Skin in the Game?
Leverage, Liability, and the Long-run Consequences of the New Deal Financial Legislation

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We examine how the Banking Acts of the 1933 and 1935 and related New Deal legislation influenced risk taking in the financial sector of the U.S. economy. We particularly focus on changes relating to the liability of bank owners, and assess how the removal of contingent liability influenced leverage before and after federal and state legal changes. Using a new panel data set of bank liability laws and bank balance sheets aggregated at the state level, we show that leverage ratios are higher in states with limited liabililty for bank owners. Banks in states with contingent liability converted each dollar of capital into fewer loans, and thus could sustain larger loan losses (as a fraction of their portfolio) than banks in limited liability states. The New Deal replaced a regime of contingent liability with stricter balance sheet regulation and increased capital requirements, shifting the onus of risk management from banks to state and federal regulators. By separating investment banks from commercial banks, the Glass-Steagall Act left investment banks to manage their own leverage, a feature of financial regulation that, in part, depended on their partnership structure.

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I. Introduction

In an effort to reform the present structure of financial regulation, policymakers have looked back at the pivotal legislation of the 1930s for guidance. Some commentators have argued that the Banking Acts of 1933 and 1935 set the U.S. financial system on a trajectory of safety and stability that promoted long-run growth in the economy; it is argued that the virtues of Depression-era regulation were stripped away when banking reform began in the 1990s.[1] Others have cast the 1930s legislation as a misdiagnosis of the underlying problems of the 1930s (Kroszner, 1998), and a continuance of practices ((i.e., unit banking, and the Real Bills Doctrine) or extension of them (deposit insurance) that undermine financial stability (Barth, Caprio, and Levine 2006; Demirguc-Kunt, Kane, and Laeven 2009; Calomiris 2008a, 2011).

Much of the literature on the banking acts of the 1930s has focused on the reforms of the Federal Reserve and the centralization of control under the Board of Governors, the separation commercial from investment banking, and the introduction of deposit insurance. Each of these has had far reaching implications. In this paper, we revisit the Banking Acts of 1933 and 1935 to shine new light on changes that affected the incentives and risk taking of financial firms. Banking reforms of the 1930s were seen as a direct response to the nearly 10,000 bank failures of that era, but they had long-lasting consequences that may have contributed to the leveraging and risk taking that fueled the credit boom of the 2000s. We focus on how New Deal Banking and Securities legislation from the mid-1930s altered incentives for financial firms to manage their risk, shifted oversight of commercial banks to new federal agencies, and left the oversight of risk in investment banks to themselves or to regulatory agencies with little existing experience or authority to manage it.

Our analysis begins with an examination the different liability regimes that applied to commercial banks, the reforms of the New Deal, and theoretical reasons why liability laws may influence leverage and risk taking. Section III describes the data used

[1] See, for example, Kuttner (2007) and Stiglitz (2009).

in our empirical analysis. It tracks changes in regulatory regimes at the state and national level from 1910 through 1955. We combine this regulatory information with state-level aggregates on the balance sheets of banks. Section IV uses panel data to analyze the effects of bank liability laws. We find that banks in states with contingent liability had lower leverage ratios. Further, commercial banks facing contingent liability converted each dollar of capital into fewer loans, relative to banks facing limited liability, and thus could sustain larger loan losses (as a fraction of their portfolio) than banks in limited liability states. Sections V and VI present other New Deal changes in the regulatory environment for financial institutions that affected risk taking, including changes that affected investment banks. We conclude by discussing the long-run consequences of the financial reforms of the 1930s for the U.S. financial system.

II. Contingent Liability

A. Background

Though deposit insurance and the separation of commercial banking from investment banking have received the most attention, the removal of contingent liability was perhaps one of the more consequential microeconomic changes that came out of the New Deal for banks. By the 1830s, most states had passed laws limiting the liability of non-banking corporations (Oesterle, 1992). Until the 1930s, however, limited liability was the exception, rather than the rule. Between the Civil War and the Great Depression, most states had laws that made stock holders responsible for a portion of the bank's debts when banks failed. Contingent liability gained a further foothold when the National Banking Act made double liability a requirement for national banks:

> "The shareholders of every national banking association shall be held individually responsible, equally and ratably, and not for one another, for all contracts, debts, and engagements of such association to the extent of the amount of their stock therein, at the par value of, in addition to the amount invested in such shares…" (U.S. Revised Statutes sec. 5151 (1875) 12 U.S.C., sec.63)

Double liability meant that if banks failed, stockholders would lose the amount invested in the stock (due to the failure) and, if assets were insufficient to payoff creditors and depositors, stockholders were held responsible for an additional sum not exceeding the par value of their stock. During the nineteenth and early twentieth centuries, the system of double liability was vigorously enforced; more than 50 U.S. Supreme Court rulings and hundreds more in state and local courts affirmed its validity. The federal enforcement of double liability recovered $68.4 million dollars between 1865 and 1934, a significant fraction (28.3%) of total losses to all creditors of failed national banks during that period (Macey and Miller, 1992, p.57).

The number of states with double-liability continued to expand in the first decades of the 20th century. In 1910, 31 states imposed double liability on bank stockholders. Colorado (triple) and California (unlimited) imposed even higher limits (Vincens, 1957). Apparently, in reaction to the panic of 1907, several states moved to double liability; Nevada and New Hampshire did so 1911, Arizona, Arkansas, and Oregon changed in 1912, and Mississippi moved to it in 1914. Conversely, in 1923, the Idaho Supreme Court ruled double liability unconstitutional in that state. In 1929, on the eve of the Great Depression, double (or greater) liability existed in 38 states. Table 1 outlines these patterns. The column "Status 1910" indicates the liability that a state imposed on the banks that it chartered. The column "begin" indicates the year that a state with limited liability in 1910 imposed double liability on the outstanding capital stock of all banks chartered in the state and all subsequent issues of bank capital. In states that do not appear in the table, limited liability prevailed in 1910 and thereafter.

B. How does Contingent Liability Influence Risk Taking?

According to most scholars, contingent liability emerged as a way to protect depositors from "risk shifting." Depositors are at an informational disadvantaged relative to shareholders who know more about the particular assets held by banks. Contingent liability puts more equity at stake for stockholders and has the effect of making them stay on the linear portion of their payoff matrix over a greater range of outcomes (Esty, 1998). By reining in moral hazard, contingent liability potentially reduces the incidence of bank

failures and the size of losses incurred by depositors and unsecured creditors. Moreover, since creditors know that banks will act with less risk, they may in turn offer banks lower cost funds (Kane and Wilson, 1996, Esty, 1998).

Empirical evidence suggests that during the national banking era double liability reined in risk taking during periods of relative calm; during periods of crisis, it may have been less successful in this regard (Grossman, 2001; Esty, 1998). Macey and Miller (1992) argue that extended liability wind-up rules resulted in high-yielding recovery rates for depositors and other creditors.

Our paper focuses on how contingent liability influences the balances sheets of banks and hence risk taking; however, it is worth noting that there are additional ways of gauging the extent to which contingent liability reduced the incentive for bank managers and owners to embrace risky strategies. Because liability laws only bind once a bank fails, bank managers have an incentive to avoid failures and hence assessment. They may therefore choose to wind up the affairs of a bank that is not performing well, pay depositors in full, and transfer any remaining assets to new managers while they still have value – all in order to avoid assessment. By contrast, with limited liability, stockholders have no incentive to force closure of banks. They lose the call option on bank assets.

This theoretical insight suggests that voluntary liquidations ought to be more prevalent under contingent liability regimes than limited liability regimes. Macey and Miller (1992) report that from 1863-1912, 22.8% of the total of national banks organized during the period voluntarily liquidated whereas a little under 5% were involuntarily liquidated and failed to return to solvency. From 1913-1928, a period when many rural banks faced distressed, voluntary liquidations for national banks nevertheless outpaced involuntary liquidations by a ratio of nearly three to one (Macey and Miller, 1992). Even during the period of severe banking distress of 1929-1933, involuntary liquidations for national banks were still slightly below those that liquidated or consolidated voluntarily (Macey and Miller, 1992). By contrast, Grossman (2001) suggests that during periods of financial distress during the late nineteenth and early part of the twentieth century double liability does not appear to have contributed to financial stability.

Entrepreneurs may respond to differences in liability laws across states and chartering authorities by choosing particular regimes for banks to operate under. One

hypothesis is that, *ceteris paribus*, greater liability ought to reduce the incentive for new banks to be chartered. Esty (1998) shows using aggregate data from four states that the number of new banks declines monotonically with increased liability during the period 1900-1919.

Moreover, because more banks are likely to get shut down prior to failure, losses under contingent liability ought to also be lower.[2] Macey and Miller (1992) estimate that from 1865-1934, the average annual losses to depositors of failed national banks, which had double liability, was only 44 cents per thousand dollars of deposits, and assessments equaled roughly 28% of the net losses incurred by creditors. Further, they report that assessments recovered about 51 percent of the liability assessed on the stockholders of national banks, a figure they reckon reasonable given that many shareholders would have likely been forced into personal bankruptcy as a result of bank failures.

B. Legislative Changes in the 1930s

If double liability appeared to protect depositors and creditors and limited risk taking by banks, why did it then disappear? Vincens (1957) suggests that, with the Depression and waves of failures, the costs became too great. Once bank failures began en masse, depositors had little recourse for securing claims against shareholders as many of them were already in serious financial difficulty. As a result, assessments placed on national bank shareholders never amounted to more than 50 percent. Moreover, bank stock ownership had broadened considerably during the 1920s, such that many holders of stock had no insider connection to the failing bank (i.e., through employment or serving on the board) yet they were facing assessment; unlike insiders, these shareholders (many of whom purchased when stock prices were rising) may not have fully considered the implications of stock ownership of banks with contingent liability (Macey and Miller, 1992). It was also believed that the threat of contingent liability being enforced when banks became insolvent was thought to be depressing bank share prices in the 1930s, thus weakening banks' desire to maintain the system in the face of significant macroeconomic

[2] Under provisions added to the National Bank Act in 1876, either a receiver or a creditor could enforce double liability on behalf of all the creditors in the event that the liquidating bank was unable to meet its obligations (Macey and Miller, 1992).

distress (Vincens, 1957). At the trough of the depression, policymakers and bankers frequently emphasized the need to recapitalize the financial system. Double liability may have impeded this goal as it deterred investors from purchasing stocks in new or struggling banks. It may have also prevented the Reconstruction Finance Corporation from purchasing preferred stocks in banks.

