and half of those were borrowing some or as much as all of their capital from the RFC. (See Todd (1992).) Ironically, the chairman of the RFC was Eugene Mayer who was also chairman of the Fed. There was apparently no stigma attached to borrowing from the RFC until the clerk of the House revealed the names of borrowers. (Butkiewicz 1995, 1999).

Figure 2 illustrates the scale of RFC loans to banks and non-banks, and the stifling role played by disclosure. Prior to the revelation of borrower names beginning in July 1932, total RFC borrowing had reached approximately \$1.0 billion, with about half of this total going to banks. Following the name revelation, net bank borrowing flattened out and was below \$500 million four years later, even though non-bank borrowing – where stigma is far less of an issue – rose to more than \$2.0 billion of the total.

¹² Wicker (1980) disputes this: "I prefer to view the November-December bank suspensions as originating from a single disturbance-the failure of Caldwell and Company-the effects of which were concentrated mainly in 10 to 12 states. The failure of the Bank of United States had a highly localized impact in the New York City area: it probably contributed little to the explanation of the December bank failure rate. The resurgence of the failure rate in December resulted from the secondary effects of the diffusion of uncertainty and fear in the same areas as those affected earlier as well as from effects transmitted subsequently to contiguous areas" (p. 581).

¹³ Calomiris and Mason (1997) analyze the Chicago bank runs.

¹⁴ Butkiewicz (1995) argues that RFC loans played a positive role in reducing bank failures, but that revelations of the names of borrowers diminished its effectiveness thereafter.

The bank runs of the Great Depression came late relative to the timing of panics in the National Banking Era, and they were haphazard, chaotic, and spread out in time. Given that there was no bank run in 1920, the timing suggests that when depositors saw the failures of large banks in the 1930s they realized the System was not working and ran. What happened? Friedman and Schwartz (1963, pp. 318-19) write: “The aversion to borrowing by banks, which the Reserve System had tried to strengthen during the twenties, was still greater at a time when depositors were fearful for the safety of every bank and were scrutinizing balance sheets with great care to see which banks were likely to be the next to go” And Wheelock (1990, p. 424) provides some evidence for this:

This study also finds evidence of a downward shift in borrowed reserve demand during the Depression. Financial crises made banks cautious and less willing to borrow reserves. The Fed's failure to recognize this change in bank willingness to borrow contributed to its failure to interpret monetary conditions accurately. Fed officials continued to believe that low levels of bank borrowing signaled easy money.

The problem was that the expectations of depositors that banks could and would avail themselves of the discount window when in trouble were not (widely) realized. Large banks failed and depositors then ran on the banks.¹⁵

V. New Deal Legislation and the Quiet Period: 1933 - 1978

The financial legislation of the New Deal period transformed the financial regulatory system, and the role of the Federal Reserve within it.¹⁶ The Banking Act of 1933 amended the FRA to establish the FDIC and provide deposit insurance on temporary basis, later made permanent by the Banking Act of 1935. The advent of deposit insurance rendered moot – for a

¹⁵ Note that we are not making any claims about the effectiveness of the Fed as LOLR when banks *actually did borrow*. For example, Richardson and Troost (2009) contrast the policies of two regional Federal Reserve Banks (St. Louis and Atlanta) with regard to their responses to bank troubles in Mississippi during the Great Depression. Atlanta aggressively assisted banks and the bank failure rate was lower than in the part of Mississippi in the St. Louis district. The interesting question here is how Atlanta managed to overcome (or avoid) the stigma that depressed borrowing in other districts.

¹⁶ The next two sections review the main legislative and administrative changes to affect the Fed in the 75 years between the Great Depression and the recent crisis. Given our space constraints and restricted attention to the Fed, this section does not attempt anything close to a review of all financial regulation during this time period. For a comprehensive treatment of regulatory and competitive changes in the key 1979-1994 period, see Berger et al. (1995). For a discussion of changes since the 1990s leading to the rising share of non-bank financial intermediaries, see Gorton and Metrick (2010).

time – the mistake of developing the policy of “reluctance to borrow”, and there was no discussion or realization of the problem that had been created by the discount–rate policies of 1920s. Over the subsequent 75 years, the original insurance cap of \$2500 per account would be raised many times, finally reaching \$250,000 in the aftermath of the financial crisis. The FDIC would eventually get its own legislation in 1950, the language of which would provide the basis for non-bank liquidation authority it received in the DFA.

The Banking Acts of 1933 and 1935 also had a profound influence on the power and structure of the Fed. The paralyzing balance of power between the Board and the regional Reserve Banks was tipped in favor of the center, with a Board-dominated Federal Open Market Committee established in 1935. Far more obscure at the time was a small amendment to Section 13 of the FRA, granting the Fed the power to greatly expand its lending programs under “unusual and exigent circumstances”. These powers were invoked often in the recent crisis, as is described in Section VI.¹⁷

The Banking Act of 1933 is often known by the name of its sponsors, Glass and Steagall, and the provision of the Act that enforced the separation of deposit-taking and securities underwriting. This separation of banking and securities was coincident with significant new regulation of the latter, beginning with the Securities Act of 1933 (which focused on the primary sale of securities) and the Exchange Act of 1934, which created the SEC and focused on the secondary trading markets. The SEC was granted further powers to regulate market intermediaries in the Investment Company Act of 1940 (for mutual funds and other investment companies) and in the Investment Adviser Act of 1940 (which today covers hedge funds and private equity funds, in addition to traditional advisers.)

