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The Evolution of Bank Supervision: Evidence from U.S. States

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We use a novel data set spanning 1820-1910 to examine the origins of bank supervision and assess factors leading to the creation of formal bank supervisory institutions across U.S. states. We show that it took more than a century for the widespread adoption of independent supervisory institutions tasked with maintaining the safety and soundness of banks. State legislatures initially pursued cheaper regulatory alternatives, such as double liability laws; however, banking distress at the state level as well as the structural shift from note-issuing to deposit-taking commercial banks propelled policymakers to adopt costly and permanent supervisory institutions.

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The Evolution of Bank Supervision: Evidence from U.S. States

Given the potential damage that widespread bank failures can have on macroeconomic stability, the large impact of government-funded bailouts of failed banks on public sector accounts, and the considerable governmental and industry resources directed toward influencing banking market structure, it is surprising how little is actually known about when and why formal bank supervisory institutions came into existence. For example, existing research on their early evolution in the United States simply summarizes the environment for particular years (e.g., Weldon 1910) or presents a limited number of case studies (e.g., Gruchy 1937). More recent studies have examined supervision in later periods (Agarwal et al. 2011; Mitchener 2005, 2007; White 2011), but they have not attempted to provide a long-term quantitative assessment of the evolution of bank supervisory institutions.[1] We aim to fill this lacuna by analyzing the factors that led to the creation of formal bank supervisory institutions in the United States at the state level, where such institutions are defined as government agencies established specifically for the purpose of supervising banks. We examine their evolution in light of theory as well as modern policy objectives, such as the reduction of systemic risk and the monitoring of individual bank's balance sheets and management behavior.

The federalist structure of the United States implies that powers, such as the chartering of commercial banks, reside with individual states. Supervision of banks chartered by states naturally followed from this delegation of powers, and

[1] Another notable recent contribution is Grossman (2010), which describes the evolution of the banking industry and discusses the role central banks have played in bank supervision (with extended case studies on Sweden, England, and the United States). Our analysis is complementary in that it analyzes the evolution of bank supervision prior to central banking and formally measures its determinants.

meant that bank supervision initially developed at this jurisdictional level. We thus focus on when and why states established banking departments designed to both charter state financial institutions and supervise them. We trace their evolution from the early years of the republic through the beginning of the twentieth century – a critical period that laid down the foundations of the bank supervisory system observed today. To do so, we assemble a unique data set spanning 1820-1910 from archival and census records that provides information on the date of adoption of formal institutions as well as on state-specific factors influencing that decision. Using these data and additional information on supervisory characteristics, we also examine whether states made progressive improvements to the quality of their supervisory institutions. Since implementation dates and supervisory characteristics varied considerably across states, we are able to exploit both the cross-state and time differences to identify factors that drove the adoption of state bank supervision.

Results from duration models indicate that it took more than 100 years to adopt formal supervisory institutions as well as what policymakers today would consider as modern supervisory priorities. Consistent with Rajan's (2009) view that financial regulation has been procyclical, we find that formal supervisory institutions (i.e., state banking departments) rose from the ashes of banking crises. Six states created government banking agencies immediately after the Panic of 1837, six states put them in place after the Baring Crisis of 1890 and Banking Panic of 1893, and 17 made changes after the Panic of 1907. No other interval had as many new departments established. The pattern indicates that bank supervision was likely a response to bank failures: the high sunk costs of establishing formal bank supervisory institutions likely delayed states from preemptively installing them. On the other hand, prudential regulations, such as double liability requirements for stockholders and reserve requirements on deposits, were installed during relatively stable times. The timing of the

implementation of regulation in comparison to supervision suggests that they preferred using less costly regulation. Legislatures only moved begrudgingly to create formal and more expensive supervisory institutions once banking crises hit their states.

The introduction of the National Banking Act and taxes on state bank notes in the 1860s also appears to have shaped the development of modern supervisory institutions and priorities. Commercial banks shifted the composition of their liabilities from notes to deposits, simultaneously drawing more individuals (and potential voters) into the banking sector and increasing the potential for systemic bank runs.[2] Our econometric results suggest that state legislatures refocused their attention on the safety of depositors and installed relatively more costly state banking departments. As deposit taking grew in importance relative to note issuance, supervision shifted more purposefully toward maintaining the safety and soundness of banking systems.

By the beginning of the nineteenth century and prior to the founding of the Federal Reserve System, most states had established separate regulatory agencies charged with bank supervision and were requiring banks to submit balance sheet information with regularity. Our empirical evidence further indicates that states that moved earlier to create an independent banking authority devoted more resources toward supervision. Early adopters were more likely to publish highly detailed and periodic bank reports, spend more on supervision expenses, and carry out more examinations per bank. Some of these states had also given their examiners the power to shut down banks that were deemed unsafe. Because enforcement problems, compliance, and competition with federal regulatory

[2] While note holders were exposed to bank failure, notes had to be fully backed by collateral and losses were generally low. Issuance of greenbacks and silver-backed money during the postbellum period also limited the amount of bank notes that individuals would need to hold in order to carry out transactions.

agencies persisted long after the founding of the Federal Reserve System, these quality differentials may have had lasting implications for systemic stability.

II. Theoretical Arguments for Supervision

Why are commercial banks supervised? Public interest theories of regulation suggest at least two explanations for the special treatment of banks: externalities and efficiency. When large numbers of banks fail they often impose external costs on the economy, reducing lending and aggregate investment. Moreover, as banks fail and disintermediation occurs, the costs of credit can rise for firms due to the loss in information about the quality of investment projects (Bernanke 1983). Since commercial banks are conduits through which the money supply changes, a large number of failures can also impact the macroeconomy by altering the money supply (Friedman and Schwartz 1963). Prudential regulation and supervision could therefore potentially reduce the incidence of failures and "contagious runs," and limit macroeconomic externalities.

A second public-interest argument for regulating and supervising banks has to do with the efficient transfer of savings from lenders to borrowers. As in other industries, market structure can affect the price and provision of services. In banking, this translates to lending rates that are influenced by the competitive structure of the industry. While government policies often limit entry and increase the monopoly power of existing banks by making chartering costly (imposing requirements on paid-in capital or controlling who can receive licenses to operate), formal supervision could arise to ensure product and price competition and to enforce legal restrictions on bank activity.[3] Absent intervention, market

[3] In the historical context of the United States, Davis (1965) and Sylla (1969) argue that the high capital requirements of national banks and taxes on state bank notes after 1865 enabled geographically-segmented unit banks to obtain considerable monopoly power.

structure in banking could evolve in a way that leads to an inefficient or suboptimal allocation of capital, either geographically or in terms of sectoral allocation, resulting in slower economic growth.[4]

Private-interest theories of regulation provide an alternative explanation, suggesting that supervision might evolve in response to the needs of the banks they oversee. Stigler (1971) theorized that regulation principally serves to redistribute economic resources from those with less political power to those with more.[5] For example, banks may lobby for restrictions on branching or chartering and then use government agencies, such as bank supervisory departments, to limit entry. Public interest objectives thus can be compromised by the private agendas of well-organized bankers, customers, or political constituencies. Consequently, even without spillovers or efficiency considerations, regulation may still be compatible with the self-interest and profit maximizing motives of banks.[6]

Theory further suggests that bank supervision may enhance welfare given costly state verification (Townsend 1979), monitoring costs, the opacity of bank decision making (Chen 2001, Meh and Moran 2010), and incentive problems. When present and without monitoring, managers may take on more risk than what is optimal from a depositors' perspective (i.e., moral hazard). Asymmetric information may be lessened through government activities aimed at transparency or through supervision. It is certainly possible that banks could monitor their own risk. For example, managers (directors) could also be owners, aligning incentives and limiting risk taking. Alternatively, managers' contracts could be structured

[4] The special status often conferred to banks is sometimes confounded with a government's desire to extract seigniorage through monopoly note issuance. While governments may desire to have control over note issuance to derive rents, it is not clear that supervision of banks is necessary to achieve this objective.
[5] See also Posner (1971, 1974) and Peltzman (1976).
[6] Both of these approaches ignore the possibility of self-regulation, a point we also discuss.

such that they are incentive compatible, in turn limiting risk taking and rendering government policies aimed at reducing risk potentially redundant.[7]

Demandable deposits could also potentially operate like incentive compatible contracts. A bank offers to pay a fixed return on deposits, which can be withdrawn at any time, in exchange for use of deposits. If depositors doubt the safety of their bank, they have the ability to run the bank.[8] The possibility of bank runs may act to discipline bank managers such that they hold less risky portfolios (Calomiris and Kahn 1991).

In practice, it may be difficult to rein in managerial risk taking simply through the use of demand deposits. For example, Dewatripont and Tirole (1993) argue that private monitoring is costly because bank customers are small and dispersed. Before the twentieth century, few households had large bank accounts, and the release of bank information was spotty and periodic at best. Therefore, only if a handful of very large depositors exist would the costs of monitoring be outweighed by the benefits. When monitoring is imperfect, managers may still invest in risky assets and depositors may still rationally start bank runs. If runs become "contagious," they can potentially result in costly spillovers to the real economy. The possibility of "contagious" and costly bank runs, however, provides a theoretical justification for supervision and/or regulation of banks: governments can commit resources to develop technologies that monitor risk taking.[9]

Formal rules or regulations on bank behavior are another mechanism that can be used to make managers operate in ways that are incentive compatible with

[7] If such contracts can be created, then regulation of risk taking may be unnecessary since losses would accrue to equity and debtholders just like for firms in other sectors.

[8] Theorists have shown that it is rational for depositors to run on fractional reserve banks (Diamond and Dybvig 1983).

[9] It is possible that banks could act jointly and come up with collective mechanisms that would prevent spillovers to each other or to the economy, but in practice such practices have been few and far between as a result of coordination problems. Calomiris and Schweikart (1991) note that several states responded to the Panic of 1857 by developing coordination technologies.

depositors. For example, governments can impose double liability such that bank stockholders are additionally liable for losses up to the amount of their stock. Grossman (2001) shows that double liability pushed banks to reduce their risk, but that it did not guarantee systemic stability. Reserve requirements on deposits and minimum capital requirements have also been enacted to rein in bank risk taking.