Kane and Wilson (1996) suggest that regulatory and/or economic shocks can lower the value of unlimited liability. They argue that private interest theories of regulation help account for the demise of double liability in the 1930s: the benefits that once accrued to stockholders of large national banks and large state-chartered banks in double liability states evaporated in the early 1930s. Since all banks potentially benefited from decreased expenses associated with monitoring, the passage of federal deposit insurance reduced depositors' future claims and left little support from banks for maintaining contingent liability.

As bank failures mounted in the 1930s and the financial system wound its way toward collapse in 1933, public opinion began to turn against double liability as a way of protecting depositors and minimizing failures. Limiting risk taking of owners through contingent liability provided little cover for depositors facing a large and prolonged macroeconomic shock since it failed to ensure that depositors might be made whole or partially whole sometime in the future, when shareholders might be able to pay. In 1933, Congress amended the Federal Reserve Act and National Banking Act, and removed double liability from shares issued after June 16th, 1933 (48 STAT. 189 (1933), 12 U. S. C., sec. 64a). Then, in 1935, Congress further amended the National Bank Act and the Federal Reserve Act, permitting (but not requiring) national banks to eliminate double liability on all shares. The provision for outstanding shares went into effect after July 1, 1937, and required national banks to give six-months notice of its intention to end double liability (49 STAT. 708 (1935), 12 U. S. C., sec. 64a).

Having weakened depositor protections, legislators sought new alternatives to replace contingent liability. Foremost among the new policies to protect depositors was the creation of federal deposit insurance, initially enacted in 1933. The 1933 and 1935 acts also moved to strengthen capital requirements to ensure that banks had "skin in the game." Hearings on the Banking Act of 1935 highlight the reorientation of risk

management toward the use of regulatory capital standards and surplus. Anticipating that legislators were moving in this direction, the Comptroller of Currency noted in his 1934 Annual Report that "in the event that it is determined to completely eliminate this assessment of liability on shareholders, it is suggested that serious consideration be given to providing for increasing the surplus of national banking associations until same equals the amount of common stock, thereby restoring to the bank's creditors the protection now given by the potential assessment liability of the shareholders and maintaining a sound banking structure." In testimony on the Banking Act of 1935, the Comptroller again advocated that surplus should equal 100 percent of capital.[3] As a result, Congress modified the national banking act, doubling the minimum capital of $25,000 for new banking corporations (48 STAT. 185, 12 U.S. C. A. 51 (1933) and mandating that every national bank retain 10 per cent of its net earnings until the surplus equaled the total outstanding common capital stock (49 STAT. 712 (1935), 12 U. S. C., sec. 60).

With the termination of double liability for national and Fed member banks, pressure mounted for states to eliminate contingent liability for state-chartered banks. In order to avoid losing chartered banks, many states responded quickly and passed limited liability laws; others lagged, often because of the need to amend state constitutions. The last three columns of Table 1 show how states changed bank liability laws. 35 states removed double-liability from new and existing bank stock. 30 states changed liability on new and existing bank stock with the changes taking effect within the same calendar year. Five states reduced liability on the issuance of new bank stocks a year or more before reducing liability on existing bank stock. One state, Vermont, authorized limited liability for bank stocks issued after March 24, 1935, but retained double liability on all bank stock issued before that date.

States altering double-liability laws often simultaneously changed a other rules that affected bank risk taking. At least 15 states eliminated double liability only for banks that joined the Federal Deposit Insurance Corporation. At least 12 states eliminated double liability only for banks that met increased requirements for retained surplus. At least 16 required banks seeking to eliminate double liability to notify depositors in

[3] United States Congress. House of Representatives. *Hearings before Committee on Banking and Currency on H. R. 5357 (Banking Act of 1935),*74th Cong., 1st Sess., pp. 147-8

advance, either in person, through the mail, or by advertising in newspapers.[4] Double liability then lapsed after a waiting period ranging from one to six months. The latter was the most common, and was the waiting period required of national banks and of banks in the state of New York. Articles published in major newspapers on 2 July 1937 noted that most prominent national banks published notices of intent to terminate double liability as soon as possible and terminated double liability on the first day possible. In the dozen states that coincided with national timing, the principal state-chartered banks followed suits.[5]

Though it sounded the death knell for contingent liability, the Banking Acts of 1933 and 1935 and their state counterparts did not formally abolish it. Pursuant to the creation of the FDIC and subsequent legislative revisions, depositors waived their rights to contingent liability upon receiving payment via deposit insurance (52 STAT. 442 (1938), 12 U. S. C., sec. 264 (1)(7); repealed and reenacted by 64 STAT. 873 (1950), 12 U. S. C., sec. 1821(g)). It took until 1953 for contingent liability to be abolished formally:

> "In the case of each association which has not caused notice of termination of liability to be published prior to May 18, 1953, the Comptroller of the Currency shall cause such notice to be published in the manner provided in this section, and on the date six months subsequent to such publication by the Comptroller of the Currency such additional liability shall cease." (67 STAT. 27 (1953), 12 U. S. C., sec. 64a.)

III. Data

To understand the impact of removing contingent liability from the banking system, we created a new data set of legal changes and aggregate balance sheet data at the state level for the U.S. banking system. Balance sheet data are from *All Bank Statistics, United States, 1896 to 1955*.[6] This publication represents a retrospective study conducted by the Federal Reserve Board of Governors, the Federal Deposit Insurance

[4] The preceding sentences begin with the phrase "at least" because, at present, we lack a complete accounting of all changes in state banking rules and practice that accompanied changes in double-liability.
[5] See, for example, Wesley Smith, "The March of Finance," *Los Angeles Times*, July 2, 1937, p. A17.
[6] Data were collected using FRASER's online database of this source and data digitized by Mark Flood, which is available via the Inter-university Consortium for Political and Social Research (ICPSR)

Corporation, and the Office of the Comptroller of the Currency during the 1950s. It employed data from materials previously published by state and federal regulators, from state and federal archives, and from privately printed bankers' directories. The archival and private sources enabled investigators to fill gaps in existing series. Some of these gaps were substantial. The State of New York, for example, did not collect call reports from state chartered banks during the years 1933 and 1934. *All Bank Statistics'* data concerning these institutions in those years is interpolated. We analyze only those series that were accurately and consistently measured throughout our study period.

All Bank Statistics reports data from bank balance sheets aggregated by state and year. The data originated with balance sheets indicating the state of financial institutions at their spring call, which usually came near the end of June, and which the federal (and most state governments) fixed in the early twentieth century as the last business day in the month of June. The data represent aggregates of figures on the balance sheets of all banks in a state. When we report figures on total equity, therefore, we are reporting the total equity of all banks in a state. For example, when we analyze the asset-equity ratio (often referred to as leverage or balance-sheet leverage), we are analyzing the average asset-equity ratio of all banks in a state, which is calculated by summing the assets of all banks in a state and dividing that sum by the sum of the equity of all banks in a state.

To compute values for state-chartered banks, we subtract values for national banks from values for all banks using Flood's digitized files as the source. For seventeen states, this procedure lumps together data on state-chartered commercial banks, state-chartered mutual savings banks, state-chartered trust companies, and private (unchartered) banks. Mutual savings banks played a minor role in the financial systems for nine of the seventeen states where data cannot be separated. For eight states (CT, ME, MD, MA, NJ, NY, RI, VT), mutual savings banks feature more prominently. To ensure that differences at the state level in the reported financial institutions does not influence our statistical results, we replicate all calculations, figures, and tables excluding those eight states excluding these states. [7]

We combine these state-level banking data with information on the legal rules regarding banking activities, in particular the liability laws imposed on commercial bank

[7] Excluding these states does not alter our main findings.

shareholders. We constructed a panel on double liability legislation that extends the work of previous scholars by covering the period of the 1930s and filling in gaps from earlier scholarly studies. Grossman (2007) provides data on states with double liability in 1870, 1900, and 1930 (Figures 1, 2, and 3).[8] Grossman (2007) extends the information for the period prior to 1890. Macey and Miller (1992) provide information on all states that possessed double liability in the years 1912 and 1931 and states that 31 states abolished double liability by 1944. Marquis and Smith (1937) describe the evolution of state legislation before 1930, the status of all states laws in 1930, and the legislative changes that occurred in most states (including requirements for opting out of double liability) through the end of 1936.

Vincens (1957) provides a table indicating the "available methods of terminating liability" for states that had not abolished it as of 1956 (Vincens 1957 pp.277-8). For most states, Vincens' table provides the constitutional provision or legal code pertaining to double liability and information about the requirements for opting out of double liability, such as joining the Federal Deposit Insurance Corporation or giving public notice of termination of liability. The listed requirements, however, is not exhaustive, and the table does not indicate the initial date on which the state allowed (or forced) banks to abandon double liability. Instead, the table cites the date of the statute currently in force. Arkansas, for example, eliminated double liability for new bank stock in 1933 and for bank stock already outstanding in 1935. To supplement these data and fill in the remainder of necessary information on state bank liability laws, we collected information from: the NBER/University of Maryland State Constitutions Database; *Bankers Magazine* ("In the Months News," a column that we checked for each month from 1933 through 1940); the *Banking Law Journal* ("Banking Legislative Trends in the States" and "Banking Decisions," two columns which we checked in every issue from 1933 through 1955); the *Wall Street Journal* (in particular, articles on 15 May 1936, 9 March 1937, 30 June 1939); the *New York Times* (particularly articles 16 August 1936, 27 May 1938); and *Paton's Digest of Legal Opinions* (1926 Edition and 1946 Supplement).