Section III discussed the Fed’s move away from using the discount window and towards an emphasis on open-market operations. This emphasis increased through the quiet period, with the Fed gradually gaining independence from the Treasury so that price stability supplanted both financial stability and fiscal accommodation as the central goal of monetary policy. This evolution was aided by the Fed-Treasury Accord of 1951, but did not completely come to

¹⁷ The Fed’s emergency-lending power in Section 13(3) was first granted by the Emergency Relief and Construction Act of 1932, which later received amendments in the Banking Act of 1935 and in Federal Deposit Insurance Corporation Improvement Act of 1991; these amendments proved crucial for the lending powers used in the recent crisis; see Mehra (2011).

dominate policy until the inflation of the 1970s brought the issue of price stability to the forefront.

After the New Deal legislation, the most important piece of financial regulation to affect the Fed was the Bank Holding Company Act (BHCA) of 1956. In the BHCA, the Fed was given oversight responsibility over holding companies that included commercial banks in their structure, with rules codified about the separation of banking and non-banking activities. Importantly, this responsibility gave the Fed insight and access to the largest commercial banks, all of which (over time) became part of BHCs. The role of BHCs in the overall financial system has increased steadily since passage of the BHCA, so that today they cover the vast majority of assets in the banking system.

VI. The Transformation of Banking: 1979 - 2006

In the 1970s, banking in the United States was still a relatively simple business (compared to today), with this simplicity supported by ceilings on the interest rates for time deposits (Regulation Q), the prohibition of paying interest on demand deposits, and by restrictions on both inter- and intra-state branching. These restrictions gave banks monopoly rents in local markets, creating incentives to keep risk low and preserve the franchise value of the bank charter. This charter value began to collapse in the late 1970s with a steady rise in short-term interest rates and the market response of alternatives to traditional deposits (on the liability side of the balance sheet) and loans (on the asset side).

The story of banking since the 1970s is largely about the relaxation of the regulatory restrictions on bank activities, often for the express purpose to allow banks to compete more effectively with non-bank alternatives. These regulatory changes were an endogenous response to the market-based changes that roiled the industry, and not the direct cause of these changes. Nevertheless, both the growth of these non-bank alternatives and the continuing attempts to work around regulations has contributed to the growth of the far more complex financial system of today. Gorton, Lewellen, and Metrick (2012) show that the net effect of these changes is that bank deposits share of the “safe” financial assets in the United States fell from 80 percent in 1952 to less than 30 percent by 2007. In this section, we discuss the forces that drove this change.

A. Competition and Regulatory Changes under Rising Interest Rates

The disintermediation of banking was driven on the liability side mainly by the loss of deposits to money-market mutual funds (MMMFs). MMMFs are effectively an industry built upon a regulatory arbitrage: a MMMF effectively promises “stable value” on all investments, an implicit promise that was made explicit by a government guarantee during the recent financial crisis. MMMFs can therefore offer something equivalent to the insurance of bank deposits, without having to pay insurance to the FDIC or be subject to bank regulations.

The most important of these avoided bank regulations for MMMFs was Regulation Q, which limited the interest banks could pay on time deposits. Prior to the late 1970s, MMMFs had less than \$5 billion in assets. After the interest rate spikes beginning in 1977, MMMFs grew rapidly, including a rate over \$2 billion per month in the first five months on 1979. MMMF assets continued to grow throughout the next three decades, rising from \$76 billion in 1980 to \$1.8 trillion in 2000, with a further increase to \$3.8 trillion on the eve of the financial crisis in 2007. Even more than the quantity competition, the existence of MMMFs eroded the profit margins for traditional banking products, and forced banks to use price competition where none had existed before (Keeley and Zimmerman, 1985).

At the same time, the geographic and economic scope restrictions on banks – so useful for creating charter value and limiting risk-taking – provided profit opportunities for bank substitutes on the asset side of the balance sheet. The markets for corporate bonds and commercial paper grew throughout the period, further eroding the profitability of the traditional bank business.

With these competitive forces on both sides of the balance sheet, legislators and regulators faced pressure to loosen restrictions on bank branching and product scope. Congress responded in 1980 with the Depository Institutions Deregulation and Monetary Control Act (DIDMCA), which phased out limits on the interest paid on time deposits, allowed for some types of interest-bearing demand deposits, and decontrolled the rates that could be charged on bank loans. The Garn-St.Germain Act of 1982 further expanded the product offerings at banks by allowing money-market savings accounts that could directly compete with MMMFs . All of these new accounts were successful at attracting deposits, but at the cost of draining profits from traditional non-interest bearing accounts.

With the need to pay market rates on short-term deposits, the sharp rise in interest rates beginning in 1979 placed great pressure on banks. By the early 1980s, many banks had assets dominated by long-term fixed rate mortgages and commercial loans, coupled with high-interest deposit accounts on the liability side. The combination was not sustainable, and led to the Savings and Loan crisis of the 1980s and 1990s. By the late 1980s, Congress turned its attention to cleaning up the mess of this crisis and dealing with perceived failures in the regulatory system. The Financial Institutions Reform, Recovery, and Enforcement Act (FIRREA) of 1989 replaced the thrift regulator with a new agency (which itself was later replaced after the recent crisis) and established the Resolution Trust Company to manage the bad assets of failed banks; The Federal Deposit Insurance Corporation Improvement Act (FDICIA) of 1991 both strengthened the authority and resources of the FDIC and mandated “prompt corrective action” for failing banks. Elements of FDICIA, in particular, would prove crucial for some actions taken during the recent crisis.

In the shadow of the S&L crisis, individual states were also responding to competitive pressure on their banks by entering into multi-state agreements to effectively allow bank holding companies to expand into multiple states – expansions that increased the size of Fed-regulated BHCs. True interstate branching was finally permitted by the Riegle-Neal Act of 1994, which repealed the part of the McFadden Act of 1927 that had effectively banned nationwide branch networks.