III. Institutional Development of Bank Supervision in the U.S.

Guided by our discussion of theory, we now provide some further structure to the econometric model we test in Section IV by providing a roadmap to the key institutional changes that also may have influenced the path of bank supervision. We document how policymakers' perceptions about the public need for supervision changed over three eras, and discuss how this was shaped by a changing economic environment including the growth of the nation and the repeated incidence costly financial panics. The first period covers the nation's early history when banks received special charters from state legislatures to operate and which appears to have drawn to a close with the Panics of 1837 and 1839. The second period corresponds to the Free Banking Era – a period beginning around 1837 when special chartering fell by the wayside and state bank supervision evolved in response to the growth in commercial banking and ended after the Panic of 1857 and with the large number of bank closures during the early Civil War. The last period covers the National Banking Era, 1863-1913, including the rise of dual banking, the shift to deposit-taking commercial banks, and the Panic of 1907, all of which appear to have further transformed state bank supervision.[10]

[10] Grossman (2010) uses a similar periodization to study the evolution of banking and various prudential regulations (e.g., double liability, minimum capital requirements).

A. *Special Bank Charters and the Young Republic*

Commercial banking emerged slowly during the first decades of the 19th century, a period when private banks and moneylenders featured prominently. In part, the growth in banking was hindered by the chartering process. Individuals wanting to create a bank had to seek legislative approval at the state level. The use of special acts of incorporation to charter banks was a practice inherited from Europe. American legislators, however, viewed their authority to bring banks into existence with some trepidation, fearing that charters effectively granted monopolies that were concentrated in a "moneyed elite." Because states were banned from issuing their own currency, some politicians also worried about concentrating banks' unique power to create money through note issuance in the hands of a few.[11] Special charters balanced two objectives: permitting banks to exist but providing more control over banking than a fixed set of standards.

The chartering process was tedious and requests were often denied by state legislatures. Often in order to obtain a charter, banks had to agree to purchase government debt or make loans to the state (Bodenhorn 2003).[12] Special bank charters were also susceptible to influence peddling, and many histories of this period describe a process whereby charters were handed out only to those that were politically connected. For example, as one banking historian describes, "It had long been difficult to get new bank charters in New York…And whenever a new one was decided on...opportunities were afforded the public to purchase stock—provided of course that most of the stock went into the possession of Democrats" (Hammond 1957, 574). Fears of centralized bank power were

[11] Although they feature less prominently in the early discussions of bank chartering, some legislatures expressed concern that the issuance of "bad notes" would lead to a faulty money supply or that excessive note issuance could lead to inflation.

[12] This was a common practice in Europe during the period. Bodenhorn (2003) and Hammond (1957) provide detailed descriptions of the evolution of bank charters and the politics surrounding chartering during the antebellum period.

ironically enhanced by the special chartering process. Since banks needed special government privilege to operate, banking during this period grew slowly, mostly in urban areas, and banks had considerable monopoly power.

Bank supervision sprouted its first roots in response to these special charters, and with the general concern of giving banks the right to exist and issue notes.[13] In addition to rules such as reserve requirements and double liability of stockholders, legislators sometimes required simple reports of condition and reserved the right to inspect banks by special committee. However, these requirements had little bite and were often avoided. When reports were requested, it was easy to hide the true state of a bank's condition. Virginia problems are indicative of this early era of bank supervision. In 1817, residents of Lynchburg accused Farmers' Bank of Virginia of discriminating in its lending practices, including lending excessively to insiders (directors) and real estate agents. In response, the Virginia legislature appointed a committee to examine the bank's practices, but the bank's directors had no incentive to cooperate with the committee: there was no legal means to enforce it to comply with requests for information or changes in conduct (Gruchy 1937).

In spite of these shortcomings, incremental improvements took place in the first three decades of the 19th century. For example, Massachusetts passed a law in 1803 requiring periodic statements by banks; the law specified which items were to be included and authorized the assessment of fines when reports were not submitted. In 1813, the governor of the state set up a system of three bank commissioners to enforce charter regulations, including minimum paid-in capital, but their examinations could not be described as comprehensive by any means (Gruchy 1937).

[13] Some states placed limitations on note issuance or prohibited dealings in certain types of securities. These types of provisions were often vague and enforcement was virtually non-existent.

New York also moved relatively early to improve bank supervision. The New York Safety Fund, set up in 1829, established a mutual insurance system that guaranteed the liabilities of failed banks.[14] The fund authorized three bank commissioners to examine member banks on a quarterly basis and determine if they were solvent. This public-private partnership also authorized any three banks to call for the examination of any other bank within the system.[15] Despite giving them the power to supervise member banks, the commissioners had no legal basis to shut down banks unless they were in violation of a particular section of state banking law. The fund eventually had to be bailed out through state borrowing after the Panic of 1839, making it any early example of socialized risk in the American banking system.[16]

A group of banks in Indiana also set up a self-insurance system to limit risk taking in 1834. Under this system, state banks in Indiana were independent but were mutually responsible for each other's liabilities. A board of directors, composed primarily of the individual bank presidents, was created to oversee the integrity of all the banks in the system. This structure encouraged banks to monitor each other's portfolios in order to prevent default while allowing each bank a large degree of autonomy (Weber 2011). As a result, no member bank in Indiana failed during the Panics of 1837 and 1839. Eventually groups of banks in Ohio (1845) and Iowa (1858) set up similar mutual guarantee systems.

Archival evidence from the era of the early republic shows that formal bank supervisory institutions were only present in Massachusetts and New York before 1830, despite nearly 420 banks operating across the other 24 states.

[14] It is helpful to note that the insurance was only intended to cover bank notes, and it was only through loose wording that some depositors were paid out. During the collapse of the system, New York properly defined the language to make sure that no additional depositors were repaid.
[15] The fund, however, did not properly incentivize its member to monitor each other as failures were borne by the fund and not individual banks (Weber 2011).
[16] A similar insurance scheme was started in Vermont in 1831, but suffered from similar problems as well.

Legislative records at both the state and national level also suggest little impetus for more formalized bank supervision. If anything, the 1830s ushered in the Jacksonian Era of Free Banking and a move toward less government involvement in banking at both the national and state level.

B. The Free Banking Era: Unleashing the Genie from the Bottle

Bank creation through special legislative chartering does not appear to have quenched the nation's thirst for capital. Beginning in the 1830s, 18 states passed general bank incorporation acts permitting groups of individuals to form banks without legislative approval.[17] Free banking laws were particularly prevalent in the Midwest, but many states in the Northeast also passed versions. These laws specified a well-defined set of capital, reserve, and note issue requirements. While these particular requirements differed by jurisdiction, all free banks, regardless of the state in which they were chartered, were required to fully back their note issues with government bonds or other specified assets.[18]

Free banking reduced entry costs and hence led to a tremendous growth in the number of state commercial banks.[19] Despite the financial panics of 1837, 1839, and 1857, the commercial banks in the U.S. increased from just over 765 banks in 1836 to more than 1,600 in 1860. Consistent with the laissez faire nature of the laws, free banking states generally did not create agencies to monitor bank

[17] Rolnick and Weber (1983, p.1082) dates the passage of free banking laws as follows: Michigan 1837 (repealed 1839) and 1857; Georgia 1838; New York 1838; Alabama 1849; New Jersey 1850; Illinois 1851; Massachusetts 1851; Ohio 1851; Vermont 1851; Connecticut 1852; Indiana 1852; Tennessee 1852; Wisconsin 1852; Florida 1853; Louisiana 1853; Iowa 1858; Minnesota 1858; Pennsylvania 1860. Kentucky, Missouri, and Virginia are generally not considered free banking states as their general incorporation law differed from the rest.

[18] The intent was that notes should be "riskless" since the state could redeem the notes of a defaulted bank out of the collateral bonds.

[19] For instance, 46 free banks were chartered in four years after free banking was established in Wisconsin.

behavior. Instead, states chose the cheaper regulatory option of requiring notes to be fully backed with collateral that was held by a state official in the hope that it would prevent losses. While they still had the ability to run on a bank, noteholders only truly needed to worry about repayment in the case of dramatic bond market or economic fluctuations that would have affected all banks in a given state. During the discussion of free banking in Indiana's Constitutional Convention of 1850, it was argued that "the state should have no more interest in banks than to protect the billholder. All else must be left to the exigencies of commerce." (Esarey, 1912, pp. 272-273) In this way, legislatures were more likely to increase backing requirements than watch over bank activities, and at most, free banks were required to publish unaudited balance sheets a few times a year. Hence with little government attention directed toward supervision, depositors, noteholders, and creditors had to rely on private monitoring and the limited information published by banks to monitor bank behavior.

Free banking nevertheless several raised concerns for state policymakers. Of foremost concern was the issuance of notes by free banks. Free banking legislation placed few, if any, restrictions on the size of note issuance, continuing a trend that had been started in the era of special charters.[20] Varying in quality and quantity, many thousand types of bank notes circulated by 1860, constituting two-thirds of the money supply (Temin 1969, Table 5.2). The vast array of notes represented a potential risk to state banking systems since note issuance was not fundamentally limited and since mechanisms to induce banks to issue them prudently were largely lacking in state laws.

During the Free Banking Era, state banking proved to be susceptible to market fluctuations. By 1863, nearly two-thirds of all free banks and about a third of all legislatively charter banks had closed their doors. Due to the requirement

[20] Banks received interest on their bond collateral and thus had little incentive to rein in their issuance.

that notes be fully backed, losses to depositors and noteholders were generally minor outside of panics and a few states (King 1983).[21] Scholars point to insufficient portfolio diversification and lack of proper supervision as reasons for these failures (Jaremski 2010). Rockoff (1974) and Rolnick and Weber (1984), for instance, highlight how Indiana state officials did not accurately price collateral bonds, and how Minnesota's law allowed risky revenue bonds to be used as collateral. In response, 15 states established separate banking authorities (generally called state bank commissioners) between 1830 and 1863. Similar to the New York Safety Fund, however, most commissioners had little power to take action against banks that were in danger of becoming insolvent, and primarily focused on determining if de novo banks were in compliance with capital and note requirements. Moreover, at this point in time, very few states had developed banking departments that devoted resources to regular and periodic examinations of balance sheets and the monitoring of risk taking.