[8] The publicly available data set from Grossman (2007) does not, however, provide precise years of change for many states.

These sources enable us to date adoptions and departures from double-liability regimes before and after the Great Depression. In almost all cases, states adopted contingent liability for the stock of all banks chartered in their state at an instant in time (rather than phasing in double liability slowly over time, for different class of stockholders, or on an opt in / opt out basis). The additional liability came into effect soon after passage of the act or at beginning of next calendar year. Dating departures from contingent liability regimes is more complicated. Several issues about the timing of these changes potentially complicate our analysis. The Federal government and some state governments initially eliminated double liability for newly issued bank stock and later for all bank stock. Vermont eliminated double liability only for newly issued bank stock, and as of 1955, had not eliminated liability for outstanding stock. In most cases, laws came into effect with a lag, lasting from one month to one year. Participation in the program was optional. Banks could choose to opt out of double liability. Doing so required them to provide public notice, ranging from one month to six months prior to the cessation of liability. A non-member, non-FDIC state bank's decision to change its liability status was almost always voluntary; it was ubiquitous, but not universal. Most state and national banks gave notice immediately. This was noted in articles in major newspapers near the date that double liability ceased for outstanding shares of national and many state chartered banks.[9] Almost all banks opted out of double liability eventually. In 1953, "all but 25 out of almost 5,000 national banks had published the required notice and opted out of double liability (Macey and Miller, 1992, pp. 38-9)." In 1957, all but 96 state-chartered banks had given notice and opted out of double liability (Vincens, 1957, p. 277).

Because of these complications, we date define a state's departure from double liability in as the first year in which all of the state-chartered banks in state had opportunity to opt out of double liability for all existing stock prior to July 15 of that year. In states without the opt out provision, we date the end of double liability to the year in which laws eliminated double liability for banks before July 15. July is the cutoff because our balance sheet information comes from the banks' spring call report, typically collected on the last business day in June.

[9] For example, see *Los Angeles Times*, July 2, 1937.

IV. Contingent Liability and Risk Taking

A. Time Series Evidence from Bank Balance Sheets

Our empirical strategy focuses on the microeconomic consequences of contingent liability laws by examining bank balance sheet characteristics as outcome variables. We compare the experience of state-chartered banks operating in states with and without double liability to the experience of national banks operating in those same states. We exploit the variation in double-liability laws across states, within states over time, and between states and the national banking system. This variation enables us to identify the effects of contingent liability on bank risking and to separate contingent liability's influence from confounding variables, state-specific factors, and changes in the economic and financial system.

Figure 1 displays the number of states subject to double liability on owners' equity, the total number of banks in the United States, and the total number of banks subject to double liability. A small number of states adopt double liability at the beginning of our panel. Most states eliminated double liability in the late 1930s. The number of banks under contingent liability peaks about a decade after the last state adopts double liability. The initial peak in the number of banks under double liability, and the initial decline in the number of banks under double liability, reflected trends in the total number of banks in the United States. Both series fall in the 1920s and 1930s. The fraction of banks under double liability remains roughly constant. After 1935, the fraction declines rapidly, as states switch their double liability regimes.

Figure 2 displays leverage ratios from 1910 through 1950 Following standard financial accounting, we define the ratio as the bank's assets divided by its assets minus liabilities, or in other words, assets over owners' equity. [10] This ratio indicates how many dollars a bank invests (in financial and physical assets) for each dollar that its owners

[10] For a review of the concept of leverage, see Katia D'Hulster, "The Leverage Ratio: A New Binding Limit on Banks," *World Bank Note* Number 11, December 2009.

invested in the firm. This definition permits us to compute leverage directly from bank balance sheets; since regulators collected these data, they are readily available for our sample period.[11]

Figure 2 plots average leverage for state and nationally-chartered banks for the years 1910 through 1955. The average is the calculated by summing the assets of all state-chartered banks in a state and dividing by the sum of the equity of all state-chartered banks in the state. Equity is the sum of the book value of paid up capital, surplus, undivided profits, unpaid dividends, and all other retained earnings on the balance sheet of a bank (other than reserves for losses and liabilities for future expenditures, such as taxes). We calculate the state level averages, and then plot the average across all states in Figure 2. We focus on this average of averages because it illustrates the variation which our statistical methods exploit: the variation in averages across states.[12]

The figure shows that leverage of national and state banks evolves similarly over time, likely reflecting the fact that leverage at a point in time depends upon a common set of underlying financial and economic factors. Given the average for state banks is composed of states with differing liability regimes they apply to state banks, it is not surprising that leverage varies more for state banks than for national banks. The standard error for state-bank state-level averages in 1914 was 0.30, more than double the standard error for national-bank state-level averages of 0.14. Another way to put this is that limited variation among national banks likely stems from nationwide standards imposed on all of these organizations by the Office of the Comptroller of the Currency and the Federal Reserve System.[13]

Figure 2 shows leverage risking for commercial banks throughout the first half of the twentieth century. Leverage ratios begin the century between 5 and 6. After the

[11] It represents the principal form of leverage available to commercial banks during the first half of the twentieth century. While most of the financial concepts, contracts, and organizations (such as mortgage backed securities and bank holding companies) that today enable financial institutions to increase exposure to risk and return also existed during the period that we study (in fact, many of these concepts were invented and popularized in the United States in the early twentieth century), regulations discouraged (and in many cases prohibited) commercial banks from employing these instruments before the 1980s.

[12] For robustness, we note that (i) directly calculating the national average and (ii) calculating an average of state averages weighted by the assets of banks in each state yield similar pictures.

[13] In the late 1930s, when the bulk of state-chartered banks join the Federal Deposit Insurance Corporation, variation for state-chartered banks quickly converges to towards the variation for nationally chartered banks.

creation of the Federal Reserve and during World War I, leverage ratios rose to between 7 and 8. Prior to these events, state-bank leverage on average exceeded national-bank leverage. After, national bank leverage exceeded state bank leverage, possibly because the Federal Reserve reduced liquidity risks for member banks. All national banks belonged to the Federal Reserve System, while only a fraction of state-chartered banks joined the System. Leverage falls during the contraction of the early 1930s, but with the dissolution of double liability during the New Deal, it begins to show an upward trajectory. Thereafter, leverage rises dramatically from pre-Depression levels, peaking during World War II at more than 17 for state banks and 20 for national banks. Though falling some, leverage remains roughly double the value prior to 1929.

A related ratio that reveals something about bank risk taking is equity divided by total loans. It suggests the percentage decline in the value of a bank's loan portfolio that would exhaust its capital, force the institution into insolvency, and (in double liability states) trigger assessments on stockholders, and thus reveals information about the default risk of the banks' loan portfolio. Figure 3 shows that banks in the early twentieth century had large equity buffers. Before the creation of the Federal Reserve System, the average banks' loans could lose 30% of their value and the bank would remain solvent. Hence, a high value, like the 35% for state banks in 1910, indicates that the average state banks would remain solvent even if its loans lost one-third of their value or if one-third of their average borrowers stopped repaying their loans. The inverse of this value indicates how intensively bankers' employed their equity in local lending markets. In 1910, for example, state-banks' loan/equity ratio approached three, which means that for each dollar of equity, the bank extended three dollars in loans. After the creation of the Federal Reserve, banks assumed greater lending risk and employed capital more intensively. After the collapse of the banking system in the 1930s, surviving banks became extremely conservative. In some years, the average bank could sustain losses of more than 40% of its loans and remain solvent.

Retained earnings as a share of loans indicates the losses on loans that would impair the average bank's capital, absorb all of a bank's retained earnings, and consume the value of its paid-up capital. Losses of this magnitude would hence threaten a bank's ability to operate, scare potential creditors, and likely trigger regulatory intervention,

including a forced merger with a healthier institution, requiring the bank to raise additional capital, or forced liquidation. In double-liability states, regulators could do this by imposing assessments up to the par value of outstanding stock. Figure 4 shows this ratio fell after the creation of the Federal Reserve and as the economy boomed in the 1910s and 1920s. It then rose substantially during the 1930s, partly as a reaction to rising risk and partly in response to legal changes requiring banks to increase their surplus (i.e. retain additional income) in order to opt out of double liability.[14]

The cash-to-asset ratio reveals the fraction of bank assets invested in extremely safe and liquid assets (but with low return). Cash includes cash items (such as checks in the process of collection) and deposits at other banks (including reserves deposited in money center banks and Federal Reserve Banks). Figure 5 shows this ratio varied over time, with banks holding proportionately more safe assets following the banking crises of the 1930s. Note that banks 'cash' holdings at times varied for reasons beyond their control. All banks faced reserve requirements, which specified fractions of certain types of deposits that had to be held as cash in their vault or deposits at a private or Federal Reserve bank. These requirements varied across time, states, cities (country, reserve, central reserve), and clearing houses. Policies of the Federal Reserve also influenced reserve balances, particularly the open-market operations and changes in reserve requirements during the 1930s.

Figure 6 depicts the loan-to-asset ratio. This ratio indicates the portion of the bank's assets placed in loans. These were typically commercial loans to local businesses, and to a lesser extent, loans to individuals or loans on real estate. This ratio remained relatively steady until the 1930s, and then declined rapidly, as banks limited lending, because loans default risk rose. Banks shifted towards bonds, whose liquidity and high real yields in a deflationary environment appeared increasingly attractive. Another shift towards bonds occurred during World War II, when the government borrowed enormous sums, and the Federal Reserve's war bond initiatives placed many of these bonds in the portfolios of commercial banks.

[14] To reiterate, in the 1930s almost all states that changed double liability laws did so by giving banks the option to opt out of or to retain double liability for their shareholders. The same was true for national banks.

B. Panel Analysis

Our statistical method asks whether these key balance-sheet ratios differed for banks in states with and without contingent liability.[15] Our strategy will initially examine differences in the raw data, We then add state and year fixed effects to control for differences across states and over time. We then additionally control for fluctuations in economic conditions over space and time by using national banks as a control group and comparing the behavior of state banks relative to national banks in states subject (and not subject) to double liability. Finally, we employ changes in double-liability laws at the national and state levels to construct difference-in-difference estimates. We present a variety of specifications to determine the robustness of our results and accuracy of our standard errors.