At the same time that Fed-regulated BHCs began to build nationwide networks, they also lobbied for a loosening of the Glass-Steagall (Banking Act of 1933) restrictions on the combination of deposit-taking and securities dealing. These restrictions were relaxed in stages through the 1990s, before ultimately being repealed in the Gramm-Leach-Bliley Act of 1999. Following the passage of this Act, BHCs could register as “Financial Holding Companies” and have unlimited activity in securities and insurance within separate subsidiaries. On the eve of the financial crisis, virtually all major banks were within the Fed’s regulatory scope, with many of these banks also having large non-bank subsidiaries. However, non-bank-affiliated securities firms and insurance companies remained important exceptions to the Fed’s regulatory reach – exceptions that would prove crucial in the recent crisis.

Given our focus on the Fed’s role as LOLR, one additional regulatory shift is noteworthy. The stigma induced for discount-window borrowing by Fed policy in the 1920s persisted into the

21st century, formalized by rules that limited discount borrowing to banks that could demonstrate an inability to get credit through private markets. Recognizing this problem, the Fed changed the rules of the discount window in 2003 and created multiple categories of window borrowing, one of which required no demonstration of any need. This policy failed to completely eliminate stigma, as is shown by Armentier et al. (2009) and discussed in Section VII.

B. Capital Regulation and the Basel Accords

One special element of bank regulation and supervision has played a large role in recent Fed history: the setting of capital standards. “Capital” in this context is defined in its narrowest sense as the common-equity component on the right-hand-side of the balance sheet, with various broader definitions including broader forms of equity and the present-value of different kinds of safe revenue claims. For our purposes here we will just refer to all of these definitions as “capital”, unless there is an important reason to be more specific.¹⁸

It is useful to begin our capital discussion by asking why anyone should care about “capital standards” at all. In a cost-benefit framework, the benefit of banks all having higher capital should be that each individual bank has a lower probability of distress. Given the access to the safety net, banks may not fully internalize the social cost of failure. In addition, even in the absence of such access, banks would not internalize the spillover effects of their failure on other institutions. For these reasons, the government has an interest in lowering the probability of failure by requiring higher levels of capital than may seem privately optimal to banks.

But what about the costs of holding bank capital? If we believe the assumptions of the Modigliani-Miller (MM) theorem, then banks should be indifferent to the fraction of their capital structure held as equity. Under the pure form of MM, regulators could set capital standards as high as they want, and banks should not complain: it would be all benefit and zero cost. Even with the standard frictions of taxes and some cost advantages for bank debt, the private cost of raising bank capital would appear to be very low, and well below the potential benefits of lower probability of bank failure. In spite of this MM reasoning, the banking industry has consistently resisted higher capital standards, arguing that higher capital would lead to much higher costs.

¹⁸ Our discussion of capital rules and the Basel process focuses on the role played by the Federal Reserve and the implications for the growth of the shadow banking system, and is not intended to be a comprehensive treatment. Goodhart (2011) is a definitive history of the Basel process up through 1997, and Kashyap, Stein, and Hanson (2011) is an accessible survey of the intellectual debate about capital standards in the post-crises world.

Although many of these industry arguments are unpersuasive, Kashyap, Stein, and Hanson (2010) point out that even small increases in cost of the capital – on the order created by standard frictions in MM – could be sufficient to drive significant flows from banks into non-bank financial institutions. In any case, banks certainly behave, contrary to MM, as if capital was relatively costly, and for the purposes of this paper we take this behavior as given, and do not attempt to resolve this debate.¹⁹

Prior to the 1980s, there were not any standardized rules for bank capital, even across different regulators within the United States. Instead, capital was considered as one component of the overall regulatory picture, and supervisors set rules for banks on effectively an *ad hoc* basis. This lack of standardization proved problematic in the unstable interest rate environment of the late 1970s, and caused international concerns in the aftermath of the oil shocks and subsequent global flows of capital from oil-rich nations. In 1981, The Fed and other U.S. regulators put its first nationwide standard in place, focusing on simple ratios of the narrowest form of capital, with no adjustments made for the underlying riskiness of bank assets. At the same time, an international consortium of regulators began work on a set of standards that could be applied across the major economies; this process culminated in the “Basel I” accords of 1988, implemented in 1990 in the United States. Both the Federal Reserve Board and Federal Reserve Bank of New York hold seats on the “G10” committee that has negotiated each step of the Basel process.

Basel I included standards for different definitions of capital in the numerator of the capital ratio, and also provided differential risk weights in the denominator depending on broad asset classes. In the 1990s, adjustments to the Basel I standards allowed banks to use internal models to calibrate the capital required for various assets. These models, and the subsequent negotiation with regulators, introduced a further layer of differentiation across countries, as national authorities varied in their interpretations of appropriate risk weights. The coarseness of these risk weights, among other weaknesses, convinced regulators of the need for a more complete update of the Basel system, resulting ultimately in the Basel II accords of 1997. The Federal Reserve was an active participant in the process, but the United States never fully

¹⁹ For the most forceful argument in favor of the MM interpretation that capital is not costly, see Admati and Hellwig (2013). In addition to the aforementioned Kashyap et al. (2010) paper, other recent perspectives on this debate include Baker and Wurgler (2013), Gorton and Winton (2012), and Irwin (2013)

adopted the Basel II accords, instead using adjustments to a Basel I based framework to accomplish similar goals.²⁰

As of 2006, most of the developed world had fairly complex implementations of capital standards, with the Fed as the primary regulator for the largest financial holding companies in the United States. Nevertheless, regulatory capital proved to be a slow-moving measure of bank health, and in no country did it provide clear warnings of the coming crisis. In the aftermath of the crisis, the Fed was a main driver of the next round of “Basel III” accords, though as of this writing the Basel III standards have not yet been implemented in the United States.

VII. The Financial Crisis of 2007-2009

When the financial crisis began in 2007, the Federal Reserve had two major challenges to its LOLR function. First, the stigma of the discount window, originally created by the policies of the 1920s, still caused a reluctance to borrow by member banks. Second, the sharp growth of maturity transformation outside of member banks – in the so-called “shadow-banking” sector – left a large portion of the financial system without access to the discount window. Most of the Fed’s actions during the crisis can be viewed as attempts to deal with these challenges.