Banking panics, in particular, seem to have played a central role in the creation of these banking departments. Of the 15 states that installed supervision between 1830 and 1863, six states created formal supervisory institutions in the three years following the Banking Panic of 1837, and two of the hardest hit states of the Panic of 1857, Iowa and Missouri, set them up within two years of experiencing bank failures. The number of large and publicized bank closures stirred up fears of instability. As a likely response to both a demand for reform

[21] About a third of all free banks and a fifth of all charter banks left behind some noteholder losses. Antebellum banks also issued more short-term debt and made far fewer long-term commercial loans and investments than today's banks; hence liquidity mismatch was less of a problem. They also tended to make many loans to insiders and members of the board of directors (at least in the Northeast), thus lessening the information asymmetry problem and reducing losses (Lamoreaux 1986, 1994).

from the public as well self interest, politicians seized upon these failures and used banking reform as a platform for gaining electoral support.[22]

Even New York and Massachusetts upgraded their supervisory institutions in response to the instability of the era. After the suspension or failure of 32 banks, Massachusetts strengthened its board of bank commissioners in 1838, requiring it to conduct annual examinations of all banks in addition to any special examinations requested by the legislature. The state supreme court also empowered the commissioners to force any bank to cease unsound businesses practices. This enabling provision provided the first basis for a state's supervisory authority to take action before a bank became insolvent, and eventually became a universal feature of state bank regulation. In 1851, the state passed a free banking law and, in contrast to some other states, simultaneously enabled stockholders or creditors to request an examination of any bank in the state.

The Panics of 1837 and 1839 also led New York to require all bank notes to be backed by only New York or Federal bonds in 1841, and abolish its banking commissioners after the failure of the Safety Fund in 1843. The state then took a new approach in 1851 when it transferred authority from the State Comptroller to a newly, independent banking department. The superintendent of this department was authorized to hire as many examiners as "necessary," had the authority to require quarterly reporting of balance sheets from all banks, and (in 1853) gained the power to solicit weekly statements of condition for all banks.[23]

The structure of each state's banking system may also explain the timing of changes in supervisory practices. For instance, the general lack of state supervision in the South (where only Florida, Georgia, and Louisiana installed supervision) was likely a result of their state-sponsored banks. The banks had

[22] For instance, the architect of the National Banking Act, Salmon Chase, railed against the improper behavior of state banks while he was governor of Ohio (Davis, 1910).
[23] These features were later embraced by the Comptroller of Currency's office, the regulatory agency authorized to oversee national banks beginning in the 1860s (Gruchy 1937).

large capital stocks, were filled by state funds, and were allowed to branch throughout a state. The resulting small number of banks may thus have limited the incentives for legislatures to develop costly supervision. Louisiana stands out as the clear exception. It established a board of commissioners in 1842, and improved the quality of supervision with its free banking law in 1853 by requiring weekly statements of condition, uniform quarterly reporting (including details on loans by maturity), and annual bank examinations. In this way, the state was on par with New York and Massachusetts and surpassed the level of supervision in most other states.

C. The Era of the Dual Banking: Bottling the Genie

The Panic of 1857, the Civil War, and a series of banking failures during the early 1860s ushered in dramatic changes to the American banking system. The National Banking Acts of 1863 and 1864 established national banks – a new type of commercial bank that was federally chartered by the Office Comptroller of the Currency and competed with state chartered banks. The Act adopted free banking's process of incorporation, but made that conditional on higher capital, note, and reserve requirements than many state laws.[24] Borrowing extensively from the supervisory systems of New York, Massachusetts, and Louisiana, the Office of the Comptroller of the Currency (OCC) also extended government's role in supervising banks. It required commercial banks it chartered (national banks) to file reports of condition five times a year, and implemented a system of regular bank examinations. OCC examiners were charged with looking at the balance sheets as well as the quality of management and loans of national banks.

[24] First, the Acts avoided the attachment of note issuance to risky state debt by requiring the use of U.S. Treasury bonds to back 90% of their value. Second, they prevented the creation of rural banks by increasing minimum capital requirements. Third, they avoided land speculation by prohibiting loans secured by real estate. Finally, they increased reserves on notes and required them on deposits as well.

While they had the ability to prohibit payments of dividends and compel write-downs of capital, the OCC did not have the authority to force banks that were nearing insolvency to alter their behavior (Bolles 1888; Robertson 1968). It only had the authority to force a suspension if the bank had defaulted and failed to redeem its bank notes.[25]

Competition from national banks as well as a tax placed on state bank notes fundamentally altered the balance sheets of state banks. Liabilities shifted from notes to deposits. Figure 1 shows that deposits in the antebellum period were a smaller and relatively constant portion of liabilities than bank notes, but deposits quickly surpassed them after the Civil War. The rise in deposits is often attributed to state banks gradually introducing demand deposits and checking accounts as a way of competing with national banks, but national banks also seized upon the benefits of deposits. By the end of 1900, bank notes made up less than 10% of all liabilities. The shift in the U.S. banking system to the widespread use of demand deposits exposed banks to greater liquidity risk and depositor runs, as witnessed by the banking Panics of 1873, 1893, and 1907, where liquidity seems to have played a role (Sprague 1910).

In response to the rise of demandable deposits, state policymakers seem to have begun to shift their focus toward ensuring bank safety and making improvements in supervisory standards in order to protect depositors and improve solvency. However, this shift began slowly, with significantly cheaper alternatives like double liability laws being installed first.

Double liability maintained that directors, chief executive officers, chief financial officers, and stockholders of banks would have to pay up to twice the par value of their shares in the event of bank failure. With more at stake, bank owner-managers may have taken less risk. States appear to have adopted this

[25] White (2009) provides much more detail on supervision under the OCC and offers some comparison with state supervision.

earlier than formal supervision (with 32 states installing double liability prior to creating a separate banking department) as an early attempt to mitigate bank risk taking.[26] Figure 2 shows that most states in the Midwest and Northeast had passed a double liability law before 1870, and potentially in response to the National Banking Acts' requirements, many more passed one during the 1870s and 1880s. By 1890, 27 states had enacted double liability.

Similar to modern regulations, reserve requirements during the period stipulated that banks had to keep a certain proportion of their liabilities in legal tender. While reserve requirements were legislated in a few states before 1863, only two states (i.e., Louisiana and Massachusetts) extended it to deposits. As shown in Figure 2, reserve requirements did not gain traction until after the Civil War. Like double liability, many of the requirements were legislated in periods of relative calm. Ten states enacted reserve requirements between 1863 and 1890, 12 between 1897 and 1905, and five more after 1915. Unlike double liability, however, many of these requirements came after supervision, with only 10 states installed them before supervision.

In contrast to these regulatory changes, the creation of independent state banking departments saw little development between 1863 and 1890. Only California installed bank commissioners during this 27-year period, bringing the number of states that had a separate department to 18 in 1890 (Figure 3). The next two decades, however, saw a flurry of activity, such that by 1914, only Arizona, Delaware, and Indiana were without an independent banking authority. Once again, banking crises seem to have been an agent for change, bringing the shortcomings of the states' supervisory systems to the forefront. Six states installed formal supervisory institutions within four years of the Baring Crisis of

[26] Only 7 states installed double liability after a separate banking authority was created (GA, MI, MS, NH, NV, NY, OR). The average state installed double liability almost 15 years before the authority.

1890 and the (banking) Panic of 1893; 17 more states established formal supervisory institutions between 1907 and 1914.

Existing state banking departments also responded to the Panic of 1907. For instance, New York reformed its laws in 1908, giving the state banking department the power to restrict chartering by requiring that banks receive charters only if "public convenience and advantage" required a new financial institution. Several other states passed legislation or began to more strongly enforce restrictions on the chartering of new banks.

By the beginning of the twentieth century, the actions of state banking authorities had been affirmed by the Supreme Court of the United States. In a 1911 decision, the Supreme Court ruled: "It has been held, we do not doubt rightly, that inspections may be required and the cost thrown on the bank." (Noble State Bank v. Haskell, 219 U.S. 104. January 3, 1911). Therefore, groundwork had been laid for supervision in the public interest prior to the creation of the Federal Reserve System.

IV. Explaining the Development of State Bank Supervision

A. Predicting When States Adopted Formal Supervisory Institutions

We now turn to assessing the adoption of formal supervisory institutions. Using a wide variety of archival records including state constitutions, state banking reports, and survey data based on responses from state banking departments, we obtained the year in which each state first established an independent banking authority (e.g. Office of the Bank Examiner, Bank Commissioner, or state banking department), our measure the adoption of formal supervisory institutions. (See the data appendix for further details and for sources on all variables included in our empirical analysis.) To explain the timing of adoption, we estimate Cox proportional hazard models where observations are by

state and by decade.[27] The panel is updated each decade, such that states without banks or areas that were still territories are excluded from the sample until those conditions are met. The dependent variable is coded as either a zero in a decade where the state had not established an independent banking department for any of the years of that decade or a one if the department came into existence during the decade.[28] Like a probit or logit, the hazard coefficients provide the relative effect on the probability of adopting supervision, but unlike those models it better accounts for differential state entry dates and the unbalanced nature of our panel. A positive coefficient implies the covariate increases the probability of adoption and a negative coefficient would imply it decreases the probability.

Based on the theory and historical evidence presented in Sections II and III, we include a set of conditioning variables influencing the legislative decision on when to create formal state bank supervisory institutions.[29] Since commercial banking grew at different rates across states and over different eras (free banking versus the national banking era), we include the number of new banks created in a given decade in the regressions. States also experienced differing degrees of banking distress, so we account for this by including closures (either voluntary liquidations or failures) across the previous decade as an additional factor.[30] We

[27] Because demographic and economic data on states are only available every 10 years, we have chosen to conduct the model at the decade level rather than exclude potentially important determinants. While hazard models are often used for continuous data and the proportionality assumption might miss some of the effect of the explanatory variables, the results reported in the paper are robust to using discrete choice models as well as other types of survival models.

[28] In order to form a complete panel of states, we disaggregate states such as West Virginia and Virginia and South and North Dakota for the whole period.

[29] Many of these same factors have been used by Grossman (2001, 2007) and others to study the political economy of prudential regulation such as double liability.

[30] Alternatively, we could have used the rate of closures to measure distress; however, calculating the rate requires that the denominator is nonzero. Since some new states had no banks at the beginning of a decade yet still had entry and closure during the 10-year period, we would be required to drop these observations from the analysis. Regardless when we include the rate of bank closure and entry, the coefficient on state banks closures generally remains economically important.

normalize closures by state population to measure the relative impact of bank losses.