Table 2 examines how leverage is affected by bank liability laws. The dependent variable is the asset-to-equity ratio. Data are aggregated at the state level so that the dependent variable is the weighted average of the asset-equity ratio for all state-chartered banks in a state. Thus, we have an observation for each state for each year from 1910 through 1955, for a total of 2,208 observations.

In the first column of Table 2, we regress the state leverage ratio on an indicator variable that equals one if the state possessed double liability and zero if it did not. This simple regression yields the difference in the average leverage ratio between states with and without double liability. The coefficient reveals that on average, leverage ratios in limited liability states exceeded leverage ratios in contingent liability states. The difference could be due to change in leverage ratios over time and to state specific effects correlated with liability laws of states. Column 2 controls for these possibilities by adding year and state fixed effects. While these effects explain much of the variation in leverage (the r-squared rises from 0,19 to 0.81), contingent liability remains correlated (substantively and significantly) with leverage. The null hypothesis that leverage in limited-liability states exceeded leverage in contingent liability states cannot be rejected at the 1-percent level.

[15] For ease of exposition, any state without limited liability is defined as a "contingent liability" state.

Columns 3 and 4 add the asset-equity ratio for national banks as a variable to control for circumstances in each state the influenced bank leverage. These columns also present standard errors calculated using the Huber-White sandwich, which generates consistent standard in the presence of heteroskedacticity and autocorrelation. We find similar results when we cluster the standard errors either by year or by year and region. For all of these specifications, we fail to reject the hypothesis that banks operated with lower leverage ratios in states that imposed contingent liability on banks.

Table 3 examines the equity-loan ratio, which indicates the fraction of the loan portfolio that the average bank could lose before becoming insolvent. Column 1 presents the raw average for the entire panel. It appears that banks in double liability states could lose lower fractions of their portfolio before exhausting their capital. The coefficient indicates that from 1910 through 1955, banks operating in contingent liability states could on average lose 3.059 less of their portfolio (in percentage terms) in comparison to limited liability states before becoming insolvent. Column 2 begins to unravel this paradoxical result. Adding state and fixed effects reduces the magnitude of the coefficient to close to zero; it now appears substantively and statistically insignificant. As Figures 1 and 3 suggest, the reason for this is that the number of limited liability states rose rapidly in the late 1930s at the very time that lending declined for all banks. As a result, there is spurious correlation between limited liability and lending over the entire panel. Column 3 indicates how the estimate changes after controlling for local conditions. Column 4 indicates the estimate when controlling for changes over time, space, and local conditions. After including these additional controls, we observe a clearer negative correlation between contingent liability and risk taking: banks in states with contingent liability converted each dollar of capital into fewer loans, and thus could sustain larger loan losses (as a fraction of their portfolio) than banks in limited liability states.

The results shown in Table 3 (and similar results in the following tables) shed light on differences in the existing empirical literature. Previous scholars (Vincens 1957 and Esty 1998) note that their results depend upon their particular sample and specification. The results of double liability appear, in many cases, to vary over time (Grossman 2001, 2007). Given the dramatic changes in the structure and performance of banks over time and across space, it is possible to pick samples (particular years or states)

that generate almost any result. Our panel analysis avoids potential pitfalls by enabling us to calculate the average impact of contingent liability controlling for variation over time, space, and local economic conditions.

Using an empirical set up similar to the previous two tables, Table 4 examines the retained earnings to loan ratio as the outcome variable. This measure focuses on the losses that a bank could sustain on its loan portfolio before its capital became impaired, an event which typically triggered regulatory intervention. Once we include state and year fixed effects and correct our standard errors so that they are robust, we find that banks in states with contingent liability invested more conservatively than banks in states with limited liability. Banks in contingent liability states could sustain larger losses as a fraction of their portfolios before running out of retained earnings.

Table 5 examines leverage in banks after the creation of the Federal Deposit Insurance Corporation (FDIC). We use the same empirical strategy as the preceding tables, but limit the analysis to 1933-1955 in order to focus on the evolution of leverage since the New Deal. We include three additional control variables. The first indicates whether a state required banks opting out of contingent liability to join the FDIC. The second indicates whether a state required banks opting out of contingent liability to notify depositors before the change, and the third indicates where a state required banks opting out of contingent liability to increase surplus (i.e. retain additional earnings).

Column 1 shows that the leverage ratio of banks in states with contingent liability was about 3 points lower than the leverage of banks in states with limited liability. During the 20 years following the banking holiday, the leverage of banks in states with contingent liability averaged about 9. The leverage ratio in states where banks could opt out of double liability averaged about 12.

Leverage of banks required to join the FDIC moved in the other direction. The coefficient on the requirement to join the FDIC was 1.7. Controlling for local conditions, state fixed effects, and year fixed effects diminishes all of these coefficients. Column 4 shows that, with a full set of controls and robust standard errors, leverage increased by about 0.5 for banks that were required to join the FDIC. Leverage decreased by 0.5 in states where banks were required to increase equity when opting out of contingent liability. In states that required both membership in the FDIC and increased equity, the

effects appear to have cancelled each other out. These results suggest that a substantial share of the increase in leverage after the New Deal occurred because federal and state legislation swapped contingent liability for deposit insurance.

C. Consequences

By eliminating contingent liability, Congress removed a shield providing some protection to depositors that had existed for at least three quarters of a century. In place of contingent liability, they substituted deposit insurance and strengthened bank capital. It has been well documented that the introduction of federal deposit insurance removed the incentive for most depositors to monitor banks, and introduced moral hazard (Calomiris, 1990; Demirgüç-Kunt and Kane, 2002).

We showed that eliminating contingent liability increased risk taking by bankers, but there are other unintended consequences of the banking reforms that affected risk taking but have received less attention. For example, even without deposit insurance, the decision by policymakers to marginalize bank liability and elevate the importance of capital and surplus effectively shifted the burden of monitoring banks to regulators. Liability requirements are straightforward and require little monitoring by depositors and creditors. Capital requirements, on the other hand, place demands on regulators to verify balance sheet particulars with regularity, and then report these publicly to achieve market discipline. Executing this task, however, is complicated by reporting standards (marking to market versus book value) and the opacity of many types of assets. Banks have become increasingly adept at satisfying regulatory capital by shifting assets "off the balance sheet." Regulators struggle to maintain compliance and ensure banks have "skin in the game," but banks today seem more than capable of amassing risk despite capital regulation.

V. Partnerships and the Separation of Investment Banking from Commercial Banking

Contingent liability is one of several incentive-compatible ways of limiting leverage. Another is partnerships. Like contingent liability, partnerships mitigate moral hazard by changing the payoff function for owners. Once firms incorporate, however, the tight link between owner/managerial decision-making and risk taking no longer exists. Indeed, managers' incentives (e.g., pay for performance) become aligned with outside shareholders, who seek large, quarterly returns. Within-firm accountability is replaced by shareholder accountability, and return on equity becomes the principle goal. Focusing on maximizing shareholder returns may also change firm-client relationships by placing more emphasis on short-term transactions than long-term deals.

While commercial banks needed charters of incorporation to conduct business investment banks, on the other hand, had historically operated as partnerships whereby the firm's capital originated from existing partners and new partners who joined the firm. The partners in these firms used the capital to invest in deals, sometimes individually, but the pool was monitored by all partners. This structure kept incentives aligned so that excess risk taking in trades and investments was limited. Moreover, individual bonuses were usually decided by other partners and awarded based on the firm's overall gains; this kept incentives aligned so that individual partners an incentive did not seek personal gain by leveraging the firm's resources.

Since partnerships also work to limit risk taking and leverage, we turn to examining how the Banking and Securities Acts of the New Deal had long-term consequences for the behavior of investment banks. We begin with the Banking Act of 1933, commonly known as Glass-Steagall Act, which famously created a firewall between investment banking and commercial banking, eliminating the ability for commercial banks to carry as brokerages and underwrite securities.[16] Previous scholars have focused on the motivations behind separating commercial from investment banking and analyzing whether the decision to separate investment banking represents a mistaken

[16] Gramm-Leach-Bliley Act (GLBA) repealed the two provisions of Glass Steagall restricting affiliations between banks and securities firms in 1999, the same year that the last major investment bank in the U.S. went public.

diagnosis about the causes of the calamitous fall in the stock market from 1929-33 (Kroszner and Rajan, 1994; Puri, 1996; Drucker and Puri, 2006). At the time of its passage, policymakers ascribed the stock market boom and bust to improper banking activity. According to this view, commercial banks had used depositors' funds to engage in risky securities activities, fueling the bubble in stock prices and their eventual calamitous fall. Commentators believed that commercial banks used their securities affiliates to sell new issues to the public, and engage in trading all while lending to these and other firms through its banking division.[17] Under the provisions of the Banking Act of 1933, commercial banks had a year to decide whether they would specialize in investment or commercial banking. If they chose commercial banking, then only 10% of their income could come from securities, though the underwriting of government bonds was exempted. Large financial firms of the period, like J.P. Morgan, were forced to change their business model in order to comply.

For investment banks, the first key feature of the new financial regulation of the 1930s was that they had been sectioned off from commercial banks. As a result, Federal bank regulators thus came to view the investment banks as outside their regulatory and supervisory domain. They instead concentrated their efforts on enforcing a broad array of new provisions aimed at controlling the risk taking of *commercial* banks. For example, Section 3(a) of the 1933 act required that Federal Reserve Banks monitor commercial bank activity to ensure that bank credit was not used for "speculative trading or carrying" of securities, commodities, or real estate. Section 7 placed restrictions on the total amount of loans secured by stock and bonds and authorized the Fed to impose tighter restrictions on such loans made by member banks in any Federal Reserve district. Section 11(a) prohibited Fed member banks to act as agents for nonbanks by lending to brokers or dealers on their behalf.[18] A second important feature of the new regulatory environment is that no new agency was created to manage the risk taking of investment banks. Section 4 of the Securities Exchange Act of 1934 authorized the creation of the Securities

[17] "Popular support for the Act came from investigations by the Pecora Committee (U.S. Senate Committee on Banking and Currency, 1933-1934), which examined alleged abuses at the security affiliates of commercial banks, in particular, National City Company and Chase Securities Corporation." (Drucker and Puri, 2006).