As we have discussed at length above, the evolution of Fed policy towards the discount window in the 1920s led to a reluctance to borrow by member banks. Policies both formal and informal continued to discourage borrowing from the discount window throughout most of the 20th century, a policy only partially mitigated by the 2003 changes in window policy. Despite an additional change in August 2007 that decreased the discount-window premium by 50 basis points and increased the eligible term for window loans, banks were still reluctant to borrow throughout 2007.²¹ The Term-Auction Facility (TAF), created in December 2007, was a major attempt to alleviate this problem.

In the TAF, the Fed created regular auctions of pre-set total quantities of set terms (either 28 or 84 days), and the same institutions eligible to use the discount window were able to submit bids. The rules for these loans were similar (but not identical) to those for the discount window.

²⁰ There is an active debate about the role of regulatory arbitrage around the Basel accords, and capital rules more generally, on the rapid growth of securitization in the last two decades. Gorton and Metrick (2013) summarize the empirical evidence and conclude that regulatory arbitrage was not a major factor in the growth of securitization.

²¹ In an interesting parallel to the role of the RFC during the Great Depression, many banks found an alternative source of back-up liquidity to escape the stigma of the discount window in this case the Federal Home Loan Banks. Ashcraft et al. (2010) describe how the FHLB system became a “lender-of-next-to-last resort” with over \$1 trillion in loans at the peak of the crisis.

The market apparently believed that some combination of the stigma and risk of possible disclosure of TAF loans was significantly lower than those from the discount window: According to Almantier et al. (2011), TAF credit outstanding peaked at over \$300 billion, nearly three times the peak for discount window credit. This quantity difference occurred despite TAF rates that were higher on average than rates at the discount window, by an average of 37 basis points overall and more than 150 basis points after the Lehman bankruptcy. Banks were willing to pay a significant premium to avoid the stigma of the discount window.

Continued pressure in short-term funding markets led to the near-bankruptcy and fire sale of Bear Stearns to JP Morgan in March 2008. As Bear Stearns was not a depository institution and thus did not have access to the discount window, the eventual Fed guarantee that enabled the JP Morgan sale required use of the FRA's 13(3) authority, its first invocation during the crisis. The Fed also responded by expanding the discount window – historically reserved for depository institutions – to include a broader group of primary dealers including Lehman Brothers, Merrill Lynch and Goldman Sachs. A further expansion of the LOLR function came through the Term Securities Lending Facility (TSLF), which allowed primary dealers to effectively exchange illiquid securities for government bonds. This expansion also required the use of Section 13(3) authority. While Fleming et al. (2010) and Hrung and Seligman (2011) show that the TSLF was successful in reducing stress in repo markets, later developments showed that the Fed's domain for acting as the LOLR for other parts of the shadow banking system still had major limitations.

These limitations became apparent after the failure of Lehman Brothers and the subsequent freeze in a broad swath of short-term funding markets. In the fall of the 2008, 13(3) authority was used to create an alphabet soup of facilities, each targeted to effectively extend the LOLR function to another part of the shadow-banking system. The Term Asset-Backed Securities Loan Facility (TALF) allowed borrowers to post various asset-backed securities as collateral for term loans; the Commercial Paper Funding Facility (CPFF) created facilities to buy commercial paper directly from issuers, to substitute for the highly stressed traditional buyers (often special purpose vehicles); the Asset-Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) purchased asset-backed commercial paper from money-market mutual funds; and the Money-Market Investor Funding Facility (MMIFF) lent to money-market mutual funds on a broad range of collateral, effectively acting as a discount window for

these funds. The Fed also used its 13(3) authority to create special-purpose vehicles to support lending programs to AIG in September 2008.

Overall, the Fed made significant use of its 13(3) powers during the crisis, expanding its role as a LOLR well beyond the depository institutions typically served by the discount window. To go with the LOLR function, the Fed marked the end of the panic phase of the crisis with the Supervisory Capital Assessment Program (SCAP), also known as the “stress tests”, carried out in the spring of 2009. The SCAP expanded the standard supervisory reviews to include specific look-ahead stress scenarios, an element of what is now called “macroprudential” regulation.

VIII. The Dodd-Frank Act and the Fed’s Role Today

The Dodd-Frank Act of 2010 targeted several of the most glaring holes in the pre-existing regulatory structure, with significant implications for the Fed’s role as supervisor and as LOLR. As of this writing (mid-2013), many of the most important components of the DFA are still in the rule-writing stage, and any assessment of the DFA’s impact is necessarily preliminary. Nevertheless, there will clearly be profound effects on the role of the Fed. While some parts of the DFA expanded the Fed’s role as a supervisor, the legislation was drafted and ultimately passed during a time when the Fed was under tremendous political and media pressure for its actions during the crisis, and this pressure led to some restrictions on the Fed’s discretionary power as the LOLR.

From a supervisory viewpoint, the DFA unambiguously increased the Fed’s role. The Financial Stability Oversight Council (FSOC), a new coordinating body created by the DFA, has the power to designate some financial institutions (including nonbanks) as being systemically important, with these institutions then subject to oversight and (additional) regulation by the Fed. Such designations effectively make the Fed a primary regulator for all large financial institutions and market utilities, no matter what their main function. Furthermore, the DFA gives the Fed an explicit mandate to set higher capital standards and to give extra scrutiny to these largest firms. This explicit mandate is consistent with the contemporaneous Basel III accord, which as of mid-2013 is yet to be implemented in the United States.