It should be noted that using decennial data might create a timing mismatch with the bank data. For instance, supervision could have been installed early in a decade, resulting in the closure of insolvent banks. To the extent that this within-decade phenomenon occurred, the coefficient on bank closures would be biased upward. However, despite the possibility of reverse causality, Figure 4 illustrates that independent bank authorities were installed after financial panics and bank closures rather than before them. As a robustness check, we find similar results when we use higher frequency data or when we only include closures and entries prior to supervision being installed.[31]

Because the structure of U.S. banking changes significantly with the introduction of national banks in the 1860s, we disaggregate the bank entry and closure data into separate variables for state and national banks. In considering the creation of state banking departments, legislators may have viewed the growth or failures of national banks differently from those state-chartered institutions that were directly under their purview. The inclusion of national banking data at the state level also allows us to test whether there were any potential positive or negative externalities associated with national banks. For instance, even though the OCC had no regulatory or supervisory authority over state banks, the mere presence of national banks could have created a positive demonstration effect. The Comptroller's Office developed a set of best practices with respect to bank examination, including understanding how accounting procedures and asset portfolios affected risk and failure likelihood. National banking may also have influenced state banking through a legislative requirement passed in 1873, which mandated that the OCC file an annual report describing the banking condition of

[31] Results are available upon request.

the entire country. To fulfill this duty, the OCC had to gather information on state banks even though they were outside its formal jurisdiction and implored some states to change their practices.[32] On the other hand, the presence of national banks could have delayed the establishment of state banking departments, either by creating an incentive to free ride on the OCC or by introducing competition in laxity, i.e., an incentive not to impose costs on state-chartered banks that national banks faced.

As we described in Section III, state legislatures may have delayed the creation of formal supervisory institutions since they had a lower cost substitutes, such as double liability laws and reserve requirements. On the other hand, the passage of free banking laws, which accelerated the growth in state-chartered banks, could have increased the public demand for supervision. We therefore include dummy variables indicating whether a state had passed a double liability law or had passed a free banking law.[33] While it is possible that the adoption of double liability was endogenous to supervision, very few states installed it after supervision. In this way, double liability seems to have been an early attempt to prevent bank risk taking without devoting any resources to do so. We do not include a dummy for reserve requirements because, as discussed in the previous section, they were largely installed *after* formal supervisory institutions.[34]

The taxation of state commercial bank notes and the shift away from note issuance of state commercial banks were important changes to banking that occurred in latter half of the nineteenth century. Moreover, theory points to how fractional-reserve banking can lead to runs (Diamond and Dybvig 1983). Since banking in the nineteenth century was localized in nature, depositors typically

[32] It sent regular notices to all state banking departments, requesting information on the state of banking. The OCC even provided copies of bank supervision guidelines for states to use.
[33] A regression with double liability as the outcome variable and supervision as an explanatory variable shows no statistical relationship between the two.
[34] However, when included in the estimation, the results are quite similar to those shown in the table.

held funds in just a few banks at most. As noteholders often would have held a variety of notes from banks across the nation, exposure to runs on particular banks was more likely for depositors than noteholders. State legislatures may have thus responded to the growth in fractional-reserve, deposit banks and the risk of runs on individual banks by creating formal supervisory institutions. To proxy for this shift in banking practices and the greater potential risk of depositor runs, we include the ratio of total circulation to total deposits in each state.

We also include three measures to account for observable differences in the level of development across states and over time: the log of a state's population; the urbanization rate (defined as those places with more than 2,500 people); and the percent of the population that is non-white. Since these factors are potentially endogenous to economic growth and stability, we exclude them from some specifications. When they are included, we use lagged values (from the previous decade) to deal with endogeneity concerns. Finally, as noted in Section III, since the timing of adoption may have been influenced by geographical differences such as banking market structure, regional indicator variables are also included as controls.[35]

B. Empirical Estimates

Estimating a hazard model over the entire sample period of 1820-1910 has the virtue of statistical power; however, sometimes it is less useful for taking into account evolving legislative priorities given structural changes in the American banking system. For example, in the antebellum period, state legislatures liberalized entry requirements with free banking laws. Because deposit accounts were fairly limited and note issuance was fully collateralized, banking largely grew unabated and there were few advances in supervision.

[35] Dummies for the South, Midwest, and West are included, with the Northeast being the omitted category.

However, by the postbellum period, the National Banking Acts gave rise to competition between state banks and national banks and to the rapid growth of banks funding their investments via deposits rather than notes. Because legislative priorities may have shifted in response to these structural changes, the estimation and interpretation of some of our coefficients using the entire sample period is sometimes problematic. For example, before 1870, the estimation procedure will assign values of zero to national bank entries and closures instead of a null value even though no national banks existed. We therefore also present hazard model estimates for the sub-sample periods of 1820-1860 and 1860-1910. We focus our discussion on the sub-sample estimates when we want to highlight how the perceptions of state legislatures may have been altered by structural breaks in American banking.

As shown in Table 1, the entry of new state banks seems to have delayed the establishment of independent state banking departments, but only during the postbellum period. The coefficient on state bank entry is not only insignificant, but relatively small in size during the antebellum period and over the whole sample period. On the other hand, the entry of new national banks accelerated their establishment across the postbellum period and the whole period. Based on the specification shown in Column 6, a one-standard-deviation rise in the entry of state bank (i.e., 0.39 banks) decreased the probability of installing formal state bank supervisory institutions by about 1%, while a one-standard-deviation increase in national bank entry (i.e., 0.14 banks) raised the probability by roughly 3%. These results suggest that state legislatures may not have wanted to interrupt the fast growth of state banking, but chose to step in when national banks became numerically significant.[36] The coefficients on state bank entries are therefore not significant during the antebellum era because state authorities did not have to

[36] It is also possible that state legislatures installed formal supervision after observing the stability of national banks.

compete directly with the Comptroller for bank charters and would not have seen the installation of supervision as lessening their relative power over the banking system in the state. These findings suggest that the private interests of established bankers did not slow down the adoption of formal state supervisory institutions. Instead, legislatures seem to have eventually become concerned with either creating supervisory institutions for public interest, perhaps because they worried about negative spillovers from the presence of national banks or, alternatively, because they were responding to a potential chartering race with the Office of the Comptroller of the Currency. Legislatures may have wanted to create state banking departments with an alternative array of services and regulations than those of the OCC in order to draw banks away from the federal system.[37] Thus, in contrast to competition leading to laxity in regulatory standards, such reserve and capital requirements, our results suggest that competition from national banks may have initially improved supervisory standards of states by encouraging policymakers to adopt formal institutions earlier.

Periods of state banking distress also help to predict when formal supervisory institutions were put in place. The number of state bank closures accelerated the establishment of formal supervisory institutions across both the antebellum and the postbellum period. On the other hand, the number of national bank closures does not seem to have been significantly correlated with the adoption of state banking departments in the postbellum period. Only across the entire sample are the coefficients on scaled national bank closures statistically significant; in this case, the negative sign is due to the fact that they take a zero value for nearly 50 years. Based on the underlying hazard ratios from the specification shown in Column 6 (which includes the full set of control variables), a one-standard-deviation rise in state bank closures per 100,000 people (i.e., 0.16

[37] White (1983) describes how states also competed with the OCC through minimum capital and reserve requirements.

banks) increased the probability of installing supervision by about 4%, while a one-standard-deviation rise in national bank closures (i.e., 0.05 banks) decreased the probability by about 2%.

State policymakers thus may have been more compelled to change supervisory practices in response to distress for banks they had chartered (i.e., state banks) in comparison to those that may have created negative spillovers but for which they had no chartering authority (i.e., national banks). As with other bureaucracies, state banking departments persisted once they were established. Therefore, a state had to be willing to commit to operational costs indefinitely. In normal periods, when losses were relatively low, states might not have seen the benefit in obligating themselves to future taxpayer liabilities. It appears that it was not until financial panics and widespread state bank depositor losses united constituencies that politicians were forced to act in the public interest.

State legislatures also might have responded to the high bank resolution costs that occurred from banking panics. Without a staff of examiners, court officials of the state would have been saddled with the time consuming process of obtaining records of bank assets, negotiating with loan customers, and tracking down stockholders; court-ordered liquidations can be slow, and can delay the redeployment of productive assets back into the economy (Anari, Kolari, Mason 2000). Hence, in the wake of failures and economic disruptions associated with them, legislatures may have been compelled to set up state banking departments to reduce resolution costs.

The switch from circulation to deposits also influenced the willingness of state legislatures to establish formal supervisory institutions. The coefficient is statistically insignificant in the antebellum period when deposits were consistently low and held mostly by firms. On the other hand, it is statistically significant, negative, and large in magnitude in the postbellum period, when deposits were growing relative to circulation. Since depositors were generally more susceptible

than noteholders to losses associated with particular banks, we interpret this as an indication that elected legislators, accountable to depositors, began to pay more attention to bank operations as deposits became more widely held.

Free banking laws were installed during the antebellum period, but they did not have a statistically significant effect during the period. Instead, they seem to have slowed down the adoption of supervision during the postbellum period. Combined with the negative coefficient on state bank entry, these results suggest that those states that liberalized their banking sector early continued to push their state banking system to grow relative to national banks.

Double liability seems to have sped up the introduction of bank supervision in all periods as well as the two sub-periods. Two-thirds of all states passed double liability laws prior to establishing formal bank supervision, and most installed it several decades before (Figure 4). Therefore, states appear to have postponed establishing costly supervisory institutions until after double liability had been tried and had been found lacking. Over time, as more states experienced significant numbers of state bank failures, legislators and depositors would have observed that double liability failed to prevent banking panics, and likely learned, through first-hand experience, how hard it was to track down and obtain payments from stockholders without the help of formal institutions charged with this responsibility. For example, OCC examiners checked to make sure all stockholder information for national banks was up to date and a few states even published detailed information on stockholders in their annual report. In the wake of banking distress, state banking departments and improved supervision thus may have evolved to improve the effectiveness of double liability laws and reserve requirements.

The results indicate that, while a few states installed independent supervisory departments close to the period of antebellum banking panics, their adoption was slow and not affected by much else. Hence, the latter half of the

nineteenth century marks an important shift toward a system of state bank supervision that would more explicitly deal with the negative externalities associated with fractional reserve banking and deposit-taking financial institutions. The changes, however, do not appear to have driven policymakers to immediately create state banking departments charged with the purpose of examining and supervising banks. Rather, legislators seem to have pursued cheaper options for reigning in bank behavior, such as double liability for bank stockholders, and appear to have resorted to devoting significant resources to formal supervision after periods of banking distress. The competition between state and national banks also seems to have played a role in slowing down the adoption of formal supervision.