[18] Willis, H. Parker (1935), "The Banking Act of 1933 in Operation", Columbia Law Review 35 (5): 697–724,

Exchange Commission (SEC), which emerged as the watchdog agency for ensuring fair listings on stock exchange and for protecting consumers. The 1934 act and subsequent statutes specified that the SEC should promote full public disclosure of securities and protect the investing public against fraudulent and manipulative practices in the securities markets. This included regulating the trading of securities in secondary market, and monitoring the conduct of dealers and brokers. It was meant to provide better enforcement and protection for consumers than the Blue Sky Laws states had put in place. The SEC was regulator of securities markets, not as a prudential regulatory agency. It was given little if any mandate to oversee other types of behavior of investment banks.

Hence, an important consequence of the Securities and Banking Acts of the New Deal is that investment banks were left to manage their own risk. Such a system can limit leveraging as long as incentives are aligned to do so, but these appear to have lasted less than 40 years. As global capital markets began to reintegrate in the 1970s, U.S. investment banks began to face stiffer competition from large European universal banks such as Deutsche Bank and Credit Suisse. They sought to grow in scale and scope, but the partnership structure appeared to stand in the way of achieving minimum efficient scale.

No doubt influenced by the lobbying of investment banks who sought to expand in size in order to maintain or increase market share, in 1970 the New York Stock Exchange repealed a ban that restricted investment banks from being traded publicly on the exchange. Shortly thereafter, investment banks began to convert in large numbers from partnerships to corporations. Technological changes within the industry accelerated the shift away from partnerships, reducing the benefits of investing in tacit human capital through the mentoring of new partners (Morrison and Whilhelm, 2008). Retail investment banks moved to corporations first due to batch processing technologies that improved the settlement of many, small geographically dispersed accounts. Wholesale firms incorporated after further improvements in micro-computing facilitated the adoption of financial engineering techniques. Goldman Sachs was the last of the big investment banks to convert, and it did so in May 1999.

Once investment banks lacked financial incentives to maintain partnerships, a potentially dangerous cocktail was created by the legacy of the New Deal Banking and

Securities Acts. First, with access to public markets, investment banks could more easily funds and increase leverage. Second, neither the SEC nor the three-headed regulatory banking hydra (Fed/FDIC/Comptroller of the Currency) had the power or interest in looking after the risk taking of investment banks. In 1955, the ten largest investment banks held about $821 million of subordinated debt and equity. By 2000, a year after all investment banks had completed the move to public corporations, this figure exceeded $190 billion (Morrison and Whilhelm, 2008).

VII. Insider Lending and Ownership

In addition to contingent liability and partnerships, other legal changes in the New Deal banking acts also likely affected long-run risk taking in financial system. Many of these changes were introduced in the Banking Act of 1933 and had the consequence of influencing the way that banks were owned and operated.

One group of changes severely restricted the behavior of owners and managers to conduct insider lending. Section 12 of the Banking Act of 1933 prohibits member banks from lending to their own executives and requires officers to report loans they receive from any other bank to their board of directors. Section 13 of the act placed limits on making loans to or investing in the stock of affiliates. And Section 33 amended the Clayton Anti-Trust act so that no officer or director of a bank under U.S. law may be an officer, director, or employee of a corporation (other than a mutual savings bank) or member of a partnership making loans secured by stocks or bonds except to its own subsidiaries.

Another group of changes were aimed at broadening ownership and making it management and directors more accountable to shareholders. Section 31 limited the maximum number of directors of national banks to 25, in the belief that too large of a board was unwieldy and unaccountable. Section 19 legislated cumulative voting by shareholders so that they could vote the number of shares owned in the usual manner or cumulate shares and give one candidate as many votes as the number of directors multiplied by the number of shares.

Such changes were likely aimed at eliminating conflicts of interest, especially in the case of publicly-held commercial banks.[19] As other scholars have noted (Lamoreaux 1986, 1994), however, insider lending had emerged in American banking as a way to limit moral hazard in lending. By loaning to managers and directors, banks knew the projects and could monitor them more closely. As the scale of banking grew, this may have become impractical, and hence regulatory changes were sought to prevent abuse in the case of publicly-traded banks. In the broader scheme of New Deal regulatory changes, however, these prohibitions reflect the removal of another internal control on risk taking. Commercial banks were forced to search for returns on outside projects, and if publicly held, to choose ones that maximized shareholder return.

VIII. Conclusion

Some critics of the repeal of GSA argue it permitted Wall Street investment banking firms to gamble with their depositors' money that was held in affiliated commercial banks.[20] We think these criticisms, in part, miss the mark: the leveraging that fueled the recent financial crisis was driven by the incentives within the firm. From our perspective, what stands out from the New Deal financial legislation are its long-run consequences.

First, contingent liability was removed for commercial banks. A system that had led banks to leverage less and close earlier if they were losing money was “replaced” this with deposit insurance, stricter regulation of lending and borrowing practices, and beefed up capital requirements. The net result of these changes was to take the monitoring of risk out of banks’ hands and place it in the governments’ hands. Deposit insurance would require the FDIC to ensure that banks’ contributions to the deposit insurance fund were

[19] See, for example, the Pecora Hearings.

[20] ^ http://www.dailykos.com/story/2008/03/17/475756/-Banking-Deregulation-and-Clinton
^ http://www.investopedia.com/articles/03/071603.asp
^ "Sold Out: How Wall Street and Washington Betrayed America, March 2009, Consumer Education Foundation" www.wallstreetwatch.org
^ "Clinton repeal of Glass-Steagall faulty as seen today" March 17th, 2008, http://mortgageblues.us/news/398
^ "The Repeal of Glass-Steagall" http://motherjones.com/kevin-drum/2009/03/repeal-glass-steagall
^ http://www.alternet.org/news/146900/nouriel_roubini%3A_how_to_break_up_the_banks,_stop

weighted according to risk, but this required the FDIC to understand the risk. Lending and borrowing restrictions meant that examiners had to carefully examine balance sheets to ensure compliance, but (with the government now the backstop via deposit insurance) this created incentives for banks to "game the system" and make it difficult to monitor portfolios. Tighter capital requirements kept some skin in the game for banks, but provided no explicit incentive to rein in leverage. They too suffered from banks "gaming the system," and moving transactions off the balance sheet.

Second, investment banks were cast off, and left to their own devices. Partnerships had provided a mechanism for restraint and self control. External oversight potentially provided a way to reinforce prudent behavior. By the 1970s, neither of these conditions existed. The major American investment banks began to raise funds through stock issuance and have managers pursue objectives that respond to outside shareholder rather than partners, Glass Steagall had the unintended consequence of keeping investment banks beyond the purview of regulators that were used to managing risk , and the S.E.C. (created during the 1930s) had largely been captured by the industry.

References

Banking Law Journal . "Double Liability of State Banks." Vol. 58, Issue 1 , pp. 19-23. 58 Banking L. J. 19 (January to December 1941)

Banking Law Journal . "Banking Legislative Trends in the States." Vol. 73, Issue 11 , pp. 871-874, 73 Banking L. J. 871 (1956)

Banking Law Journal . "Banking Legislative Trends in the States." Vol. 73, Issue 10 , pp. 771-777. 73 Banking L. J. 771 (1956)

Barth, James R., Gerard Caprio, Jr., and Ross Levine (2006). *Rethinking Bank Regulation till Angels Govern* (Cambridge: Cambridge University Press).

Board of Governors of the Federal Reserve System (U.S.), 1959, *All Bank Statistics 1896 - 1955*, accessed Jul 18, 2012 from FRASER, http://fraser.stlouisfed.org/publication/?pid=39

Calomiris, Charles W. (1990). "Is Deposit Insurance Necessary? A Historical Perspective." *Journal of Economic History* 50(2): 283-95.

Calomiris, Charles W. (2008a). "Banking Crises," *NBER Reporter* (National Bureau of Economic Research), no. 4: 10-14.

Calomiris, Charles W. (2011). "The Political Lessons of Depression-Era Banking Reform." *Oxford Review of Economic Policy*.

Demirguc-Kunt, Asli, Edward Kane, and Luc Laeven, eds (2009). *Deposit Insurance Around the World* (Cambridge, Mass.: MIT Press).

Demirgüç-Kunt, Asli and Edward J. Kane. (2002). "Deposit Insurance Around the Globe: Where Does It Work?" *Journal of Economic Perspectives* 16:175-176.

Drucker, Steven and Puri, Manju. (2006). "Banks in Capital Markets: A Survey." In *Handbook in Corporate Finance: Empirical Corporate Finance*, edited by B. Espen Eckbo Elsevier/North-Holland: New York.

Esty, Benjamin C. (1998). "The Impact of Contingent Liability on Commercial Bank Risk Taking." *Journal of Financial Economics* 47:189-218.

Flood, Mark D. United States Historical Data on Bank Market Microstructure, 1896-1955[Computer file]. ICPSR version. [producer] Mark Flood. Montreal, Quebec: Concordia University, 1998. [distributor], Ann Arbor, MI: Inter-university Consortium for Political and Social Research 1998. doi:10.3886/ICPSR02393.v1

Grossman, Richard S. (2001). “Double Liability and Risk Taking.” *Journal of Money, Credit and Banking* 33(2): 143-159

Grossman, Richard S. (2007). Fear and Greed: The Evolution of Double Liability in American Banking, 1865-1930.” *Explorations in Economic History* 44: 59–80

Jackson, Howell E. (1993). “Losses from National Bank Failures during the Great Depression: A Response to Professors Macey and Miller.” *Wake Forest Law Review* 28 (Winter): 919-32.