The DFA also expanded the Fed’s regulatory power in several other important ways. We mention two of them here, as they relate closely to earlier discussions in this paper. First, Title II of the DFA provides for an “orderly liquidation” process for certain nonbank financial

institutions, with this process modeled on the resolution of depository institutions by the FDIC. Using FDIC bank resolution as a model in Title II introduces some new challenges, since large non-bank institutions are quite different than the depository institutions handled historically by the FDIC. The Fed has a major role to play in both the decision to liquidate and in the mechanics of any liquidation – these roles are a crucial (and previously missing) complement to the LOLR function. Second, the DFA makes “stress tests” – a successful innovation by the Fed in 2009 – a permanent component of supervisory procedures for systemically important institutions.

The DFA was debated and passed under a motivation and public promise to end “too big to fail” and public bailouts of the largest institutions. Such a promise is complex and somewhat at odds with a successful LOLR function. It is not possible to follow Bagehot’s dictum while at the same time being absolutely sure that insolvent institutions are not being bailed out in some fashion. The tension between the elimination of “too big to fail” and the execution of a successful LOLR function will not go away after passage of the DFA, but the desire for the former led to some restrictions on the latter. Specifically, the 13(3) powers used during the crisis have been restricted by requiring more cooperation with the Treasury, more disclosure to Congress, and less flexibility to design programs to aid specific borrowers. In addition to the restrictions on the Fed’s 13(3) powers, other restrictions were made on Treasury’s emergency use of rescue powers such as those used for money-market funds, and the FDIC’s ability to broadly guarantee bank assets without an act of Congress. Taken together, Dodd-Frank significantly reduced the flexibility of the executive branch and the Federal Reserve to act quickly in a crisis, while expanding their ability to act pre-emptively before one.

It is also important to note that the DFA did little to address the vulnerabilities in the shadow-banking system at the heart of the panic during the crisis. Repo reform was left entirely out of the DFA, with no clear jurisdiction for any agency to act. MMMF reform was left to the existing statutory powers of the SEC, and it has proved difficult (so far) for significant changes to the status quo. Securitization received some new rules for risk retention by sponsors, but larger-scale reforms were not included. The FSOC has some flexibility to address all of these shadow-banking issues in the future, but the necessary FSOC powers are still untested. Overall, the Fed and other regulators still have significant limitations for liquidity provision and oversight for the markets that ran in 2007-2008.

IX. Conclusion

The Federal Reserve plays a central role in financial regulation, with responsibility as both a lender-of-last-resort and as a supervisor for the largest institutions. The discount window was intended to provide this LOLR function through the provision of contingent liquidity to banks; that is, there would always be a credible supplier of liquidity should the state of the world be one in which depositors would otherwise run on the banks. If this institution was credible, then depositors would never run. But, in the 1920's the main concern of the Fed was to discourage discount window borrowing. The entire intellectual and policy history of the discount window following the Great Depression is one of discouraging its use with virtually no thought about its role in preventing crises. This stigma created in the 1920s has persisted to the present day, through more than 75 years of expansions in the Fed's regulatory authority, beginning with the New Deal and culminating in the Dodd-Frank Act of 2010. It has left the Fed with the difficult balancing act of acting as a reliable LOLR in "crisis times", without inducing moral hazard in "normal times". In an ideal world, all depositors (wholesale and retail) would be confident that the Fed would lend freely in a systemic crisis, while letting all institutions fail outside of a crisis. In the less-than-ideal world that we live in, there are many challenges to this balance. We conclude with a statement of these challenges, written as questions:

- 1) In the crisis, the Fed extended its LOLR function beyond traditional banks, recognizing the broad expansion of the financial system. These programs have been discontinued. To prevent market panics, do these programs need to be in existence all the time, just like the discount window for traditional banks?
- 2) Following passage of the DFA, the Fed has a greatly expanded responsibility for supervision of the largest financial institutions, and for the monitoring of financial stability. What is the optimal way to perform these functions in "normal times" so as to prevent liquidity crises?
- 3) Given the continued reluctance of borrowing from the discount window, and the new informational requirements for other emergency lending programs, what are the Fed's best options to reduce the stigma for its LOLR function, and to prevent liquidity runs before they start?

References

- Almantier, Olivier, Eric Ghysels, Asani Sarkar, and Jeffrey Shrader (2011), “Stigma in Financial Markets: Evidence from liquidity auctions and discount window”, working paper
- Alston, Lee, Wayne Grove and David Wheelock (1994), “Why Do Banks Fail? Evidence from the 1920s,” *Explorations in Economic History* 31, 409-431.
- Anderson, Clay (1966), “Fundamental Reappraisal of the Discount Mechanism,” Federal Reserve Bank of Philadelphia.
- Angly, Edward (1931), *Oh, Yeah?* (New York, Viking).
- Ashcraft, Adam, Morten L. Bech, and W. Scott Frame (2010), The Federal Home Loan Bank System: The Lender of Next-to-Last Resort?, *Journal of Money Credit and Banking* 42(4), June.
- Beckhart, Benjamin (1924), *The Discount Policy of the Federal Reserve System* (Henry Holt and Company; New York).
- Bordo, Michael and David Wheelock (2011), “The Promise and Performance of the Federal Reserve as Lender of Last Resort, 1914-1933,” NBER Working Paper No. 16763.
- Brunner, Karl and Alan Meltzer (1968), “What Did We Learn from the Monetary Experience of the Great Depression?” *Canadian Journal of Economics* 2, 334-348.
- Burgess, W. Randolph (1935), *The Reserve Banks and the Money Market* (Harper & Brothers; New York).
- Butkiewicz, James (1995), “The Impact of a Lender of Last Resort during the Great Depression: The Case of the Reconstruction Finance Corporation,” *Explorations in Economic History* 32, 197-216.
- Butkiewicz, James (1999), “The Reconstruction Finance Corporation, the Gold Standard, and the Banking Panic of 1933,” *Southern Economic Journal* 66, 271-293.
- Calomiris, Charles (1994), “Is the Discount Window Necessary? A Penn Central Perspective,” *Federal Reserve Bank of St. Louis Review* 76(3), p. 31-56.
- Charles W. Calomiris and Joseph R. Mason, (1997), “Contagion and Bank Failures during the Great Depression: The June 1932 Chicago Banking Panic.” *American Economic Review* 87 (1997).
- Chandler, Lester (1967), “Selective Credit Control,” study for Fundamental Reappraisal of the Discount Mechanism (Board of Governors of the Federal Reserve System).