C. Quality of State Bank Supervision

As shown in Figures 3 and 4, adoption of formal supervisory institutions by states was nearly completed by the first decades of the twentieth century. That said, the quality of state banking departments nevertheless varied considerably across states. For instance, the size of examination staffs, expenditure to support examination activities, and the quality of data collected by examiners differed. To learn more about the determinants of differences in the quality of supervisory institutions, we first examine when states began to publish separate banking reports, using the same hazard model framework as in the previous section. We then analyze how reported measures of expenditure and size of examination departments differed toward the tail end of our sample period (1911), after most states had created formal bank supervisory institutions.

Some state banking departments began to publish detailed and standardized bank balance sheet data beginning in the antebellum era, but most states failed to collect detailed balance sheet information, even on an annual basis. As shown in Panel B of Figure 3, the practice of collecting standardized

information on banks began in the Northeast and eventually diffused westward. Many states in the Northeast published banking reports prior to the 1870s, with other regions lagging: the Great Plains beginning in the 1890s, the Pacific Northwest in the 1900s, and the Southwest in the 1910s.

Table 2 estimates a hazard model predicting when states began publishing regular and periodic balance sheets. We examine this outcome over the period 1820-1910 as well as for the postbellum period.[38] We find that double liability laws and the switch from circulation to deposits moved state legislatures toward providing more information to the public on individual banks. The positive correlation with the existence of double liability laws for banks may be due to the fact that stockholders demanded accurate values of their equity stakes, given their additional liability. Similarly, the positive correlation with the ratio of circulation to deposits is likely related to depositors wanting to be able to scrutinize and potentially run on a bank in which they held deposits.

After controlling for whether a state had installed formal bank supervision, state bank and national bank closures were less important for the state banking department's decision to publish regular reports. The coefficients on state bank closures were never statistically significant determinants of publishing a report whereas the coefficient on national bank closures is only significant in Column 3, when looking across the entire period and not controlling for population, urbanization, or the fraction of the population that is non-white.[39]

In 1911, the Comptroller of Currency published results from a survey that provided information for each state's expenditure on bank supervision, the number of examiners on staff, and the number of examinations conducted during

[38] We cannot estimate the model using only antebellum data because few states published a report before 1870.
[39] The lack of state reporting and national banking before 1870 positively biases the coefficient on national bank closures.

the previous year.[40] Figure 5 shows state-level differences in expenditures by banking departments and the number of examiners hired. Because the Comptroller only surveyed state banking departments for a single year, we explore the cross-state differences in supervisory quality using an OLS model and a rich set of predictive variables. In addition to including whether states had double liability laws, the regressions control for the number of years since reserve requirements and double liability laws were first put in place. Because some of the variation may be due to differences in the size of banking departments, we include the total number of national and state banks per 100,000 people in 1911. We also include each state's ratio of circulation to deposits in 1911.

Formal supervision did have a significant effect on the amount of spent on bank supervision and the number of examinations. States that had banking departments spent nearly four times more in total and 1.5 times more per state bank than the other 9 states. States that had created state supervisory departments earlier also spent more on supervision and examined banks more frequently than other states, perhaps indicating that these states might have used the additional funds to increase the quality of their supervision. The presence of double liability laws seems to have increased the number of examinations in a year, whereas free banking appears to have had no residual impact on the quality of bank supervision (at least after controlling for the number of banks in a state).

The number of national banks seems to have increased the amount a state spent on supervision as well as the number of bank examiners, perhaps an unintended benefit of competition. A one-standard-deviation increase in the number of national banks per 100,000 people (i.e., 0.77 banks) increased total amount spent on supervision by 20 to 26% and the number of examiners grew between 32% and 36%, depending on the specification. Some states thus might

[40] Because the Comptroller did not receive information on Alabama, Illinois, or Louisiana, they are dropped from the sample.

have devoted some resources to watch over national banks. Consistent with this is the fact that we observe some states publishing data on national banks in their annual reports. Alternatively, the number of state banks is only statistically significant in Column 3. The relative insignificance of state banks is likely due to the fact that banking departments would have to spend more as the number of banks increased, but would be able to spend less per bank.

V. Conclusion

From the outset, government officials in the U.S. were skeptical of giving banks too much power and autonomy. Regulation initially focused on efficiency considerations – controlling the size and monopoly power of banks. As a result, an atomistic, largely non-branched banking system emerged to service the needs of industry and agriculture. The first attempts at state bank supervision focused on assessing whether banks had sufficient paid-in capital to open for business and whether they had sufficient assets to back up the notes they issued. Policymakers in the early nineteenth century appear to have paid little attention to systemic risk. A century later, state bank supervision though far from perfect, had made considerable strides toward modern standards and objectives. The vast majority of U.S. states had established separate state banking departments by the time the Federal Reserve System was founded.

Using a newly-assembled data set on the establishment of formal supervisory institutions, we show that state banking departments, which employed dedicated, supervisory staff to conduct regular and periodic examinations, were slow to emerge. The large initial fixed costs of establishing such institutions appear to have been one factor that influenced state legislatures' choice to use far cheaper regulatory systems based around double liability requirements for stockholders and bank reserve requirements. Repeated and costly banking crises,

however, appear to have moved states to look beyond these cheaper options, and forge permanent agencies devoted to bank examination. Twenty-seven states installed supervision immediately after one of the period's three major panic periods: 1837/1839, 1890/1893, and 1907. For instance, in its first report written in 1912, Kentucky's banking commissioner explained that:

> Prior to 1912, there were few safeguards thrown around banking institutions in this State. The frequency with which bank failures occurred led the Legislature, in 1912, to pass a comprehensive act looking toward the regulation, examination and proper conduct of all State banks, and providing for the closing and winding up of the affairs of all such as were found to be in an insolvent condition. This legislation has, as its ultimate aim the protection of the depositing public (Smith 1913, VI).

As we show, there are several reasons why states likely chose to install supervision after panics. First, public outcry after large or widespread banking failures increased the demand for financial stability. As banks changed from issuing collateralized notes to uncollateralized deposits, more and more individuals became exposed to the negative effects of fraudulent behavior and financial crises. Elected officials in the postbellum were increasingly accountable to taxpayers holding bank deposits and supervising in the public interest. Second, state officials likely learned that banking distress could involve sizable resolution costs. Liquidating banks meant taking accurate account of all failed banks' assets, wrapping up loans, and tracking down any stockholders who were liable for losses. Politicians might have been able to more easily justify the expenses associated with permanent state banking departments if they could reduce resolution costs by using qualified supervisory staff to liquidate banks. Finally, if legislators could make the claim that state banking departments prevented future failures, then supervision in the public interest may have become more palatable

to taxpayers. Ex post, there appears to be some evidence to support this conjecture. During the next severe banking crisis to hit the U.S. economy, states with higher quality bank supervisory departments experienced fewer failures during the Great Depression (Mitchener 2005, 2007).

Our findings from an analysis of the timing of the publication of state banking reports and the 1911 Comptroller's survey of state banking departments speak somewhat further to this point, suggesting that institutional learning may help account for differences in supervisory quality that were apparent in the 1930s. Looking at when states began publishing regular and periodic reports, we find that hardly any states published detailed data before an independent authority had been established. The states that created permanent state banking departments the earliest also tended to have the most detailed summary of bank portfolios. Looking at the 1911 Comptroller's survey of state banking departments, those states that established independent supervisory agencies earlier had banking departments that, on average, spent more on supervision and carried out more examinations. Therefore to the extent that better information and more examinations lead to greater bank stability, the timing of supervision installation is important.

In spite of the average improvements in state bank supervision, the creation of formal state banking departments also had unintended consequences, helping to solidify a problem of competition in laxity that would persist within U.S. banking. Since commercial banks could obtain from either state or federal regulatory agencies, it created incentives to compete over light regulation and supervision. State legislatures, for instance, seemed to pull back from installing formal supervision when state banks were struggling to compete with national banks, and even lowered reserve and capital requirements. The consequences of this regulatory competition and the effects on bank supervision are still apparent today (Agarwal, et al. 2011).

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Data Appendix

Banking Data

We obtain the number of banks, bank entry, and bank closure data from two types of sources. We start with Weber's antebellum bank census (2005), which contains the location and dates of operation for every bank before 1861. We then extend his banking census through 1910 using the *Merchants and Bankers' Directory* (1860-1889), *Rand McNally Bankers' Directory* (1890-1900), and *Polk's Bankers Encyclopedia* (1901-1910). These bank directories are reported to provide, "a complete list of banks, bankers, savings banks, and principle trust companies." The directories include the name, location, and capital of each bank, as well as whether they were chartered by a state legislature or the Comptroller of the Currency. Therefore, by comparing the directories in successive years, we can determine when a bank was chartered and when it exited. A drawback of using these directories is that they do not permit us to determine if banks exited due to merger, voluntary liquidation, or involuntary liquidation (failure). Even so, the data provide the most comprehensive census of banking activity for the nineteenth century. As a check on the completeness of the directory data, we confirmed that the totals matched those reported in published state banking reports (when the latter became available).

For the antebellum era, the circulation and deposit data come from Weber (2005) and for the postbellum period from various issues of the Annual Report of the Comptroller of the Currency.

Independent Bank Authority

We define this the year when a state installed its first independent banking state banking authority. These agencies went by various names, the most common of which were the Office of the Bank Examiner, Bank Commissioner, or state

banking department. While individual states departments differed, they all shared the common feature of focusing on banking, rather than insurance or general business incorporation. In our analysis, we make no distinction between states that referred to the head of the agency as a bank commissioner as compared to a bank comptroller or banking superintendent. The dates were obtained from a variety of sources. Two published sources listed the dates of bank commissioners (Gruchy 1937) and banking departments (Weldon 1910), but these were incomplete and had some errors. We therefore conducted two surveys of state banking departments (in 2002-3 and a follow up in 2012), soliciting information on the origin of their departments. Third, we utilized published state banking department reports from the first years of their existence, which we were able to locate for almost all states in our sample, and which often contained useful information on legislative history and the founding of the state banking department. Whenever there were conflicts in the information we obtained, we used those dates from primary sources rather than secondary.