Kane, Edward J. and Berry K. Wilson. (1996). “The Demise of Double Liability as an Optimal Contract for Large-Bank Stockholders.” NBER Working Paper 5848 (December).

Kroszner, Randall S. (1998). “Rethinking Bank Regulation: A Review of the Historical Evidence.” *Journal of Applied Corporate Finance* (summer): 48-58.

Kroszner, Randall S. and Raguram Rajan. (1994). “Is the Glass-Steagall Act Justified? A Study of the U.S. Experience with Universal Banking before 1933.” *American Economic Review* 84(4): 810-832.

Kuttner, Robert. (2007). “The Alarming Parallels Between 1929 and 2007,” *The American Prospect*: October 2, p.2.

Lamoreaux, Naomi R. (1986). "Banks, Kinship, and Economic Development: The New England Case." *Journal of Economic History* vol. 46, 647-667.

Lamoreaux, Naomi R. (1994). *Insider Lending: Banks, Personal Connections, and Economic Development in Industrial New England*. Cambridge: Cambridge University Press.

Macey, Jonathan R. and Geoffrey P. Miller. (1992). “Double Liability of Bank Shareholders: History and Implications.” *Wake Forest Law Review* 27: 31-62.

Macey, Jonathan R. and Geoffrey P. Miller. (1992). “Double Liability of Bank Shareholders: A Look at the New Data.” *Wake Forest Law Review* 28: 933-41.

Marquis, Ralph W. and Frank P. Smith. “Double Liability for Bank Stock.” “Federal Legislation Affecting Banks.” *Banking Law Journal*, Vol. 51, Issue 4 , pp. 349-360. 51 Banking L. J. 349 (January to December 1934)

Morrison, Alan D. and William J. Wilhelm. (2008). “The Demise of Investment-Banking Partnerships: Theory and Evidence.” *Journal of Finance* 63(1): 311-350.

Oesterle, Dale A. (1992). “Limited Liability, Development of,” in the Palgrave Dictionary of Money and Finance, vol. 2. London: Macmillan, pp.590-1.

Paton, Thomas Bugard, and Thomas B. Paton. 1926. *Paton's Digest*: *a digest of legal opinions of Thomas B. Paton, general counsel of the American Bankers Association.* American Bankers Association.

Paton, T. B., & American Bankers Association. (1946). Paton's digest of legal opinions. Supplement. New York.

Puri, Manju. (1996). "Commercial banks in investment banking conflict of interest or certification role?" *Journal of Financial Economics* 40: 373-401.

Stiglitz, Joseph E. (2009). "Capitalist Fools," *Vanity Fair*, January, p. 2.

Vincens, John R. (1957). "On the Demise of Double Liability of Bank Shareholders." Business Law Journal (April) pp. 275-9

Vincens, John R. "On the Demise of Double Liability of Bank Shareholders." *Banking Law Journal* , Vol. 75, Issue 3 , pp. 213-218. 75 Banking L. J. 213 (January to December 1958)

Table 1: Changes in Bank Liability Laws, 1910 through 1940

	Jurisdiction	Status 1910	Changes After 1910			Requirements for Termination of Double Liability
			Begin	Eliminate Liability for …. Stock		
				New	Existing	
	National	Double		1933	1937	Six month notice, and retain earnings until surplus equals capital.
1	Arizona	Limited	1912	1956	1956	Join FDIC.
2	Arkansas	Limited	1912	1933	1935	Join FDIC.
3	California	Unlimited		1937	1937	Join FDIC, and six month notice.
4	Colorado	Triple		1939	1939	Join FDIC.
5	Florida	Double		1937	1937	Join FDIC, surplus must equal capital.
6	Georgia	Double		1937	1937	Stockholders remain liable for unpaid stock. No new protections.
7	Idaho	Double		1923	1923	
8	Illinois	Double		1952	1953	
9	Indiana	Double		1940	1941	Five month notice for shares issued before December 1940.
10	Iowa	Double		1933	1938	
11	Kansas	Double		1937	1937	Six month notice for shares issued before 23 March 1937.
12	Kentucky	Double		1937	1937	Six month notice. Accumulate additional surplus (a).
13	Maine	Double		1933	1933	Bank stock issued before 16 December 1933 exempt if surplus equals capital, else stockholders liable for amount capital exceeds surplus.
14	Maryland	Double		1937	1937	Three month notice, exempt banks must annually transfer 10% of earnings to surplus until surplus equals capital.
15	Massachusetts	Double		1934	1934	Six month notice for stock issued before 1 June 1934. Accumulate additional surplus (a).
16	Michigan	Double		1937	1937	30 days' notice. Accumulate additional surplus (a).
17	Minnesota	Double				Join FDIC.
18	Mississippi	Limited	1914	1934	1934	Join FDIC, and six month notice for stock issued before 24 Oct 1933
19	Montana	Double		1936	1936	Join FDIC.
20	Nebraska	Double		1938	1938	

	Jurisdiction	Status 1910	Changes After 1910			Requirements for Termination of Double Liability
			Begin	Eliminate Liability for …. Stock		
				New	Existing	
21	Nevada	Limited	1911	1933	1933	
22	New Hampshire	Limited	1911	1937	1937	Six month notice on stock issued before 1 Jan 1911 or after 1 Jun 1937.
23	New Mexico	Double		1935	1935	
24	New York	Double		1937	1937	Six month notice. Minimum surplus raised to 65% from 20% of capital.
25	North Carolina	Double		1935	1935	Surplus equal to 50% of capital must be invested in state or US government bonds; if deficiency, stockholders liable.
26	North Dakota	Double		1939	1939	Six month notice.
27	Ohio	Double		1937	1937	Stockholders liable for unpaid stock. No new protections.
28	Oklahoma	Double		1937	1937	Join FDIC, three month notice. Stock issued after 28 April 1937 exempt.
29	Oregon	Limited	1912			
30	Pennsylvania	Double		1939	1939	Limited liability on shares issued after 1 Sept 1939. Other shares double liable if surplus below capital. After 1 July 1941, Double liability ceases on six month notice.
31	South Carolina	Double		1935	1935	Except for banks judged insolvent before 21 September 1935. Accumulate additional surplus (a).
32	South Dakota	Double		1936	1936	Join FDIC. For non-members, double liability continues for 1 year after transfer of shares.
33	Texas	Double		1937	1937	
34	Utah	Double		1940	1940	
35	Vermont	Double		1933		Shares issued prior to 24 March 1933 remain doubly liable.
36	Washington	Double		1940	1940	Join FDIC or furnish security of payment equivalent to that required by national banks.
37	West Virginia	Double		1938	1938	Join FDIC or surplus equal 50% capital, and three months' notice.
38	Wisconsin	Double		1937	1937	Join FDIC. Six month notice.
39	Wyoming	Double		1937	1937	Join FDIC. 60 days’ notice.

Notes: (a) Source appears to indicate 'accumulate surplus equal to capital' but exact amount of required accumulation unclear.

Sources: See text.

Table 2: Leverage and Stockholder Liability
Assets/Equity in States With and Without Double Liability

	Dependent Variable State Aggregate Assets/Equity			
	(1)	(2)	(3)	(4)
Indicator - Double Liability = 1	-3.529	-0.720	-0.440	-0.495
	(0.155)**	(0.150)**	(0.102)**	(0.132)**
National Bank Assets/Equity			0.706	0.709
			(0.013)**	(0.030)**
Constant	11.313	4.086	2.369	1.583
	(0.112)**	(0.371)**	(0.176)**	(0.295)**
Year Fixed Effects		yes		yes
State Fixed Effects		yes		yes
Robust Standard Errors			yes	yes
Observations	2208	2208	2208	2208
R-squared	0.19	0.81	0.77	0.88

Notes: Standard errors in parentheses. Asterisk * indicates significant at 5%; Two asterisks ** indicate significant at 1%. Observations exist for each state for each year from 1910 through 1955. Dependent variable is the sum of assets in all state-chartered banks in each state in each year divided by the sum of equity, defined as paid-up capital (common and preferred stock), surplus, undivided profits, unpaid dividends, and all other retained earnings. Independent variable is the equivalent value for the nationally-chartered banks within each state. Robust standard errors calculated using Huber-White Sandwich Method. Alternative calculations of standard errors discussed in text.

Table 2: Leverage and Double-Liability Legislation

	Dependent Variable - State Leverage			
	(1) OLS	(2) Difference	(3) GLS FE	(4) GLS FE R
National Bank Leverage	0.582	0.447	0.420	0.420
	(0.036)**	(0.028)**	(0.040)**	(0.106)**
National Bank Leverage after 1937	0.196	-0.031	0.332	0.332
	(0.034)**	(0.029)	(0.037)**	(0.112)**
National Bank Leverage * State Leverage Law	-0.076	-0.038	-0.046	-0.046
	(0.017)**	(0.013)**	(0.017)**	(0.054)
National Bank Leverage * State Leverage Law after 1937	0.001	-0.000	-0.029	-0.029
	(0.020)	(0.016)	(0.020)	(0.071)
Year Fixed Effects	yes	yes	yes	yes
State Fixed Effects	yes	yes	yes	yes
Observations	2174	2125	2174	2174
R-squared	0.98	0.67	0.88	0.88

Notes; Standard errors in parentheses; * significant at 5%; ** significant at 1% .

Table 3: What Fraction of Its Loan Portfolio Could the Average Bank Lose Before Insolvency? Equity/Loans in States With and Without Double Liability.

	Dependent Variable Equity / Loans			
	(1)	(2)	(3)	(4)
Indicator - Double Liability = 1	-3.059	0.239	-0.801	1.667
	(0.469)**	(0.501)	(0.330)*	(0.450)**
National Bank Equity/Loans			0.766	0.538
			(0.021)**	(0.030)**
Constant	30.747	35.310	6.451	14.187
	(0.339)**	(1.238)**	(0.619)**	(1.625)**
Year Fixed Effects		yes		Yes
State Fixed Effects		yes		Yes
Robust Standard Errors			yes	Yes
Observations	2208	2208	2208	2208
R-squared	0.02	0.72	0.54	0.78

Notes: Standard errors in parentheses. Asterisk * indicates significant at 5%; Two asterisks ** indicate significant at 1%. Observations exist for each state for each year from 1910 through 1955. Dependent variable is the sum of retained earnings (including surplus, undivided profits, unpaid dividends, and all other retained earnings) in all state-chartered banks in each state in each year divided by the sum of total loans at all state-chartered banks in each year. Independent variable is the equivalent value for the nationally-chartered banks within each state. Robust standard errors calculated using Huber-White Sandwich Method. Alternative calculations of standard errors discussed in text.