Clark, Truman (1986), "Interest Rate Seasonals and the Federal Reserve," *Journal of Political Economy* 94, 76-125.

Comptroller of the Currency, Annual Report, 1914.

Dang, Tri Vi, Gary Gorton and Bengt Holmström (2013), "Ignorance, Debt and Financial Crises," working paper.

Demirgüç-Kunt, Asli, and Enrica Detragiache (1998), "The Determinants of Banking Crises: Evidence from Developing and Developed Countries," *IMF Staff Papers* 45 (1): 81–109.

Federal Reserve System, Annual Reports, 1921, 1923, 1926.

Fishe, Raymond (1991), "The Federal Reserve Amendments of 1917: The Beginning of a Seasonal Note Issue Policy," *Journal of Money, Credit and Banking* 23, 308-326.

Fishe, Raymond and Mark Wohar (1990), "The Adjustment of Expectations to a Change in Regime: Comment," *American Economic Review* 80, 968-76.

Friedman, Milton and Anna Schwartz (1963), *A Monetary History of the United States* (Princeton University Press).

Glass, Carter (1927), *An Adventure in Constructive Finance* (Doubleday, Page and Company; New York).

Gorton, Gary (1988), "Banking Panics and Business Cycles," *Oxford Economic Papers* 40, 751-81.

Gorton, Gary (1985), "Clearinghouses and the Origin of Central Banking in the United States," *Journal of Economic History* 45, 277–83.

Gorton, Gary (1984), "Private Bank Clearinghouses and the Origins of Central Banking," *Business Review—Federal Reserve Bank of Philadelphia*, January/February, 3–12.

Gorton, Gary and Lixin Huang (2006), "Banking Panics and Endogenous Coalition Formation," *Journal of Monetary Economics* 53, 1613-1629.

Gorton, Gary, Stefan Lewellen, and Andrew Metrick (2012), "The Safe-Asset Share", *American Economic Review*, 102(3), 101-106.

Gorton, Gary and Andrew Metrick (2010), "Regulating the Shadow Banking System", *Brookings Papers on Economic Activity*, Fall, 261-297

Gorton, Gary and Andrew Metrick (2013), "Securitization", in *Handbook of the Economics of Finance*, Harris and Constantinides Eds, Volume 2A, George Constantinides, Milton Harris, and Rene Stulz eds., 1-70, Elsevier.

Gorton, Gary, and Don Mullineaux (1987), “The Joint Production of Confidence: Endogenous Regulation and Nineteenth Century Commercial Bank Clearinghouses,” *Journal of Money, Credit, and Banking* 19, 458–68.

Hackley, Howard (1973), *Lending Functions of the Federal Reserve Banks: A History* (Board of Governors of the Federal Reserve System).

Hamilton, David (1985), “The Causes of the Banking Panic of 1930: Another View,” *Journal of Southern History* 51, 581-608.

Hamlin, Charles (1914), “The Federal Reserve System as Established and in Operation,” An Address delivered before the New York Chamber of Commerce, December 3, 1914.

Harding, Warren P. G. (1921), “Working Back to Normal,” An Address delivered at the Annual Dinner of Group VIII of the New York State Bankers’ Association, New York City, January 17, 1921.

Hardy, Charles (1932), *Credit Policies of the Federal Reserve System* (The Brookings Institution; Washington D.C.).

Hetzel, Robert (1985), “The Rules versus Discretion Debate Over Monetary Policy in the 1920s,” *Economic Review*, Federal Reserve Bank of Richmond (November/December), 3-14.

Jacobson, Margaret and Ellis Tallman (2012), “Liquidity Provision during the Crisis of 1914: Private and Public Sources,” working paper.

Keynes, John Maynard (1930), *A Treatise on Money*, Vol. II (Macmillan & Co., London 1960 (1930)).

Laughlin, J. Laurence (1933), *The Federal Reserve Act: Its Origin and Prospects* (Macmillan and Company; New York).

Leffingwell, Russell C. (1921), “The Discount Policy of the Federal Reserve Banks: Discussion,” *American Economic Review* 11, 30-36.

Mankiw, N. Gregory, Jeffrey Miron and David Weil (1987), “The Adjustment of Expectations to a Change in Regime: A Study of the Founding of the Federal Reserve,” *American Economic Review* 77, 358-374.

Mehra (2011), “Legal Authority in Unusual and Exigent Circumstances: The Federal Reserve and the Financial Crisis,” *University of Pennsylvania Journal of Business Law*, 13(1), 221-272.

Meltzer, Allan (2003), *A History of the Federal Reserve, Volume 1: 1913-1951* (University of Chicago Press).

Miron, Jeffrey (1986), "Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed," *American Economic Review* 76, 125-140.

Mitchell, Wesley (1922), "The Crisis of 1920 and the Problem of Controlling Business Cycles," *American Economic Review* 12, 20-32.

Owen, Robert L. (1919), *The Federal Reserve Act* (privately printed for the author).

Richardson, Gary (2007), "The Collapse of the United States Banking System during the Great Depression, 1929 to 1933: New Archival Evidence," *Australasian Accounting Business and Finance Journal* 1, 39-50.