Double Liability on Bank Stockholders

This dummy value takes on positive values once a state passed a law legislating double, triple, or unlimited liability for bank stockholders. Those states that did not have a liability law or had an ambiguous law are not considered to have double liability. We obtained these dates as well as the date of removal from a variety of sources. First, we sorted through the NBER State Constitutions Database (http://www.stateconstitutions.umd.edu/index.aspx) for keywords such as bank, shareholders, stockholders, liable, liability, and double. We augmented these data using Barnett (1911, 76-77) and the complied statutes of each state. Second, we used Marquis and Smith (1937) to obtain the dates of some states that installed double liability in the antebellum period and Grossman (2001, 2007) and Mitchener and Richardson (2013) to obtain the dates of some states installed it

during the postbellum. Finally, we obtained the remaining dates from the following sources: Paton's *Digest of Legal Opinions*, Broom's F*irst Hundred Years of North Carolina Banking*, *The Pacific Reporter*, and *The Atlantic Reporter*.

Reserve Requirements on Deposits

This is defined as the year when a state first required banks to hold reserves on deposits. We obtained these dates from Rodkey (1934).

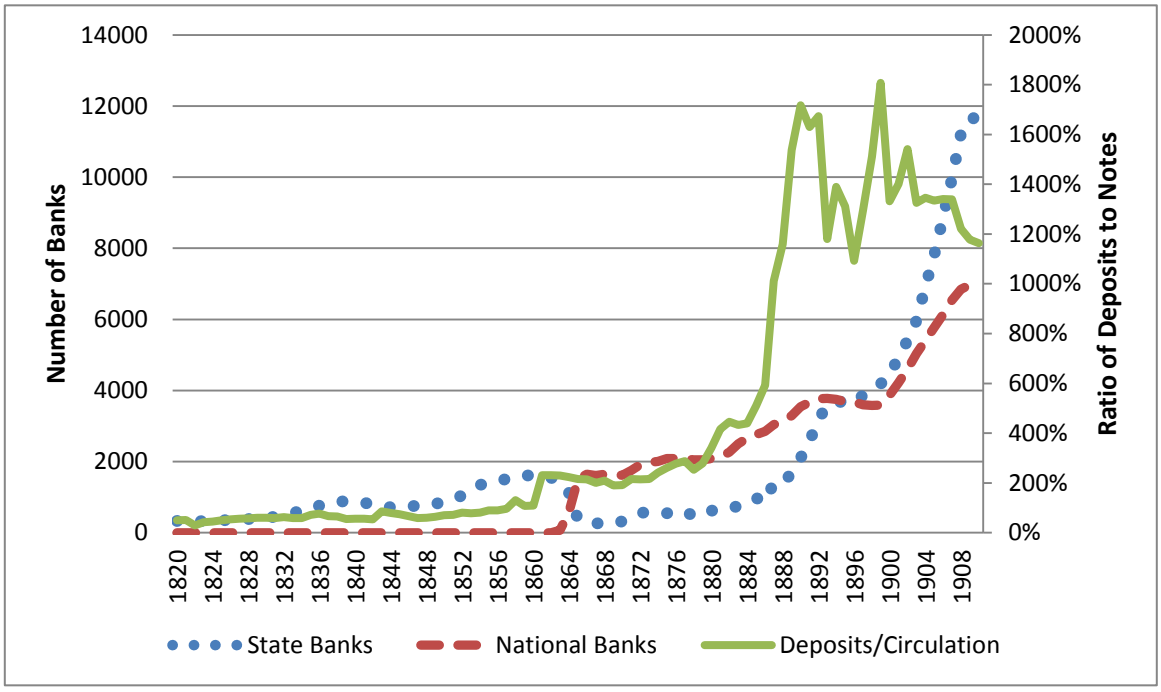
Publication Date of Banking Reports

This is defined as the first year that a state published a separate report on banking. The distinction is necessary because some states reported a small amount of banking information in an omnibus report that also contained information on population, education, farming, and finances. We gathered the dates directly from the reports themselves. Many have been conveniently scanned and put on the internet, and most others were tracked down through the Library of Congress and state libraries. For the few states that we were not able to obtain the first report, we obtained the year of the first volume through its library entry or through its numbering scheme (e.g. if the 8th *annual* report was published in 1908, the first was likely 1900).

Population Data

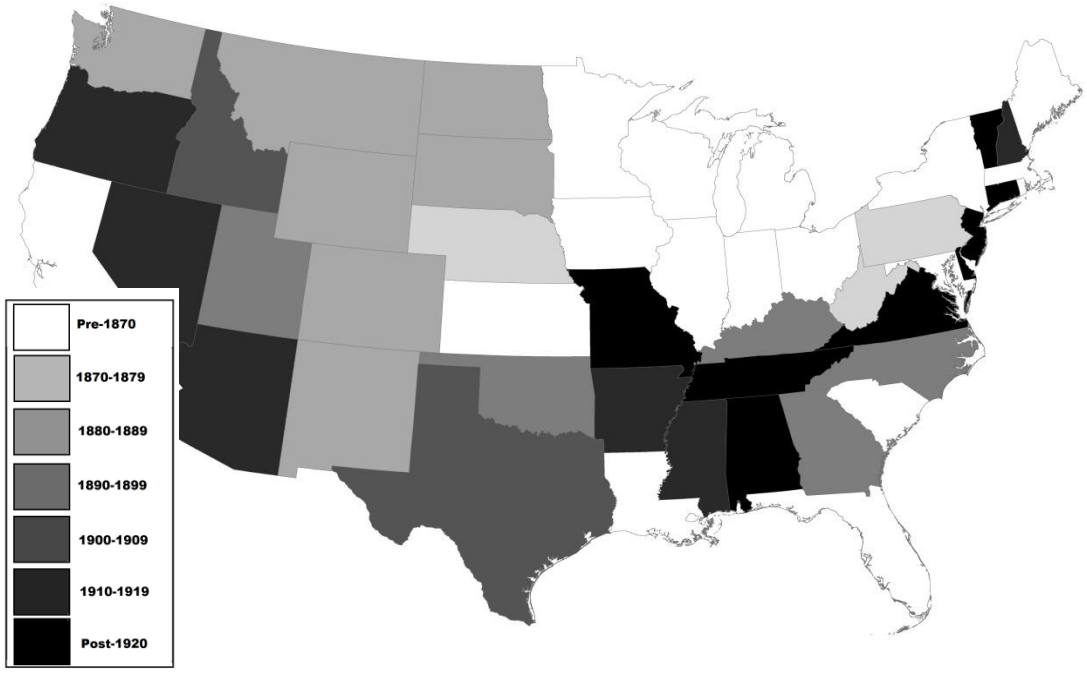
Figures on each state's total population as well as the fractions living in an urban area and that were non-white are from census data assembled by Haines (2004).

Figure 1: Number of Banks and Ratio of Deposits to Circulation, 1820-1910

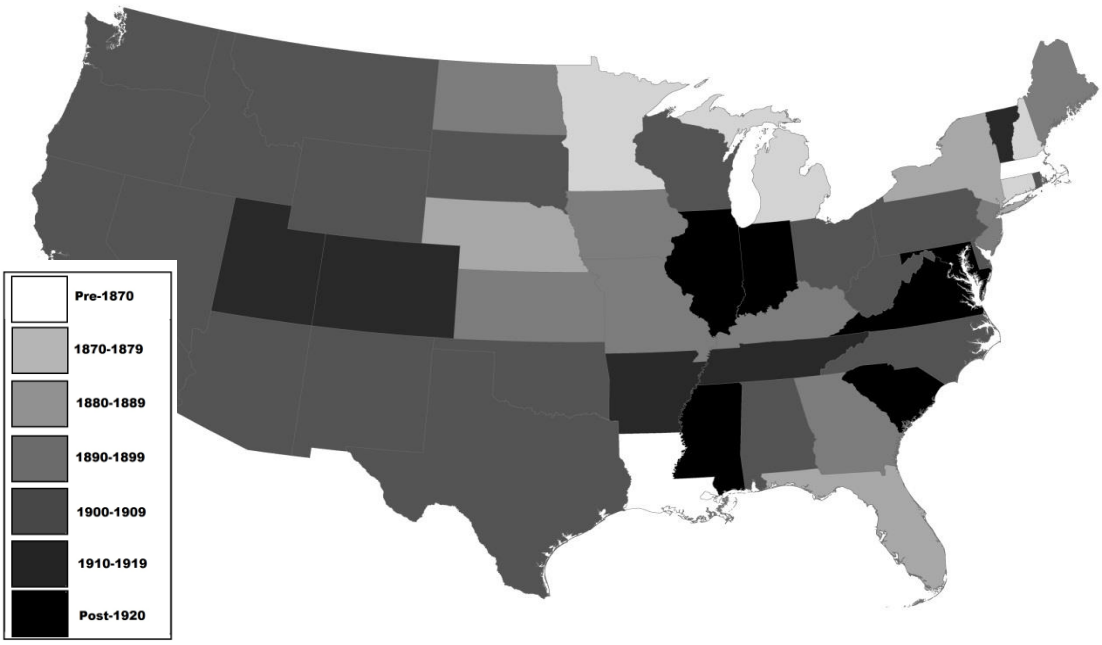


Notes: Number of state banks and the ratio of individual deposits to notes in circulation are from Weber (2005, 2008). The number of state and national banks and ratio of deposits to notes after 1870 come from the Annual Report of the Comptroller of the Currency.