Table 4: What Fraction of Its Loan Portfolio Could the Average Bank Lose Before Its Capital Became Impaired? Retained Earnings/Loans in States With and Without Double Liability.

	Dependent Variable Retained Earnings / Loans			
	(1)	(2)	(3)	(4)
Indicator - Double Liability = 1	-0.5941	-0.414	-0.557	0.682
	(0.337)**	(0.314)	(0.234)*	(0.310)*
National Bank Retained Earnings/Loan			1.045	0.519
			(0.025)**	(0.038)**
Constant	18.646	13.028	-0.431	4.948
	(0.244)**	(0.776)**	(0.422)	(0.900)**
Year Fixed Effects		yes		yes
State Fixed Effects		yes		yes
Robust Standard Errors			yes	yes
Observations	2208	2208	2208	2208
R-squared	0.12	0.81	0.67	0.84

Notes: Standard errors in parentheses. Asterisk * indicates significant at 5%; Two asterisks ** indicate significant at 1%. Observations exist for each state for each year from 1910 through 1955. Dependent variable is the sum of retained earnings (including surplus, undivided profits, unpaid dividends, and all other retained earnings) in all state-chartered banks in each state in each year divided by the sum of total loans at all state-chartered banks in each year. Independent variable is the equivalent value for the nationally-chartered banks within each state. Robust standard errors calculated using Huber-White Sandwich Method. Alternative calculations of standard errors discussed in text.

Table 5: Leverage and Requirements for Opting Out of Double Liability

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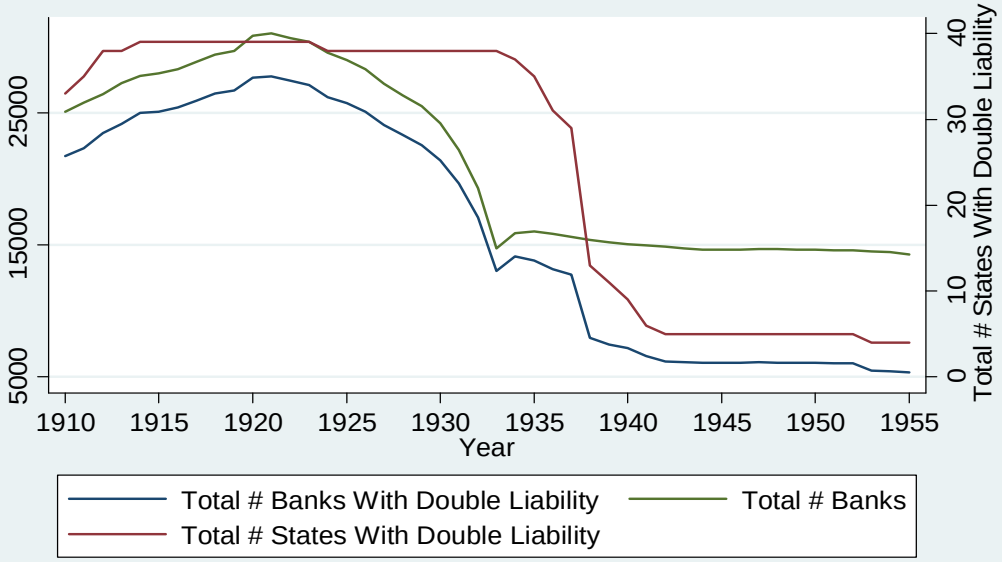
	Dependent Variable Assets / Capital			
	(1)	(2)	(3)	(4)
Indicator - Double Liability = 1	-2.999	-0.594	-0.317	-0.317
	(0.306)**	(0.287)*	(0.238)	(0.224)
Requirements for Opting Out of Double Liability				
Indicator – Join FDIC = 1	1.740	0.833	0.566	0.566
	(0.329)**	(0.318)**	(0.264)*	(0.239)*
Indicator – Notice = 1	-0.572	-0.433	0.043	0.043
	(0.314)	(0.309)	(0.256)	(0.260)
Indicator – Increase Surplus = 1	-0.165	-1.280	-1.228	-1.228
	(0.331)	(0.340)**	(0.282)**	(0.301)**
National Bank Retained Earnings/Loan			0.543	0.543
			(0.025)**	(0.036)**
Constant	12.303	5.650	1.927	1.927
	(0.194)**	(0.413)**	(0.384)**	(0.417)**
Year Fixed Effects		yes		yes
State Fixed Effects		yes		yes
Robust Standard Errors			yes	yes
Observations	1104	1056	1056	1056
R-squared	0.13	0.87	0.91	0.91

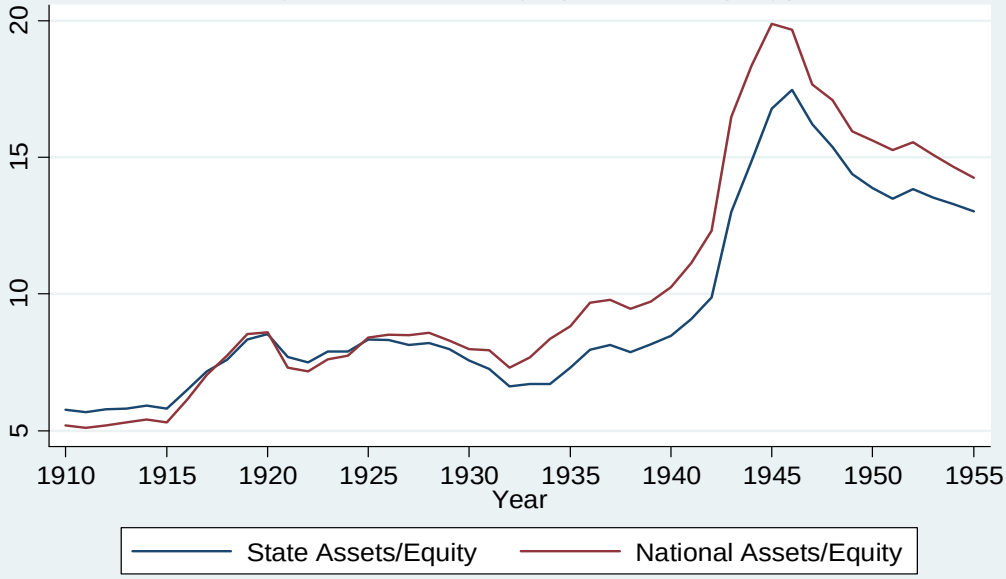
Notes: Standard errors in parentheses. Asterisk * indicates significant at 5%; Two asterisks ** indicate significant at 1%. Observations exist for each state for each year from 1910 through 1955. Dependent variable is the sum of retained earnings (including surplus, undivided profits, unpaid dividends, and all other retained earnings) in all state-chartered banks in each state in each year divided by the sum of total loans at all state-chartered banks in each year. Independent variable is the equivalent value for the nationally-chartered banks within each state. Robust standard errors calculated using Huber-White Sandwich Method. Alternative calculations of standard errors discussed in text.

Figure 1: Number of Banks and Double Liability



Note: Number of banks with double liability includes states with triple and unlimited liability.
Source: All Bank Statistics and Table 1

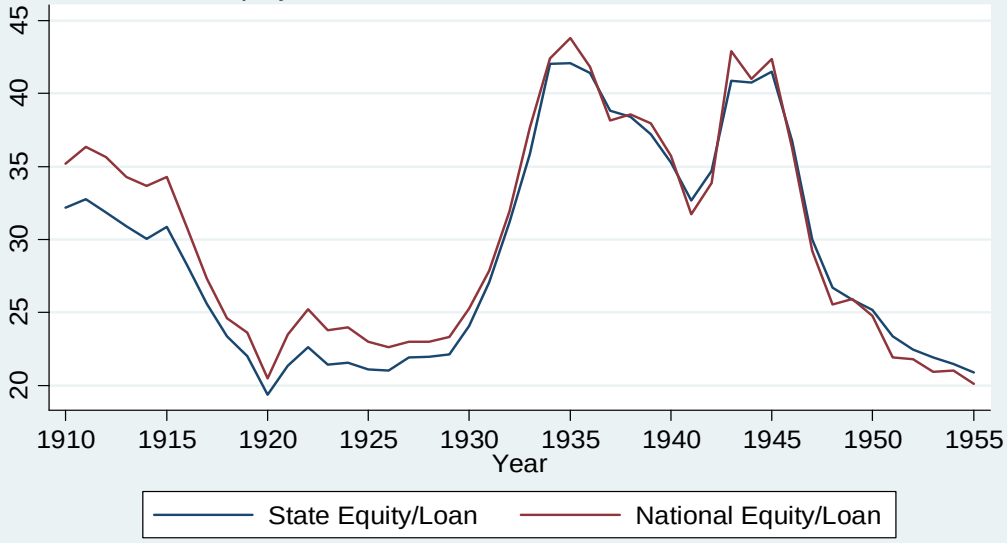
Figure 2: Leverage(Assets/Equity)