Richardson, Gary and William Troost (2009), "Monetary Intervention Mitigated Banking Panics during the Great Depression: Quasi-Experimental Evidence from a Federal Reserve District Border, 1929-1933," *Journal of Political Economy* 117, 1031-1073.

Ridgely, William (1908), "The Nation's Currency and Banking System," *The North American Review* 627 (February), 166-175.

Riefler, Winfield (1930), *Money Rates and Money Markets in the United States* (Harper & Brothers; New York).

Shiller, Robert (1980), "Can the Federal Reserve Control Real Interest Rates?," in Stanley Fischer (ed.), *Rational Expectations and Economic Policy*, National Bureau of Economic Research and University of Chicago Press.

Shull, Bernard (1993), "The Limits of Prudential Supervision: Economic Problems, Institutional Failure and Competence," working paper.

Shull, Bernard (1971), "Report on Research Undertaken in Connection with a System Study," in *Reappraisal of the Federal Reserve Discount Mechanism*, vol. 1 (Board of Governors of the Federal Reserve System), p. 249-70.

Silber, William (2007), *When Washington Shut Down Wall Street: The Great Financial Crisis of 1914 and the Origins of America's Monetary Supremacy* (Princeton University Press).

Tallman, Ellis (2010), "Comment on 'The Promise and Performance of the Federal Reserve as Lender of Last Resort, 1914-1933,' by Michael D. Bordo and David C. Wheelock presented at the conference entitled, 'A Return to Jekyll Island: The Origins, History, and Future of the Federal Reserve,'" Federal Reserve Bank of Atlanta and Rutgers University, November 5-6, 2010, Jekyll Island Club Hotel, Jekyll Island, Georgia.

Timberlake, Richard (1984), "The Central Banking Role of Clearinghouse Associations," *Journal of Money, Credit and Banking* 16, 1-15.

Todd, Walker (1992), "History of and Rationales for the Reconstruction Finance Corporation," Federal Reserve Bank of Cleveland Economic Review QIV, 22-35.

Toma, Mark (1989), "The Policy Effectiveness of Open Market Operations in the 1920s," Explorations in Economic History 26, 99-116.

Turner, Robert (1938), Member-Bank Borrowing (The Ohio State University).

West, Robert Craig (1974), Banking Reform and the Federal Reserve, 1863-1923 (Cornell University Press; Ithaca and London).

Wheelock, David (2004), The Strategy and Consistency of Federal Reserve Monetary Policy, 1924-1933 (Cambridge University Press).

Wheelock, David (1992), "Regulation and Bank Failures: New Evidence from the Agricultural Collapse of the 1920s," Journal of Economic History 52, 806-825.

Wheelock, David (1989), "The Strategy, Effectiveness, and Consistency of Federal Reserve Monetary Policy, 1924-1933," Explorations in Economic History 26, 453-476.

White, Eugene (2009), "Lessons from the Great American Real Estate Boom and Bust of the 1920s," NBER working paper no. 15573.

Wicker, Elmus (2005), The Great Debate on Banking Reform: Nelson Aldrich and the Origins of the Fed (Ohio State University Press).

Wicker, Elmus (1996), The Banking Panics of the Great Depression (Cambridge: Cambridge University Press).

Wicker, Elmus (1980), "A Reconsideration of the Causes of the Banking Panic of 1930." Journal of Economic History 40, 571-83.

Wicker, Elmus (1965), "Federal Reserve Monetary Policy, 1922-33: A Reinterpretation," Journal of Political Economy 73, 325-343.

Willis, Henry Parker (1923), The Federal Reserve System: Legislation, Organization and Operation (The Roald Press Company; New York).

Willis, Henry Parker (1915), The Federal Reserve: A Study of the Banking System of the United States (Doubleday, Page and Company; New York).