Figure 2: Dates of Double Liability and Reserve Requirements
Panel A: Decade When Double Liability First Installed

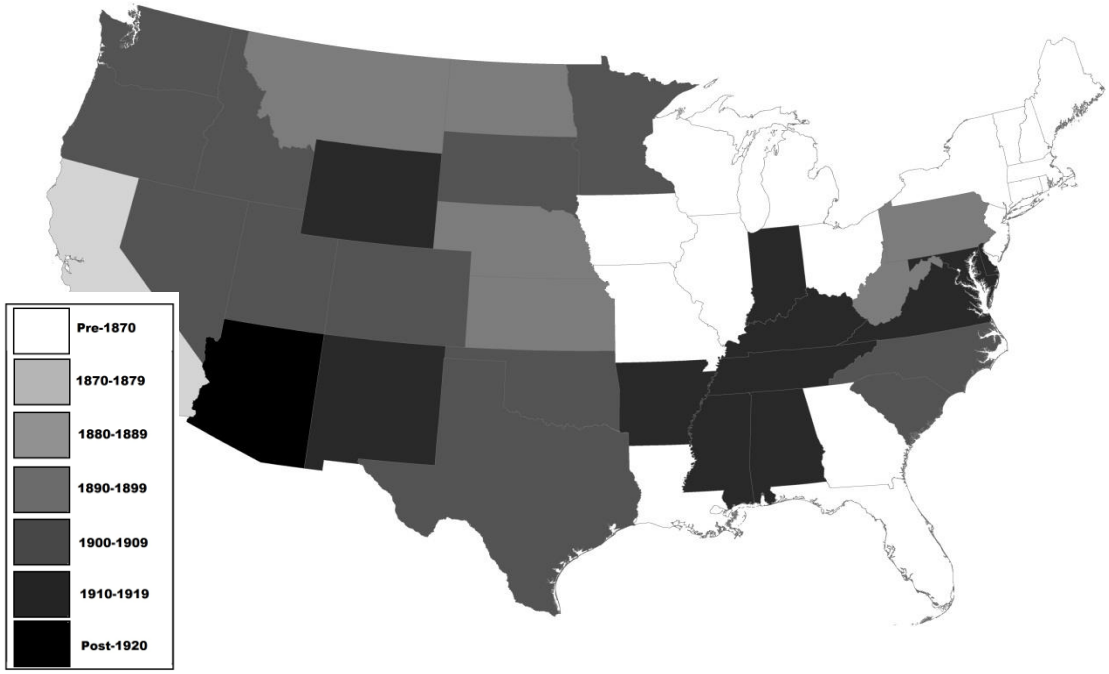


Panel B: Decade When Reserve Requirements First Installed

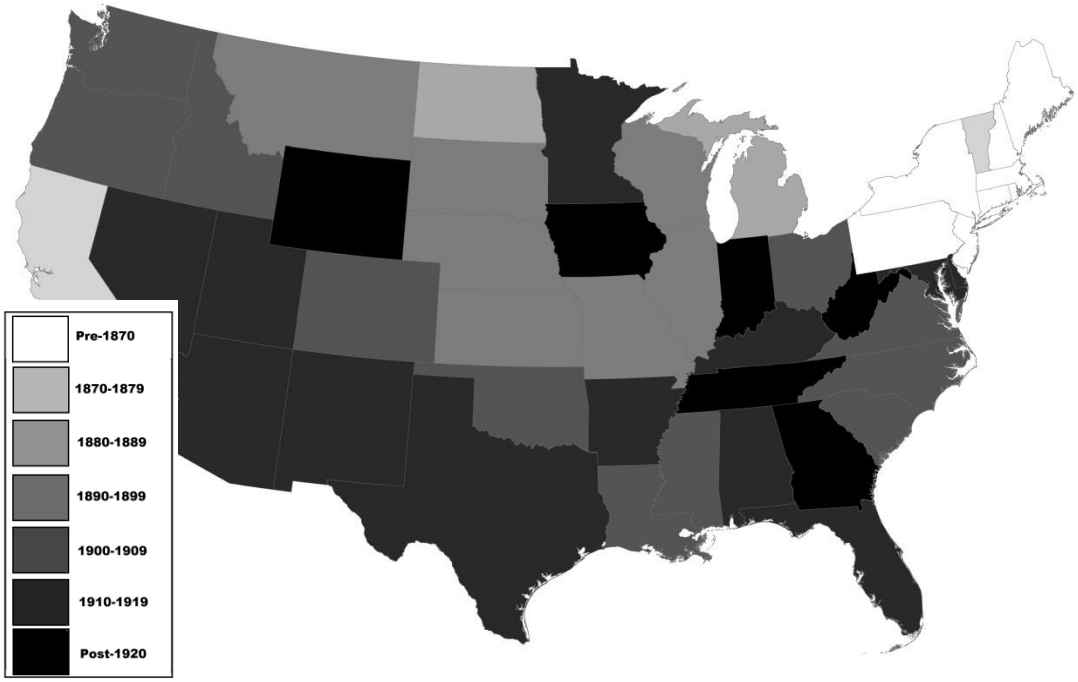


Notes: See data appendix for sources.

Figure 3: The Evolution of State Bank Supervision
Panel A: Year State Banking Department Authorized

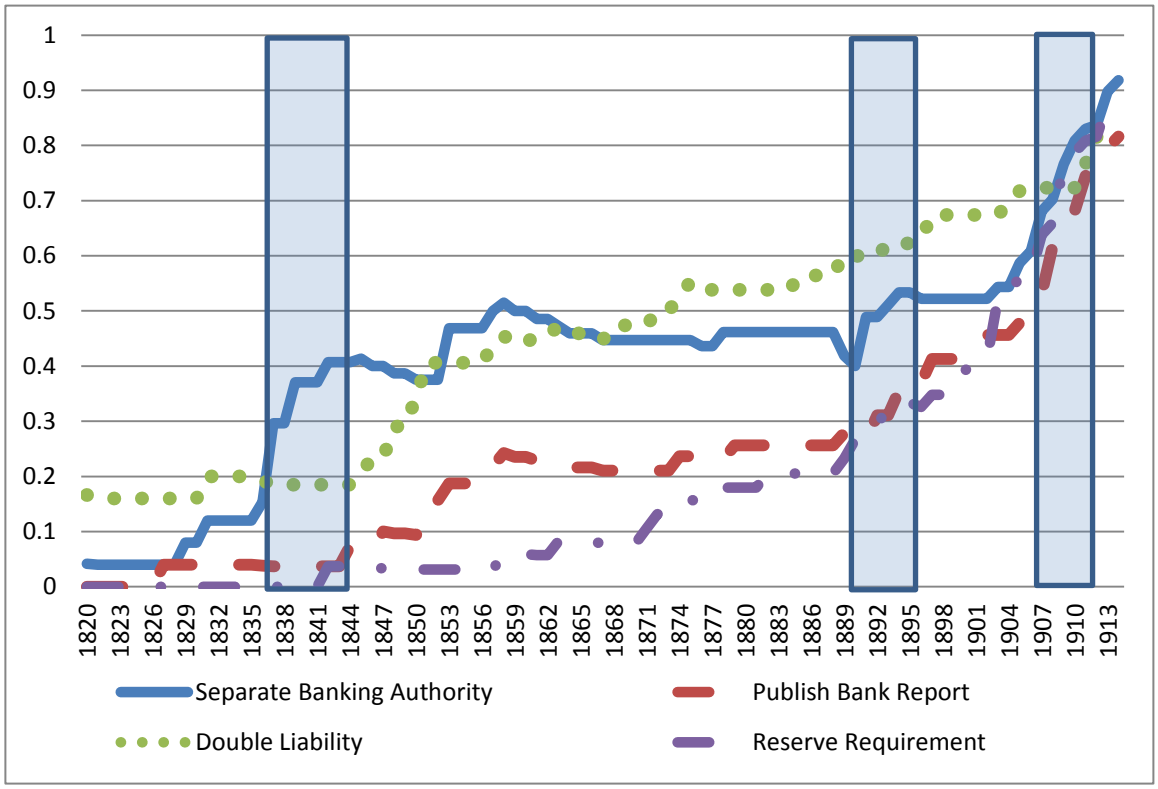


Panel B: Year When Department Began Publishing Report on State Banks



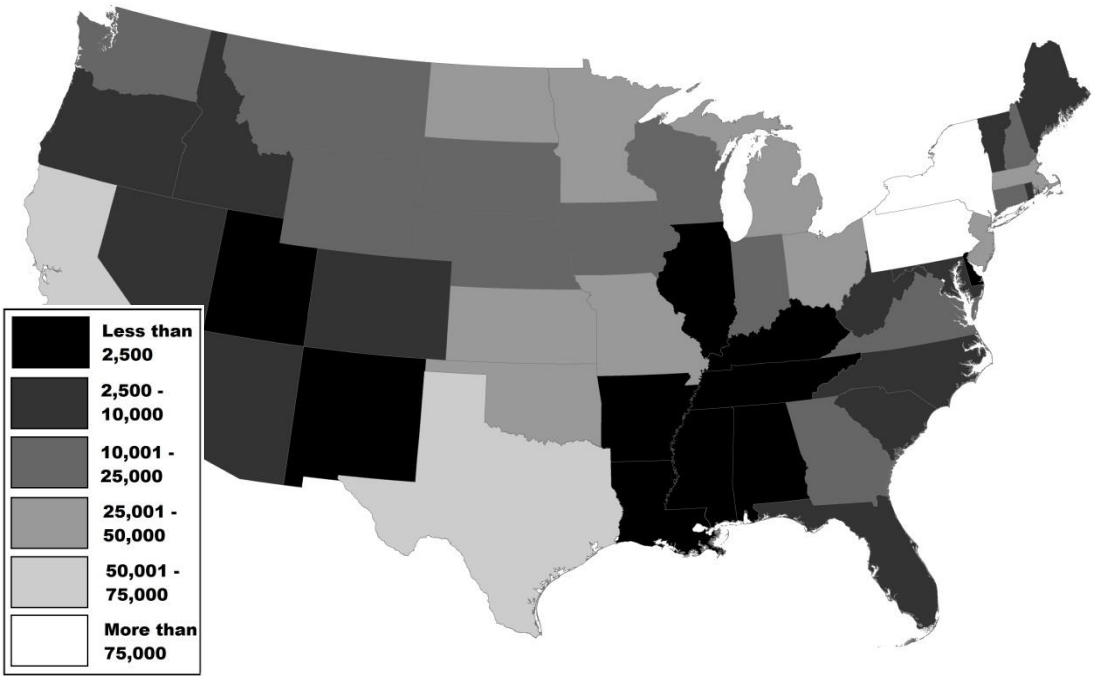
Notes: See data appendix for sources.