Aggregate ratio for each state averaged over states
Source: All Bank Statistics

Figure 3: Loan Losses That Would Exhaust Capital

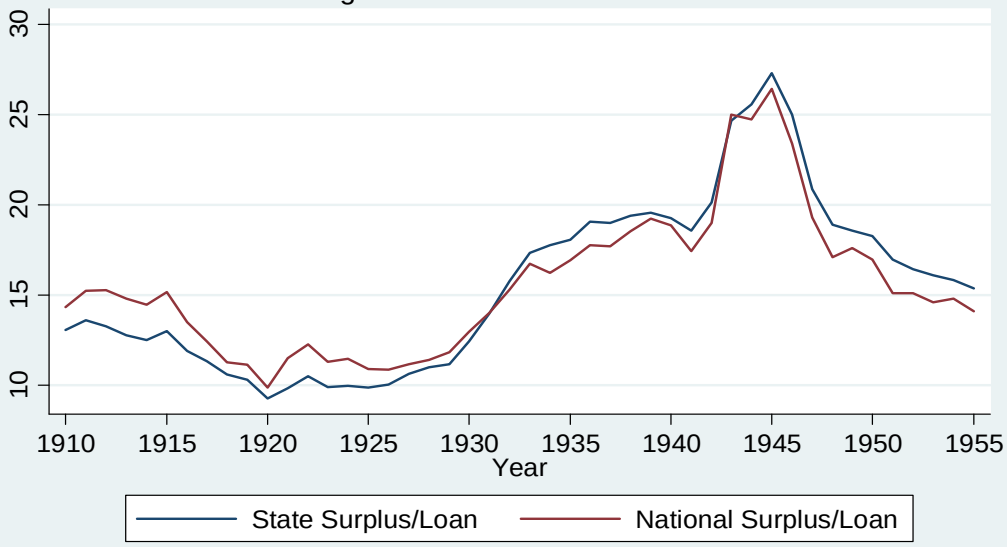
Equity/Loan Ratio for State and National Banks



Aggregate ratio for each state averaged over states
Source: All Bank Statistics

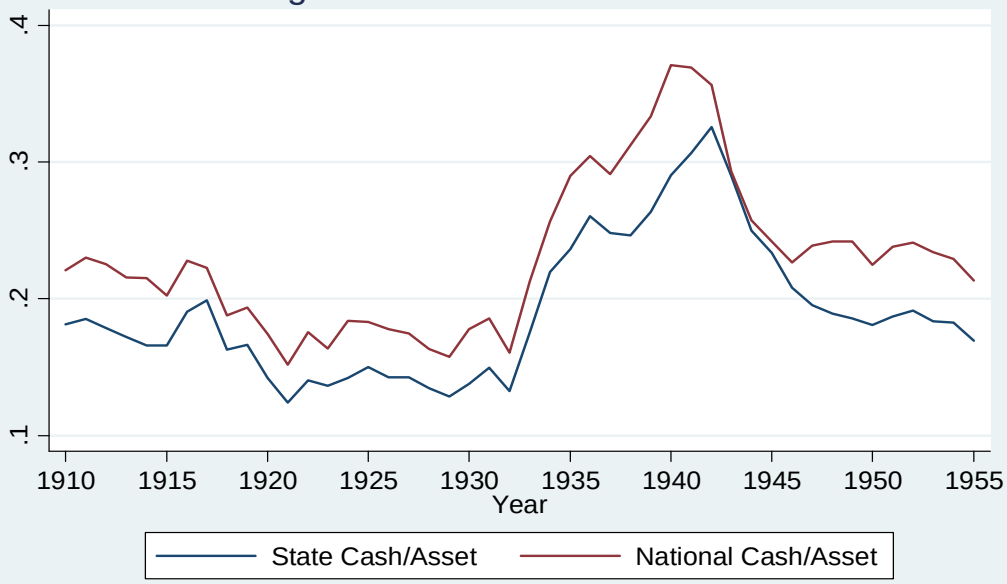
Figure 4: Loan Losses That Would Impair Capital

Retained Earnings/Loan Ratio for State and National Banks



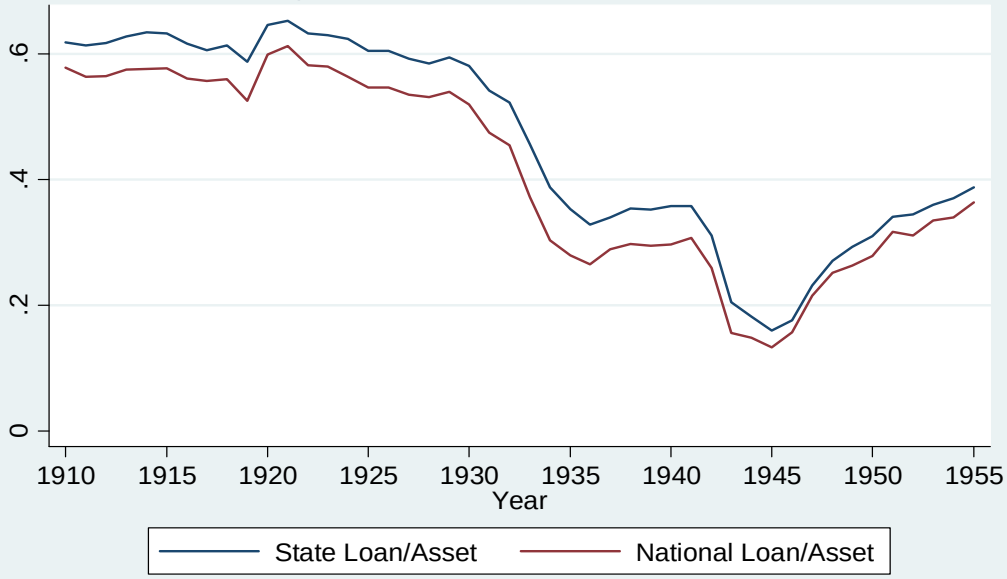
Aggregate ratio for each state averaged over states
Source: All Bank Statistics

Figure 5: Cash Over Asset Ratio



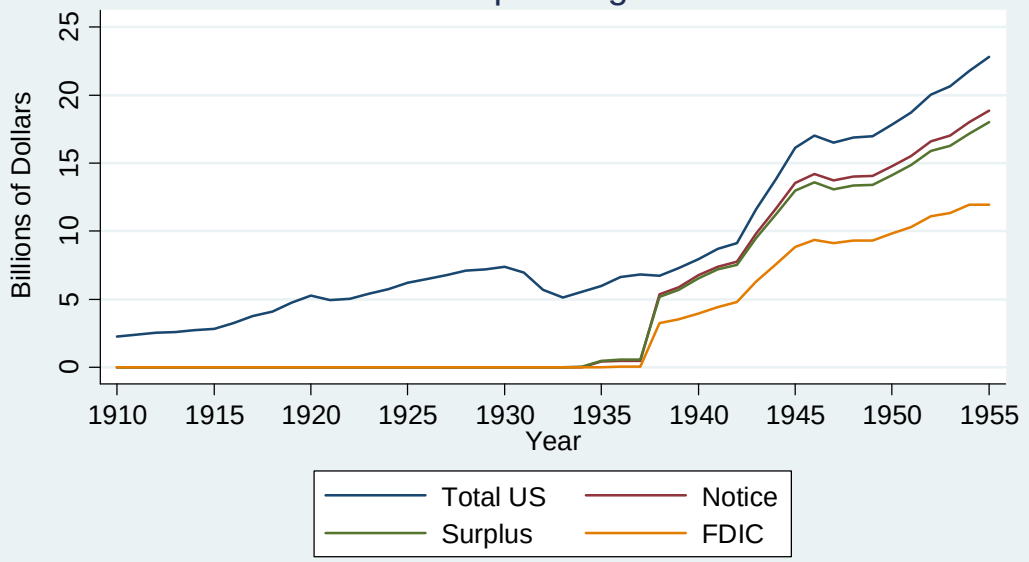
Aggregate ratio for each state averaged over states
Source: All Bank Statistics

Figure 6: Loan Over Asset Ratio



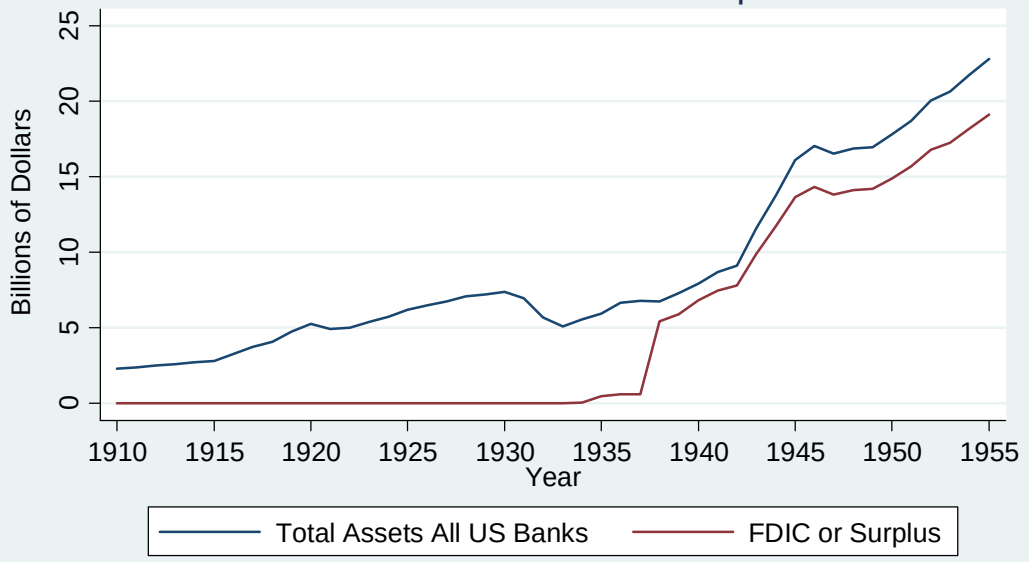
Aggregate ratio for each state averaged over states
Source: All Bank Statistics

Figure 7: Requirements for Opting Out of Double Liability
Assets of Banks Operating Under Each Rule



Values are the sum of assets of all banks, both national and state, operating under each rule.
Total is total asset of all banks in US.
Source: Asset data from All Bank Statistics. Legal data see text.

Figure 8: Requirements for Opting Out of Double Liability
Join FDIC or Increase Surplus



Values are the sum of assets of all banks, both national and state, operating under the rule.
Total is total asset of all banks in US.
Source: Asset data from All Bank Statistics. Legal data see text.