Figure 1: Federal Reserve Credit Extended, 1917-1935

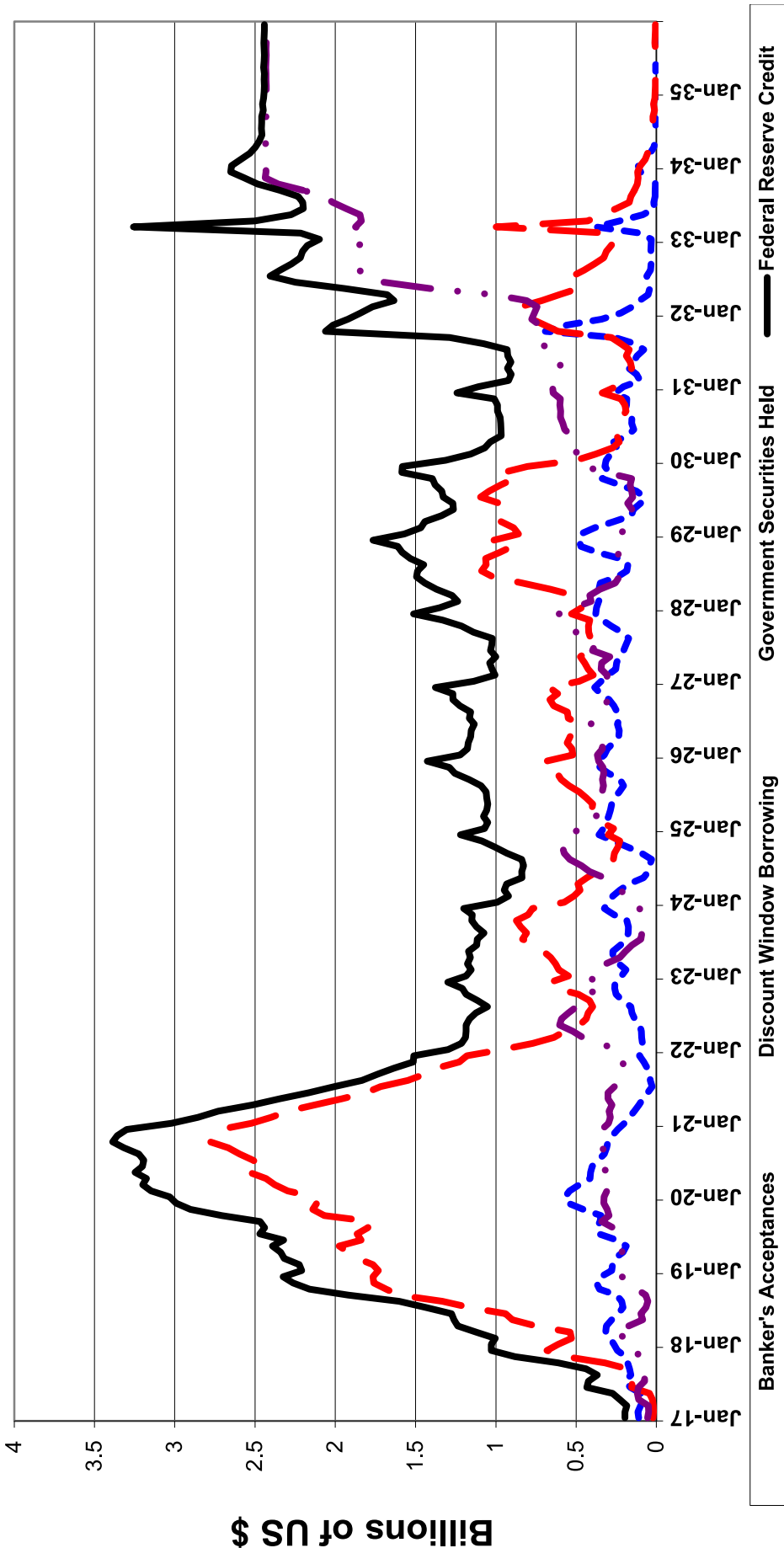
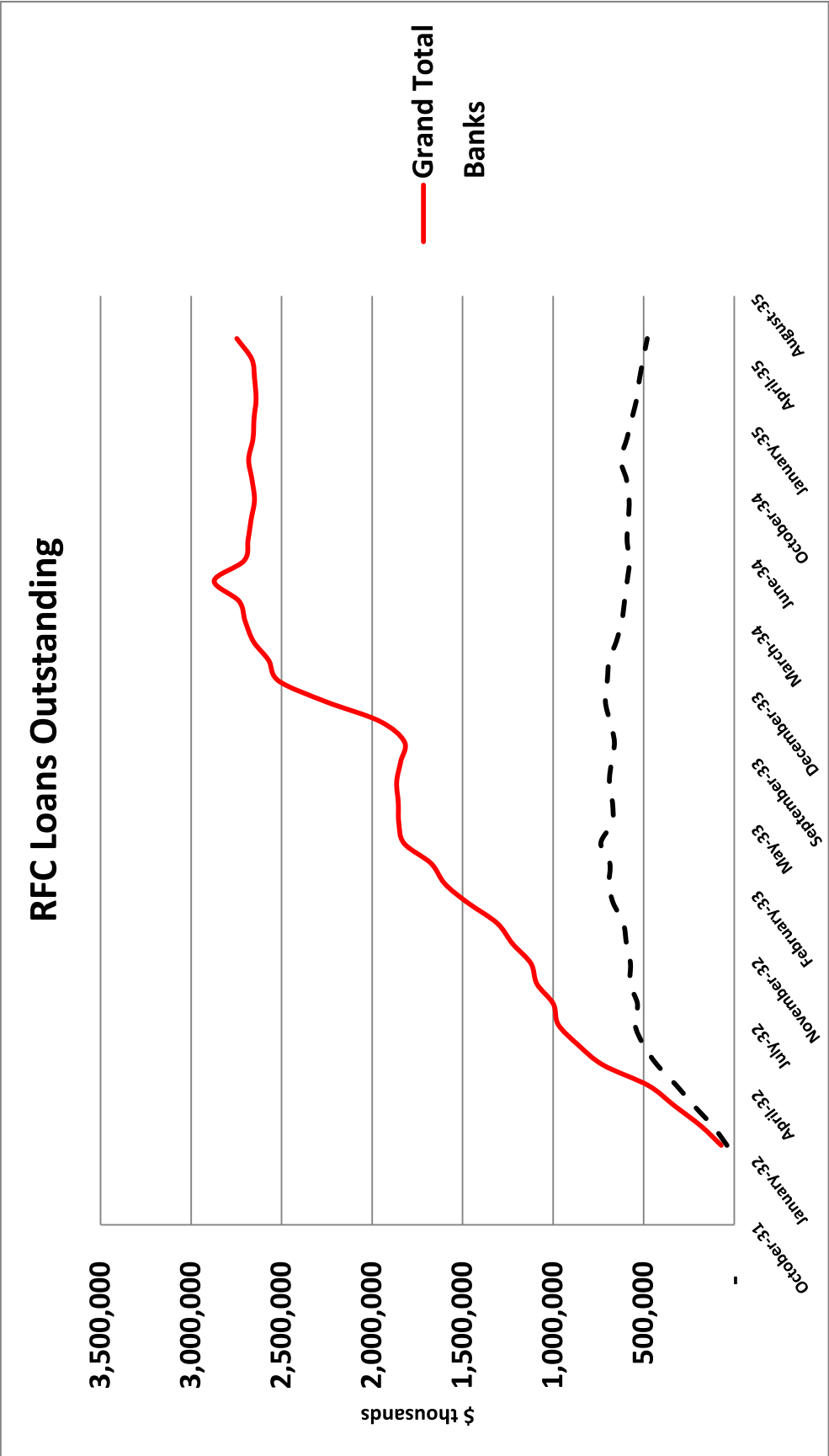


Figure 2



Source: Federal Reserve, Flow of Funds