Figure 4: Adoption Rates for State Bank Supervision and Regulation, 1820-1914 (Fraction of Existing States)

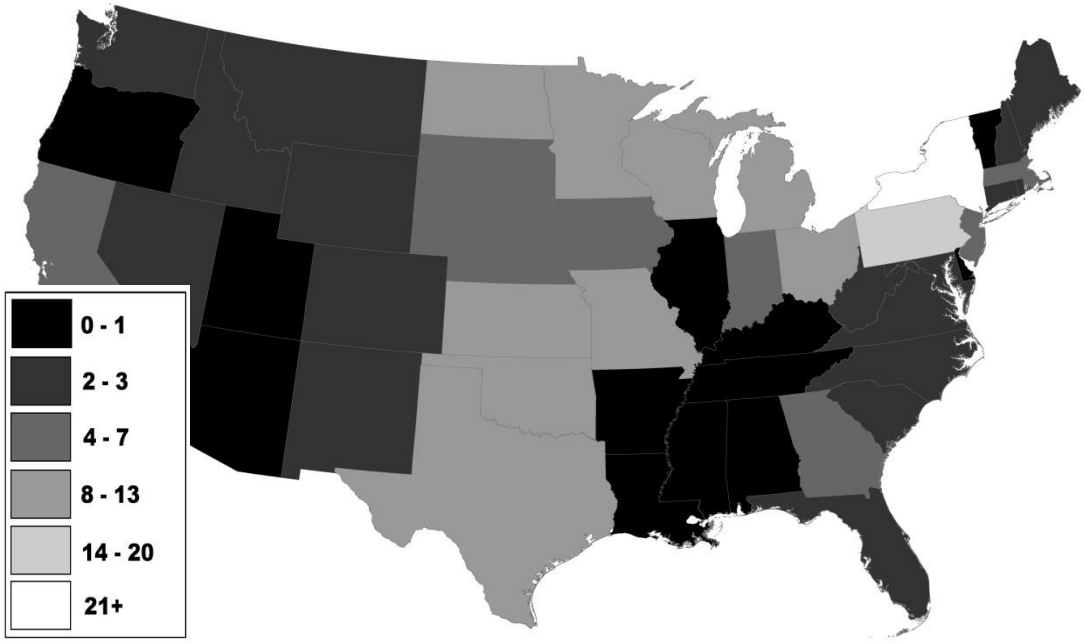


Notes: See data appendix for sources. Shaded areas mark the three main panic periods: 1837/1839, 1890/1893, and 1907. Since territories did not install regulation and supervision, the creation of new states from them results in reductions in adoption rates.

Figure 5: Quality of State Bank Supervision in 1911
Panel A: Total Expenses Spent on Bank Supervision



Panel B: Number of Bank Examiners



Notes: See data appendix for sources. No data exists for Alabama, Illinois, and Louisiana because the Comptroller did not report data on their supervision.

Table 1: Explaining the Adoption of an Independent State Banking Authority, 1820-1910

	1820-1860		1870-1910		1820-1910	
	(1)	(2)	(3)	(4)	(5)	(6)
State Bank Entry	-0.006	-0.013	-0.146***	-0.145***	-0.044	-0.039
Per 100,000 People	[0.058]	[0.081]	[0.043]	[0.036]	[0.035]	[0.036]
National Bank Entry			0.457***	0.424***	0.178*	0.180*
Per 100,000 People			[0.083]	[0.083]	[0.095]	[0.106]
State Bank Closure	0.177**	0.179*	0.251**	0.199**	0.229***	0.236***
Per 100,000 People	[0.078]	[0.092]	[0.124]	[0.089]	[0.067]	[0.069]
National Bank Closure			-0.256	0.023	-0.531**	-0.531*
Per 100,000 People			[0.389]	[0.346]	[0.269]	[0.272]
Circulation/Deposits*100	-0.001	0.001	-0.317***	-0.377***	0.001	0.001
	[0.001]	[0.001]	[0.057]	[0.093]	[0.001]	[0.001]
Free Bank Law	0.153	0.267	-2.290*	-2.440**	-1.548	-1.625
Dummy	[4.577]	[3.531]	[1.183]	[0.956]	[1.041]	[1.340]
Double Liability	1.600***	1.638**	2.657***	3.473***	2.438***	2.489***
	[0.538]	[0.694]	[0.611]	[1.319]	[0.477]	[0.491]
Log of State Population		-0.183		-0.642		0.102
(lagged)		[0.389]		[0.501]		[0.261]
Percent Urban (lagged)		-0.357		-0.061		-0.516
		[4.244]		[1.744]		[1.713]
Percent Non-White		5.629**		-1.170		-1.843
(lagged)		[2.796]		[1.646]		[1.724]
Year Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Region Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes
Observations	85	85	113	113	198	198
R-squared	0.335	0.352	0.377	0.388	0.324	0.328

Notes: Estimates are based on cox proportional hazard model, where the dependent variable is a dummy denoting whether the state had created a state banking department in that decade. Observations are defined at the state-decade level. The panel is unbalanced since new states are allowed to enter the sample when they are created, but their inclusion does not significantly bias the coefficients. State-decade observations before a state gained its first bank are not included. Region fixed effects are included in all specifications. Robust standard errors appear in brackets beneath the coefficients. *, **, and *** denote statistical significance at ten-percent, five-percent, and one-percent levels, respectively.

Table 2: Explaining the Publication of Banking Reports, 1820-1910

	1870-1910		1820-1910	
	(1)	(2)	(3)	(4)
State Bank Entry	-0.774	-1.504	1.357	1.716
Per 100,000 People	[5.287]	[6.097]	[3.286]	[3.764]
National Bank Entry	3.248	7.903	-3.038	-3.687
Per 100,000 People	[11.599]	[12.050]	[8.525]	[8.799]
State Bank Closure	2.533	7.540	8.806	12.615
Per 100,000 People	[10.700]	[12.227]	[7.483]	[8.219]
National Bank Closure	36.266	41.686	25.105*	22.616
Per 100,000 People	[26.193]	[30.715]	[12.924]	[15.058]
Circulation/Deposits*100	-0.301***	-0.336***	-0.001	-0.001
	[0.089]	[0.097]	[0.002]	[0.003]
Free Bank Law Dummy	-2.111**	-2.027**	-1.187**	-1.493***
	[0.855]	[0.988]	[0.476]	[0.439]
Separate Bank Authority	1.966***	2.015***	2.215***	2.177***
	[0.613]	[0.681]	[0.751]	[0.829]
Double Liability	1.448**	1.376**	0.572	0.893*
	[0.698]	[0.647]	[0.481]	[0.484]
Log of State Population		0.640		0.389
(lagged)		[0.407]		[0.330]
Percent Urban (lagged)		0.038		-2.009
		[2.432]		[1.824]
Percent Non-White		-0.056		-1.847
(lagged)		[2.009]		[1.903]
Year Fixed Effects?	Yes	Yes	Yes	Yes
Region Fixed Effects?	Yes	Yes	Yes	Yes
Observations	142	142	246	246
R-squared	0.379	0.388	0.461	0.477

Notes: Estimates are based on Cox Proportional Hazard Model, where the dependent variable is a dummy denoting whether the state began publishing a separate bank report in that decade. Observations are defined at the state-decade level. The panel is unbalanced since new states are allowed to enter the sample when they are created, but their inclusion does not significantly bias the coefficients. We drop observations before a state gained its first bank. Region fixed effects are included in all specifications. Robust standard errors appear in brackets beneath the coefficients. *, **, and *** denote statistical significance at ten percent, five percent, and one percent levels, respectively.

Table 3: Explaining the Level of Bank Supervision in 1911

	Ln(Supervision Expenses)				Ln(Examinations in Year)				# of Bank Examiners	
	Total		Per State Bank		Total		Per State Bank			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Separate Banking Authority in 1910	3.896***		1.541***		2.524***		0.332**		0.090	
	[1.116]		[0.437]		[0.797]		[0.152]		[1.506]	
Double Liability in 1910	1.063		0.274		1.202**		0.259*		1.711	
	[0.709]		[0.313]		[0.505]		[0.137]		[1.639]	
Years with Separate Banking Authority		0.034**		0.017***		0.018*		0.003		0.009
		[0.015]		[0.006]		[0.011]		[0.003]		[0.024]
Years with Double Liability		0.020**		0.007		0.018**		0.003		0.027
		[0.010]		[0.004]		[0.008]		[0.002]		[0.022]
State Banks in 1910 Per 100,000 People	-0.043	-0.005	-0.036**	-0.022	0.005	0.032	-0.002	0.001	-0.016	-0.003
	[0.032]	[0.039]	[0.015]	[0.017]	[0.024]	[0.031]	[0.007]	[0.008]	[0.053]	[0.053]
National Banks in 1910 Per 100,000	0.260**	0.348**	0.153***	0.188***	0.091	0.158	0.024	0.037	0.424**	0.478**
	[0.105]	[0.137]	[0.048]	[0.056]	[0.078]	[0.106]	[0.025]	[0.028]	[0.183]	[0.194]
Circulation/Deposits*100	-0.032	-0.006	-0.023	-0.016	-0.057	-0.038	-0.022	-0.022	-0.384	-0.378
	[0.095]	[0.122]	[0.042]	[0.050]	[0.076]	[0.101]	[0.025]	[0.029]	[0.235]	[0.254]
Free Bank Law Dummy	-0.244	-0.758	-0.045	-0.288	0.061	-0.224	0.089	0.049	0.695	0.511
	[0.681]	[1.078]	[0.309]	[0.448]	[0.632]	[0.910]	[0.208]	[0.240]	[1.438]	[1.520]
Log of Total Population in 1910	-0.009	0.751*	-0.415**	-0.135	0.788**	1.376***	0.075	0.177	3.562***	3.920***
	[0.363]	[0.396]	[0.179]	[0.197]	[0.305]	[0.422]	[0.113]	[0.136]	[1.094]	[1.200]
Percent Urban in 1910	5.603**	6.661**	3.771***	4.168***	2.106	2.656	0.834	0.826	2.015	1.486
	[2.066]	[2.450]	[1.051]	[1.146]	[1.510]	[2.199]	[0.553]	[0.621]	[4.470]	[4.464]
Percent Non-White in 1910	5.970	5.343	2.745	2.494	3.634	3.052	0.602	0.454	3.113	2.158
	[4.718]	[8.050]	[1.872]	[3.050]	[3.089]	[5.449]	[0.510]	[0.827]	[3.918]	[4.292]
Region Fixed Effects?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	45	45	45	45	45	45	45	45	45	45
R-squared	0.733	0.538	0.813	0.731	0.737	0.569	0.499	0.420	0.636	0.639

Notes: Estimates are based on OLS regressions, where the dependent variables are listed in the column heading. Observations are defined at the state level. Region fixed effects are included in all specifications. Robust standard errors appear in brackets beneath the coefficients. *, **, and *** denote statistical significance at ten percent, five percent, and one percent levels, respectively. Alabama, Illinois, and Louisiana are not included in the sample because the Comptroller did not report data on their supervisory practices.